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WATER SUPPLY AFRICA

New water resources development service

More reliable supplies of safe water ıld soon be on tap for rural third world communities following the formation of "Keywater", a comprehensive water resources development service now available from a consortium of major international companies headed by the Keywater division of British-based Hawker Siddeley Power Plant Ltd., man ·.acturers and suppliers of diesel powered generating sets.

Keywater's turnkey service is specifically tailored to the development of ground water resources for isolated communities in Africa, the Middle East, Indian subcontinent, South-East Asia, Central and South America. Operating in association with companies who have wide-ranging experience of overseas development projects, Keywater offers a total turnkey water package for the first time. The package covers all areas of water resources development from hydro-geological studies to the supply and installation of all necessary mechanical and electrical equipment, training for local operatives and worldwide after sales back up service.

A typical project could include: surveys and project planning; well drilling and testing by mobile plant; the provision and installation of linings and screens, submersible pumps, diesel generators and all ancilliary control equipment, reticulation pipework and storage tanks. Alternative power sources such as wind turbines or solar panels can be supplied, as can modularised systems for easy transportation and installation. Installation and commissioning will be supervised by qualified staff to ensure the project will operate correctly and to its design capability. After sales service will include training of local operatives with particular emphasis on plant maintenance. A world-wide spare parts and service organisation is part of the overall Keywater package.

Djibouti credits

Credits totalling $13.8m have been approved by the African Development Bank:

1. for the financing of a sewerage and irrigation project in Djibouti involving the construction of a main collector with two pumping stations and a treatment plant capable of handling approx. 4,000m³ a day;
2. for the rehabilitation of the water supply in the town of Djibouti and Dikhil.



Over 400 diesel-driven alternators are now installed and running in Nigeria, providing the power source for numerous ground water schemes implemented by "Keywater".

Zimbabwe order to Swedish company

Well Drill Systems AB, a member of Swedyards Corporation, Gothenburg, Sweden, has recently signed a contract with DDF (District Development Fund), Zimbabwe, representing about $2,630,000.

The order includes supply of drillrigs, equipment, handpumps, supervision, training and start-up service.

WellDrill's products are designed for the slim hole technique.Calculations show that the quantity of water obtained from a well does not increase in proportion to the well's diameter. For drilling slim holes (4½in or smaller) a small drilling machine will do. The WellDrill LWD-200, a lightweight, trailer or truckmounted drilling rig, is less than half the size of a standard DTH-model.

An entirely new water pump, the WellDrill Hand Pump, complements the drilling rigs. This pump has no pistons, which eliminates the need to replace seals at regular intervals. Instead of the piston a stretchable wire-reinforced rubber tube is used to bring the water up to the surface. The pump is virtually maintenance-free as well as easy to install, operate and maintain; the only tools needed are a pair of wrenches.

Kwara state project

Kwara State Water Corporation's $214m water supply project is to get under way at the end of this year. The project involves the supply of water to 60 different places through 500mk of pipeline, installing 700 pumps and up to 500 boreholes.

Finance has come from two loans, raised by UK Mercant Bank, Morgan Grenfell from its own capital and from the National Westminster Bank (UK), Williams and Glyn's Bank (UK), Clydesdale Bank (UK) and Credit Lyonnais (France).

The loans are backed by the UK Export Credit Guarantee Department.

continued on page 41

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Date: January 9, 1989

To: Mr. J. Daniel Gubler, Program Officer, INUWS

From: Saul Arlosoroff, Program Officer, INUWS

Ext.: 3-5557

Subject: Terms of Reference: Africa Regional Symposium on Infrastructure Strategies

1. On January 10, 1989, you will travel to Baltimore, MD., to attend selected sessions of the Africa Regional Symposium on Infrastructure Strategies for Growth, organized by AFTIN.

2. After your return to Washington, you will brief me on the main outcomes of the Symposium.

cc: Messrs. C. Carnemark, D. Grey, W. Barreiro, A. Samuelson, B. Gross (INUWS)

JDG:dr

wp5:baltor

Inga Krugmann-Randolf

Africa Needs Money and Patience

DSE Reviews Progress on Africa's Recovery Programme

"We don't want constant handouts of fish . . . what we want is fishing tackle," said Badel Ndanga Ndinga, State Secretary at the Planning Ministry of Cameroon. Put in a nutshell, the general consensus of the Africans was: "We don't want to be left alone with our reform policies, especially when prices for our export goods keep falling to the point where our own efforts and the plans we carefully hammered out with the IMF and the World Bank are stripped of the premises on which they rest." After two-and-a-half days of frank discussions in the "Spirit of Berlin," Jean Ripert, UN Director-General for Development and International Economic Cooperation, concluded: "What is needed now is for the international community to come up with some concepts to prevent the market from constantly working against the commodity suppliers."

Two years after the 13th Special Session of the UN General Assembly adopted the UN Programme of Action for African Economic Recovery and Development 1986–1990 (UNPAAERD), the Development Policy Forum of the DSE held an International Round Table in Berlin from 19 to 22 June 1988 to help draft a mid-term review. The theme was "A Common Effort for the Implementation of UNPAAERD: Lessons and Perspectives".

This exchange of experiences on a high political level was all the more frank because each delegate attended and spoke as an expert and not as the representative of his government or organization. The restructuring measures that have so far been initiated by the African governments and the international community's contribution and support of this efforts were evaluated and perspectives for the second half-term of the Action Programme were outlined. With its Berlin Round Table, the Development Policy Forum of the DSE contributed to the implementation of UNPAAERD. The first step was the Ministers' Round Table on Food Security in Africa held in Berlin in January 1987 (see D+C 2/1987). In a third step, the results of these meetings of the DSE Forum will be incorporated in the report that UN Secretary-General Pérez de Cuéllar will present to the UN General Assembly in September 1988 when it will review the mid-term success of the Action Programme for Africa. For the participants, Berlin was more than just a way-station; it was a milestone en route to New York.

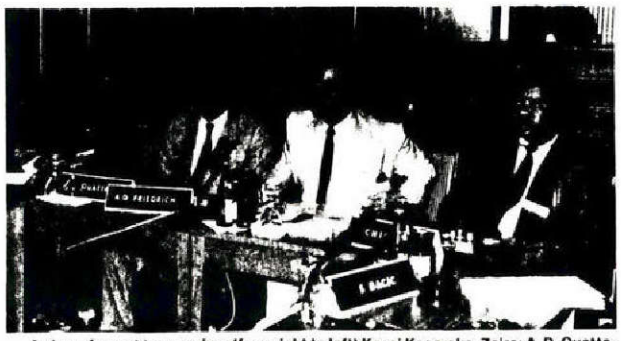
High-ranking participants

The 80 experts included four African cabinet ministers (from the Ivory Coast, Mali, Zambia and Zaire) who presided over the four working sessions. Among the top UN officials who attended were Jean Ripert, UN Director-General for Development and International Economic Cooperation; Adebayo Adedeji, Executive Secretary of the UN Economic Commission for Africa (ECA); Ambassador Ahmed Haggag, Deputy Secretary-General of the Organization of African Unity (OAU); Yves Berthelot, Deputy Secretary-General of the UN Conference on Trade and Development (UNCTAD); Dieter Frisch, Director-General at the EC Commission, and Alassane D. Ouattara, Director of the Africa Department of the IMF.

In his address, Dr. Volkmar Köhler, Parliamentary State Secretary at the Federal Ministry for Economic Cooperation, stressed the priority given to Africa in the Federal Government's development policy. About DM 2.7 billion (or 42 per cent) of annual development aid goes to Black Africa. With 94.2 per cent, the concessionary element of the aid significantly exceeds OECD guidelines. The Federal Government announced in Bonn on 9 June and at the Toronto economic summit that it would cancel debts totalling DM 2.2 billion of six African countries (Mozambique, Madagascar, Zaire, Senegal, Ghana and Zambia). Furthermore, Bonn intends to relinquish its claim to DM 86 million worth of residual debts owed by the Central African Republic, Guinea, Sierra Leone, Togo and the Sudan. It will also waive the repayment of about DM 850 million by Burma and Mauretania, both of which were recently classified as LDCs.

Supported by the international community, 30 African states have already begun to carry out economic reforms; but there is as yet no indication of an economic and social change of trend. Export earnings continue to decline (by 29 per cent in 1985-86) while debts keep mounting.

The statements made by the delegates and what they said in the course of the discussions in Berlin signified not only the present (deplorable) situation in various African countries; they also highlighted what Africa itself must do and what outside help is needed to come as close as possible to the targets set by the Action Programme. What it amounted to was a clarification process based on real conditions. There was no optimistic lip-service, and the objectives to be achieved were de-emphasized in favour of ways and means of achieving them. The conferees had already progressed from the "what" to the "how", as the Mayor of Berlin (West), Dr. Hanna-Renate Laurien, put it at a reception at the Charlottenburg Palace. And a German government official said that "this dialogue between developing and industrialized nations has acquired new substance and a new style. It is no longer a litany of one accusation after the other heaped upon the international community, which ultimately only serves to make even those from whom help should come turn a deaf ear. Instead, it is a realistic analysis of the situation, its causes and the efforts that both sides must make to remedy it. This generates helpfulness." The "Spirit of Berlin" is to be carried to New York and it is in this spirit that the work must continue.



A view of a working session: (from right to left) Kasai Kasereka, Zaire; A. D. Ouattara, IMF; Dr. A. G. Friedrich, Development Policy Forum, DSE; Gibson G. Chigaga, Zambia.
Photos: Leib

Another thing that transpired in the discussion was the realistic awareness of the interdependence of various factors. There is, for instance, the fact that food security cannot be achieved only by production incentives like higher producer prices for farmers. It also requires a marketing system, roads and adequate means of transportation from the production areas to the cities, storage facilities, experts, etc. In other words, a variety of interlinked and carefully coordinated measures is a prerequisite of success. The reports from 11 African countries highlighted this time and again. The fundamental problems of the African states are:

- Declining export earnings;
- Shortage of capital: the money needed for reforms goes into debt servicing;
- Population growth;
- Inadequate food security;
- Environmental damage.

Lessons from experiences

The summary of experiences made in implementing UNPAAERD essentially amounts to a list of obstacles that bar the way to success:

- Many more countries than anticipated are still preoccupied with sheer survival, which saps the energy needed to carry out long-term reforms.
- The ineffectiveness of public administrations hampers reforms.
- It is hard enough to arrive at decisions; but it is even harder to see them through when they spell social hardship ("If I did that my power base would be at stake"). This is particularly true when the key data on which the decisions are based worsen. For instance: if export prices tumble and the improvements promised to the public fail to materialize.
- The implementation pace of adjustment programmes should be reduced to ease social hardships (like cutbacks in the public service, cuts in state expenditures, higher food costs, etc.).
- Many countries are in the process of instituting reforms. According to the OAU, 30 African nations have already introduced sweeping reforms and 40 have launched food security programmes. But it is hard to arrive at a correct assessment of the results because of inadequate statistics and the difficulty of pinpointing which causality factors are responsible for which developments.
- It is true that the restructuring of the price system for agricultural products has boosted production; but in some instances these products cannot compete on world markets because of high African production costs on the one hand and cheap supplies from the EC and North America on the other. For instance: The Ivory Coast has doubled its cocoa and coffee output, but the price the state pays to the cocoa planters is twice the world market price. Some 800,000 tons of cocoa – about half the annual consumption – are currently stockpiled world-wide.

Dieter Frisch of the EC Commission regards liberalization as sensible in principle; but he holds that total liberalization would spell the end for local producers in some countries. He therefore suggests a pragmatic transition period in which small barriers against cheap imports should be permissible.

Sharp differences of view transpired in the assessment of financial issues. While the Africans concerned appreciated the waiving of their debts by many industrialized nations, they deplored the fact that too much of the urgently needed money is siphoned out of Africa through the servicing of bank loans. They also deplored the fact that many industrialized nations have not yet honoured the commitments they made at the 13th UN Special Assembly. ECA Executive Secretary Adedeji pointed to Africa's foreign exchange losses due to declining commodity prices: "For every dollar of financial aid that finds its way to Africa, we lose two to three dollars." Alassane Ouattara of the IMF replied that figures



ECA Executive Secretary Adebayo Adedeji

covering a two-year period provided a lopsided picture. Over a period of more than two decades, he said the inflow of money into Africa exceeded the outflow. Debtors who find the adjustment policy tiresome, he said, should consider the interests of the other party to the deal; in other words, the fact that the creditor finds unpaid loans equally tiresome.

Worries of the threshold countries

The assistance measures are essentially targeted on the poorest countries, the LDCs. But the position of countries with a medium income, like Nigeria or the Ivory Coast, has also worsened due to the erosion of oil and other raw materials prices. The Ivory Coast Finance Minister, Moise K. Koumoué, said in an appeal to the participants: "The attitude was 'they're not sick enough to die, so let's look after those who are even worse off'. But the international community must also concern itself with the suffering of the countries with a medium income to prevent their strength from being sapped still further."

The fact that predictable export earnings are crucial to development prospects was stressed again and again in Berlin. Said Ndanga Ndinga of Cameroon's Planning Ministry: "Despite our own efforts and structural adjustment measures, the limits of the economic recovery process are evident. We cannot get anywhere without outside help. Technical assistance and the rescheduling of debts provide only spotty or temporary relief. What matters most and what we really need is for the international community to help stabilize commodity prices." ■

18

Sociology, Staff Time, and Resource Management

by Scott Guggenheim

Does the Bank make the best use of staff time? Should staff allocation for different phases of the project cycle be changed? Are current approaches the right ones for improving the ways farmers manage natural resources? These were some of the questions asked during a recent roundtable on sociological aspects of natural resource management. The event was organized by the Sociology Adviser in AGR and the Training Division of Personnel.

The authors and editors of a recent anthropology book, *Lands at Risk in the Third World*, were invited to meet with Bank staff to discuss the key findings and recommendations from their studies. The book analyzes the social causes of resource abuse. *Lands at Risk* puts forward the simple suggestion that much of what passes for natural resource deterioration is not a physical but a *social* and *cultural* problem. Explaining *why* people mismanage the environment lies at the heart of programs to help manage it better.

Mistaken assumption

The book demonstrates that too often projects have tried to change individual behaviors without understanding the sociocultural structures and constraints within which rural people must manage their resources. Resource management is rarely a simple question of the environment alone; it must also deal with patterns of social organization, community structures, land tenure and sophisticated farming systems. Successful projects combine an understanding of the macroeconomic factors pressing upon the environment with a feel for the complexities of any particular project area. Assumptions about labor availability, institutional effectiveness, local conflict, and so on must constantly be field tested and revised to reflect a changing social reality. As Kevin Cleaver, AF1 Division Chief and a Bank commentator for the roundtable, pointed out, "For African agricultural projects, every mistaken assumption about rural society has translated into a failed project."

Straightforward enough. Now, how can the Bank develop projects that take due account of these sociological factors? Enter the Cohen curve, brainchild of another Bank commentator, Europe, Middle East & North Africa Division Chief Michael Cohen.

The Cohen curve states that if current project work patterns are graphed, the single largest segment in the staff time-use parabola is the time spent for appraisal. If, as the book suggests they should, projects try to respond more closely to local sociocultural circumstance, especially in countries which may not yet have the staff or experience to run large-scale, decentralized programs, staff will have to spend much more time first preparing and subsequently supervising projects. The parabolic curve thus flattens, and in some cases it would even invert.

Serious commitment

EMENA Vice President Wilfried Thalwitz endorsed Mr. Cohen's statement that a serious commitment to socially sound projects in the reorganized Bank demands a new approach to how projects are conceived and executed. He drove home the point that, just as it makes no economic sense to build the technically perfect project that loses money, it makes no sense to design for an economic optimum that people will not be socially capable of carrying out or using. He referred to two projects in Sub-Saharan Africa. "One was in Eastern Senegal," he said, "and the other in Burkina Faso. In the Senegalese project, development was in the hands of grazing associations established with Bank support. Pasture management was based on two or three villages grouped together based on sociocultural affinity. Basically, we helped them do what they knew how to do best. It ended up a rather successful project.

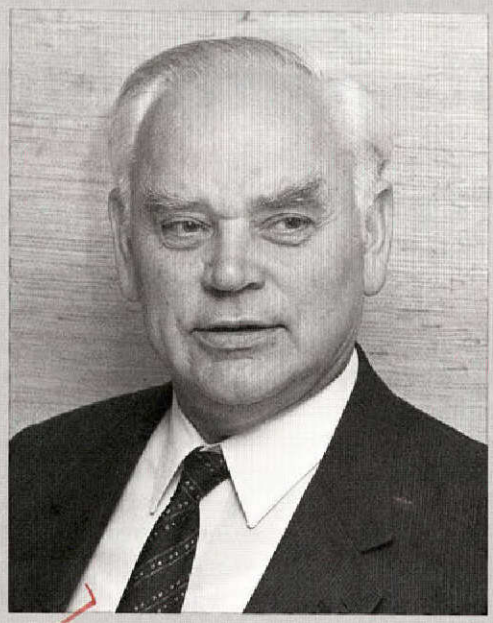
"By contrast, the Burkina project was based on a technically great idea: organized ranches and feedlots so that the cattle would fatten faster. There is not one iota of doubt that technically the Burkina project was by far the more sophisticated of the two. However, what we had not sufficiently appreciated was that herders would refuse to hand over their cattle to managers. In the end, even though the Senegal project was more modest, it produced something durable and environmentally effective, whereas the Burkina livestock improvement project turned into a problem project."

Complementarity

Two main issues summed up the themes of the roundtable. The first is that there is clearly a great deal of room for more thought about ways the Bank deploys its staff resources for different project stages. Projects that depend on decentralized management and extensive local participation require substantially different distributions of staff time. The second theme is that rural projects must have a better grasp of how farmers think, act, and organize. Without this complementarity between project design and social organization, the best we can hope for are short-term gains that end when the project closes.

Editor's note: Scott Guggenheim is an anthropologist consulting for the Agriculture and Rural Development Department.

Training and Management for Leadership



Willi Wapenhans

Willi Wapenhans, Senior Vice President, External Affairs and Administration, spoke before the Colloquium on Berlin Universities' Contribution to the Advanced Training of Personnel from the Developing Countries on September 30. Here are excerpts from his address:

Human resource development" is a phrase that captures the vast array of education and training efforts under way throughout the world.

Despite impressive accomplishments in economic and social development over the past decades, these remain trying times in the Third World. In some regions and a number of nations, natural and financial resources are stretched beyond their limits.

Severe resource constraints and pressing needs for qualitative and quantitative improvements at every educational level force strategists and Third World leaders to focus their energies on the central question of how to get the highest return from every dollar invested in education and training.

In particular, we must ask how best to train and develop leadership cadres and management personnel. Are the heavy per pupil costs of full-fledged universities reasonable burdens for developing countries to bear? Should such countries cultivate fewer abstract thinkers and more skilled development technicians? How can Third World educational planners effect a better match between skills that are taught and those their societies urgently need?

Balance and *complementarity* are the twin pillars of enlightened human resource development. The nature and effectiveness of education and training programs depend on how they meet the requirements of societies and economies at different levels of evolution and development.

Regardless of the stage of development, knowledge and its dissemination shape society, focus its value system and determine its welfare. In turn, society determines the importance its members place on education and training. Julius Nyerere, the former president of Tanzania, once told me: "Literate people may be poor, but illiterate people will never be rich."

Countries will have to design their own specific human resource development policies. Although the emphases will differ, three priorities are almost universal:

—improving the access to and quality of primary education;

—expanding and improving science and technology education;

—developing effective skills training systems.

First, education is a basic human need. Almost 40 years ago, in December 1948, the United Nations adopted its *Universal Declaration of Human Rights*. Article 26 states succinctly: "Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages.... Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit."

Second, education helps meet other basic needs. Education influences and is in turn influenced by access to other basics.

Third, education underpins and accelerates development at many levels. It prepares and trains the work force to manage capital, technology, services and administration in every sector of the economy. The effects of education are far more pronounced in a modernizing environment. Evidence suggests that a minimum threshold must be exceeded before education becomes economically useful. As experience is gained, further

Urgent, X x1 → DG DONE 42594

DG Your contribution is requested. They will come to meet us this week.

OFFICE MEMORANDUM

Date: April 21, 1988

To: DISTRIBUTION

From: Tauno K. Skytta

Extens. 34546

18

Subject: Rural Water Supply and Sanitation Strategy Review

Advisory Group Meeting

1. You will recall that in our first meeting last week we decided to discuss the consultants' draft report in the next meeting. As a result of valiant efforts by Simone Bazinet (AF5IN) and Lili Moreira (AFTIN) we have succeeded in having the extensive draft report typed - their effort is much appreciated. However, following from discussions held by the consultants with you and a number of other sector professionals, it was realized that the initial draft report is not yet complete enough to form a meaningful basis for elaborate review and discussion. It will now be circulated next week.

2. While drafting of the report continues, I have asked the consultants to prepare a **Summary Discussion Paper** to outline their findings and preliminary conclusions and recommendations. A copy of this summary paper is attached for your review. I suggest that the paper would be the basis of discussion at tomorrow's meeting.

3. Let me take this opportunity to remind you that the meeting of the Advisory Group will take place at 10:30 am on Friday, April 22, 1988 in Room J7-018.

Distribution: Locussol, Verspyck (AF1IN), Kleiner, Almassy (AF2IN), Grimes, Tenaille (AF3IN), Patterson (AF4IN), vanBeuzekom, Reedy (AF5IN), Aikins-

Afful (AF6IN), Ah-Sue, Andersen, Calegari, Hewitt (AFTIN), Woods (AFTPN), Samuelson, Wright, Boydell (INUWS), Yletyinen, Vikman, consultants (AFTIN).

cc: Doyen o/r (AFTIN), AFINF Division Chiefs, Carnemark, Arlosoroff, Zavala (INUWS), Peberdy (AFTAG), vanNimmen (EDIUT).

RURAL WATER SUPPLY AND SANITATION STRATEGY REVIEW

DRAFT DISCUSSION PAPER

I. RECENT SECTOR DEVELOPMENT

1. In Sub-Saharan Africa, the progress in rural water supply and sanitation during the first half of the International Drinking Water Supply and Sanitation Decade has been much slower than expected. Although there is a slight increase in the coverage figures of improved services, the number of rural people without access to safe drinking water and adequate sanitation will increase from 220 million people in 1980 to 240 million people in 1990. In spite of external funds (about US$100 million per annum) allocated to the sub-sector, the provision of the new services does not meet the growth of the rural population. Furthermore, the existing facilities in many places are rapidly deteriorating due to poor maintenance.

2. Four scenarios are outlined in Table 1 to illustrate different development projections. The investment and recurrent costs of each scenario are presented in Table 2. It appears that the provision of improved services to an extent equal to the growth of rural population in the region would require over 4.5 billion dollars allocated to the sub-sector in 1990-2000.

3. One could question whether the progress could be accelerated by increasing the financial resources to the sub-sector. It seems, on the other hand, that the institutions in the sub-sector, are not capable of utilizing increased financial resources efficiently. Therefore, one could also question whether the recent progress could have been achieved with lower external support.

4. In general, rural people in the region appreciate the accessibility to a water source with only minor concern for the hygienic quality of the drinking water. The suppliers of the service, however, have emphasized the quality aspect. It seems, that many development programmes respond to needs that are not clearly recognized by the target population.

II. DEVELOPMENT CONSTRAINTS AND ISSUES

Introduction

5. Although constraints, issues and lessons of development of WSS and rural WSS sector in particular have been widely identified and reported; the governments and donor community have not considered them seriously enough in planning and implementation.

6. The present most serious constraint has been determined to be inadequate financing. However, it seems that this constraint, as well as most other constraints, are mainly symptoms from the basic constraint: institutional problems.

Institutional and Manpower Development Issues

7. Typically, central government WSS organizations can be characterized as fragmented, poorly organized and poorly managed but, the situation is very similar with most other institutions, too. Therefore, although improvements in institutional performance are possible, central government WSS services cannot be expected to achieve levels of efficiency much beyond those found in central government in general.

8. Modest reforms are not sufficient in rural WSS sector. A fundamental change is needed; a shift from exclusive reliance on the central government to decentralization and development of private services within the sector.

9. The institutional development within the rural WSS sector should be seen in a broader context. Too often institutional development concentrates on the development or strengthening of vertical sectoral organizations so that sectoral services could be delivered as easily as possible. In rural projects this leads to several vertical organizations experiencing all similar problems, wasting resources and remaining weak.

10. The institutional development in rural projects should enable the local community to start a development process leading to the capability to define priorities, make plans and implement its projects. Rural WSS should be seen as one of the sectors included in the development process. This kind of approach would have significant consequences to financing systems and project planning.

11. It is also evident that the international donor programs do not always give enough time to cope with institutional development which is a slow learning process requiring patience and time.

12. Manpower development in turn has often been portrayed as a separate element of a project, although it is closely interrelated with institutional development. This has led to problems in institutional development and sustainability as well as ineffective use of resources. The concept of trainer and instructor training should be widely introduced.

Cost Recovery

13. It appears that rural water supply and sanitation capital and recurrent expenditures cannot be met without considerable cost recovery from the users.

14. The biggest problem of cost recovery does not seem to be affordability and willingness of people to pay for services. Cost recovery is hampered by e.g. government/donor policies, inadequate institutional arrangement, and inappropriately designed projects as compared with felt needs.

Project Priorities, Project Design and Economic Issues

15. Often justification of investment decisions is on the basis that improved rural WSS facilities will lead to substantial improvements of health. This justification, however, can be challenged. The main arguments to this are complex mechnisms of transmission and prevention of diseases, as well as better cost-efficiency of PHC-services compared with WSS services.

16. The best measure of justification and priority for a WSS project might be demand for water supply services. Demand can be interpreted to exist, if people are willing to pay all the cost of services in the long-run, and operation, maintenance and renewal costs in the short-run.

17. In project design the human element often receives insufficient consideration. The projects are designed by technical, financial and economic specialists concentrating on respective issues and leaving the human dimension without due consideration and planning. In cases where project preparation staff have received training in human and institutional issues, the project they subsequently designed also showed a better balance between all dimensions leading to better sustainability.

Role of Public Sector

18. Dominance of public--normally central government-- sector has left very few opportunities to private sector to develop and market their services. In addition, massive expatriate input of bilateral projects with minor interest to collaborate with local firms has tended to lean in the same direction.

19. In rural water supply and sanitation, involvement of central government normally leads also to excessive costs, poor consideration of the priorities of local people and poor service level due to the budgetary limitations.

20. The only way out of the situation is decentralization of services and encouragement of small local companies to assume duties related to planning, implementation, operation and maintenance.

Appropriate Technology and Maintenance

21. Appropriate technology is not only a technical issue, but also a socio-economic and cultural issue. In addition, there are normally several options, and often justification, for the chosen preferred option compared with other options, has not been asked.

22. Practically all literature shows that maintenance has been poor leading to inefficient use of installed capacity or complete failure of investments. However, at the same time, it has often been forgotten that sufficient maintenance might lead to the bankruptcy of the government due to practically non-existent cost-recovery.

Financing

23. Financial constraints cannot be solved without implementation of cost-recovery and fundamental institutional changes. These institutional changes should not include only delivery institutions, but also new financial systems are needed which can provide funds for communities and firms operating within the sector.

Donor Coordination

24. There is no doubt that donor coordination is the responsibility of the recipient government. However, this is not easy due to the weaknesses of institutions, specific objectives of donors and lack of national policy, strategy and plans.

25. Typical problems related to especially bilateral donor projects are poor project design, inappropriate technology, neglect of macroeconomic realities, heavy expatriate input leading to production rather than institutionally oriented projects and supply driven technical assistance.

III. PRELIMINARY CONCLUSIONS ON THE ROLE OF THE BANK

Introduction

26. The main role of the Bank may not be financing of rural water supply and sanitation investments. However, the Bank should be ready to assist countries in using their resources more effectively and defining objectives and acceptable strategies. The Bank should also be a catalyst in mobilizing other sources of funding and in policy dialogue.

Institutional and Manpower Development

27. The Bank should support such institutional development which transfers responsibilities to local communities. The main issue should be to assist local communities so that they are able to start a development process covering not only rural WSS, but also other activities as e.g. health, agriculture, education and transportation. Creation of vertical organizations should be avoided.

28. In manpower development, the key issue should be integration of institutional and manpower development, development of trainer and instructor training, and development of on-the-job training abilities of foremen and middle-managerial level staff.

Project Priorities and Design

29. Priority should be given to projects that are aiming at full cost recovery and contributing to rural development. An appropriate criteria of priority could be demand of services.

30. It could be considered whether separate rural water supply projects should be supported at all. Another approach could be to support community development projects which assist communities to start their own broad development process based on their own priorities and responsibilities.

31. In project design a special effort should be given to institutional development. Efforts should be made to assure that project staff have the necessary skills, or use specialists in this area, to participate in planning of the proposed project.

Cost Recovery and Financing

32. Full cost recovery in the long-run is the only justified goal. At the same time, such financial systems which can be used for financing rural development projects should be created. One alternative might be development of line of credit approach.

Sanitation

33. The Bank should be involved in funding of rural sanitation only in connection with health, water supply, or community development projects, using cost recovery as a basic principle.

Donor Coordination

34. The Bank together with UNDP should take an active role in donor coordination by assisting governments in preparation of sector projects, policies and strategies as well as mobilizing other international donor organizations to finance and cofinance appropriate projects.

35. The Bank should encourage the donor community to adopt sound, replicable and sustainable strategies within the sector.

36. The Bank should seek to improve its access to the specialized know-how available within the UNDP Decade program.

Table 1: Four Scenarios for the Development of Rural Water Supply and Sanitation

Year	1980		1990		2000	
Service provided	Water	Sanitation	Water	Sanitation	Water	Sanitation
Rural population in millions	275	275	330	330	380	380
Scenario A						
Coverage as %	22	20	67	67	100	100
Population served in millions	60	55	220	220	380	380
Population not served in millions	215	220	110	110	-	-
Scenario B						
Coverage as %	22	20	46	52	73	75
Population served in millions	60	55	150	170	240	285
Population not served in millions	215	220	180	160	140	95
Scenario C						
Coverage as %	22	20	35	33	43	42
Population served in millions	60	55	115	110	165	160
Population not served in millions	215	220	215	220	215	220
Scenario D						
Coverage as %	22	20	22	20	22	20
Population served in millions	60	55	75	65	85	75
Population not served in millions	215	220	255	265	295	305

In Scenario A the 100% coverage target is scheduled to be reached in 2000.

Scenario B is based on the revised national targets. The projection based on the revised targets suggest, that the coverage of improved rural water supply would be 46% in 1990, and that of rural sanitation 52% in 1990. The rate of additional beneficiaries annually is assumed to remain constant until 2000.

In Scenario C, the number of rural people without access to a safe drinking water supply and adequate sanitation is assumed to remain unchanged until 2000.

In Scenario D, the percentage of rural people with access to improved services is assumed to remain constant throughout the period 1980-2000.

Table 2: Total Required Inputs in the Development of Water Supply and Sanitation in Rural Sub-Saharan Africa

Costs in million USD (Annual Investments and Recurrent Costs)

Scenario	1980	1990				2000			
	Recurrent	Investments		Recurrent	Total	Investments		Recurrent	Total
	Water	Water	Sanitation	Water	Water	Water	Sanitation	Water	Water
A	120	640	400	440	1,100	640	400	760	1,400
B	120	360	290	300	660	360	290	480	840
C	120	200	130	230	430	200	130	330	530
D	120	40	30	150	190	40	30	170	210

THE WORLD BANK INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE January 27, 1986

TO Listed Below

FROM Nimrod Raphaeli, Adviser, UN/UNDP Operations

EXTENSION 76955

SUBJECT Regional Projects in Africa

Under the fourth program cycle of UNDP (1987-1991), approximately $190 million will be allocated for regional (multi country) projects in Africa, in addition to the usual IPF allocations to individual countries.

UNDP proposes to focus on three areas of concentration:

- Research and development for food production
- Productivity and management for production of goods and services
- Energy, water, communications and transport

The Africa Bureau at UNDP has prepared an "Orientation Paper" which spells out the strategy for the fourth cycle and invites comments from the agencies. In addition, the Africa Bureau has prepared a separate paper which provides guidelines for proposed projects. Both publications are attached for your perusal.

The areas of concentration should not be seen as definitive; indeed, in our meeting with Mr. Brown and his colleagues on January 17, Mr. Husain emphasized the issue of environment, and UNDP agreed the matter should be considered.

Mr. Damiba, the Assistant Administrator for Africa, will be visiting the Bank on February 27 to discuss the preparation of the regional program. He will welcome both comments on the strategy as well as ideas about possible Bank-executed projects.

I would appreciate your comments/suggestions by c.o.b. February 17. The two Africa Regions are also engaged in the process.

You should please note that the UNDP projects pipeline for Africa is practically empty and there is a good prospect that Bank's proposals, if well presented, will be accorded a high priority.

Please let me know if I can be of additional help.

Attachment

Distribution: Messrs. Husain (OPSVP) o/r, Rajagopalan (PPDDR), Churchill (WUDDR), Schuh (AGRDR), Pouliquen (TRP), Rovani (EGYDR), Hume (EGYPS), Lee (PPDES)

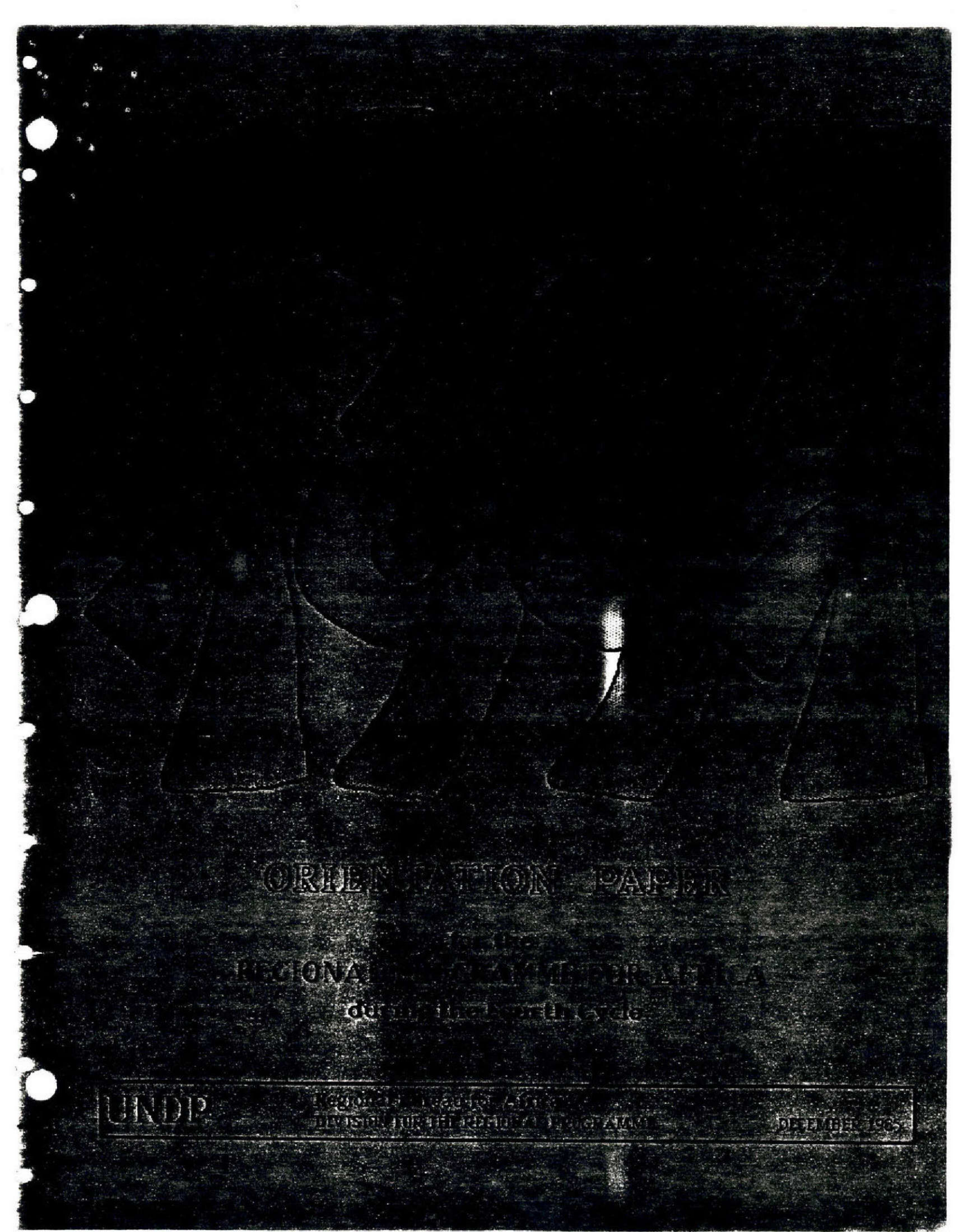
NRaphaeli:vcc

Please submit for each proposal you wish to make a separate paper using the format below, bearing in mind the limited number of projects which the Regional Programme will be able to accomodate

Preparations for the Fourth Cycle Regional Programme for Africa (1987-1991); major problems that need to be adressed in the areas of concentration

please note that this paper should not exceed 3 pages

1. analyse from your point of view the problems in the areas of concentration;
2. describe any major previous attempts made to overcome these constraints and their impact;
3. identify the likely obstacles and constraints which may be encountered in attempting to solve these problems;
4. make recommendations regarding solutions that can be applied for these problems during the implementation of the Fourth Cycle Regional Programme and the timeframe needed to apply such solutions successfully. Who are the intended beneficiaries? What can they reasonably expect to be achieved after 2, 3, 5 years?
5. describe the extent to which the proposed solutions would (a) promote and enhance African subregional and regional economic and physical integration; (b) enhance the impact of activities designed to solve similar or related problems at the national level;
6. indicate the Governments likely to participate in solving these problems and removing the constraints identified, the extend of their 'effective interest' in ensuring that these solutions are successfully applied as manifested by the political and material support which they are likely to bring to bear at the various stages of application to the solutions;
7. identify relevant 'external factors' which may be essential in the effective and successful application of the solutions prescribed (for example factors that are not directly influenced by a project but have great consecuences for project implementation and success);
8. provide approximate indications of the financial cost to (a) the UNDP Regional Programme, (b) the Executing Agency, (c) the participating Governments and (d) other interested parties;
9. give an informed estimate of the financial resources and the time required for full project identification and preparation;
10. describe briefly the likely linkages between such projects and possible related activities at the national level particularly those likely to be included in the individual Fourth Cycle Country Programmes.



ORIENTATION PAPER

REGIONAL PROGRAMME FOR AFRICA

UNDP

Regional Bureau for Africa
Division for the Regional Programme

DECEMBER 1965

ORIENTATION AND AREAS OF CONCENTRATION FOR THE REGIONAL PROGRAMME FOR AFRICA DURING THE FOURTH PROGRAMMING CYCLE (1987-1991)

I. INTRODUCTION

1. Preparations for the UNDP Fourth Programming Cycle have begun at an opportune time. In July 1985, the 21st Assembly of African Heads of State and Governments adopted the Declaration on the Economic Situation in Africa and the accompanying Priority Programme of five years' duration designed "to face effectively the twin challenges of survival and development" confronting the African region. The adoption of the Declaration and the Priority Programme was the culmination of determined and persistent efforts made by all concerned to understand and prescribe solutions to the most pervasive and intractable crisis of development that the region has ever faced. Those efforts have resulted in a series of diagnostic and policy documents each of which has, in its own way, helped sharpen and concretize perception of the African development problem and influenced the focus of an emergent concensus on policy prescriptions.

2. Collective critical examination of the African development problem actually began in earnest as early as 1976 when the Economic Commission for Africa adopted the "Revised Framework of Principles for the Implementation of the New International Economic Order in Africa"[1/] . Already at that time, in almost evident anticipation of the looming crisis of the early 1980s, it was recognized that there was no hope of realizing the expected rapid transformation of national economies through the exploitation of a narrow range of products for export at more or less stable prices to external markets that were progressively diminishing. There was likewise no future in trying to engineer the required diversification through the use of factor inputs (raw materials, machinery, technology, high level skills for entrepreneurial activities, management, production, marketing and distribution, research and development, etc.) to be acquired primarily from foreign exchange earned from such exports. In other words, it had become clear that in the context of self-reliant and self-sustained socio-economic growth and development processes, the engine must be internal. While the importance of extra-African relations, including aid, technical assistance and trade was recognized, the limits of such relations were acknowledged. In that connection the fact that, with Africa's many small and fragmented markets, regional economic co-operation and integration was a conditio-sine qua non for the realization of development objectives at the national level was emphasized.

3. These perceptions of the African development problem evolved and became more concrete as they were successively treated in, and formed the strategic basis of, the Development Strategy for Africa for the Third Development Decade adopted by the ECA Conference of Ministers at Rabat in 1979, which constituted the Monrovia Strategy for the Economic Development of Africa adopted by the Sixteenth Assembly of Heads of State and Government of African countries at Monrovia in 1979 and for the implementation of which the Lagos Plan of Action and the Final Act of Lagos were adopted by the Extra-Ordinary Session of the Assembly of Heads of State and Government (held in Lagos, Nigeria, in April 1980) devoted exclusively to the consideration of the economic problems facing

Africa. There were, of course, the sectoral studies and the associated regional strategies on food, transport and communications and industry which were undertaken and later formed integral parts of the Lagos Plan of Action.

4. These regional policy documents were in general, all addressed to long-term development issues and perspectives. However, in the early 1980s, it soon became evident that short-term difficulties arising in part from the cumulative effects and impact of shortcomings in past policies and strategies and from natural calamities such as drought and desertification as well as the energy crisis compounded long-term problems into a rapidly escalating crisis. Thus in 1981, the ECA Secretariat came out with a study entitled "Africa's Rapidly Escalating Economic Crisis: Proposals for a Short-Term Immediate Programme for Survival"2/. Which was considered by the Conference of African Ministers responsible for economic development and planning at its seventh meeting in April 1981. A few months later, the World Bank came out with its thought-provoking, though controversial, document entitled "Accelerated Development in Sub-Saharan Africa: An Agenda for Action" which was jointly assessed by the OAU, ECA and ADB Secretariats for consideration by the Council of Ministers of the Organization of African Unity and the ECA Conference of Ministers responsible for economic development and planning respectively.

5. The spate of critical analyses of Africa's economic problems continued without respite. In 1983, the ECA Secretariat prepared the Commission's Silver Jubilee perspective study on "ECA and Africa's Development, 1983-2008: A Preliminary Perspective Study"3/. Which addressed itself to the long-term development of Africa and came out clearly with the view that unless policies were changed, Africa would, by 2008, face a political, social and economic nightmare. In 1984, the Secretary-General of the United Nations produced his profound report entitled "The Critical Social and Economic Situation in Africa"4/ which analysed the emergency situation prevailing in Africa at that time as well as the medium- and long-term structrual adjustment problems of the continent. In the same year, the World Bank management proposed a joint programme of action entitled "Toward Sustained Development in Sub-Saharan Africa", the suggestions of which were very close to the requirements of the Lagos Plan of Action, particularly in respect of the attention drawn therein to population growth, human resource development, technological change and the erosion of natural resources as long-term constraints on development which, unless they received continuing and increased attention, would frustrate development in Africa. The ECA Conference of Ministers responsible for economic development and planning adopted at its tenth meeting the "Special Memorandum by the ECA Conference of Ministers on Africa's Economic and Social Crisis" including its Annex I, the "Addis Ababa Declaration on Africa's External Indebtedness" 5/ which was endorsed by the 20th Ordinary Session of the Heads of State and Government of the Organization of African Unity and addressed to ECOSOC and the International Community.

6. In 1985, as part of the preparations for the 21st OAU Summit, the ECA Conference of Ministers formulated the "Recommendations of the ECA Conference of Ministers concerning the economic issues on the Draft Agenda of the 21st Ordinary Session of the Assembly of Heads of State and Government of the Organization of African Unity" 6/. The Conference also adopted the "Second Special Memorandum by the ECA Conference of Ministers: International Action for Relaunching the Initiative for long-term Development and Economic Growth in Africa" 7/. All these documents formed a major input into the final recommendations submitted by the Steering Committee (comprising seven member States) to the 21st Summit of the OAU Heads of State and Government in July 1985.

7. Over and above these fundamental documents, there were of course the many incisive studies and position papers dealing with specific aspects of the crisis prepared by various African and international organizations and agencies. These included the ECA annual survey of economic and social conditions in Africa, the World Bank's Development Reports, the various studies by the OECD, the deliberations of the Committee for Development Planning of the United Nations, and so on.

8. As a result of this extensive examination, very few will now dispute the fact that since the Lagos Plan of Action and the Final Act of Lagos were adopted in 1980, Africa has been suffering from "the paralysis of multiple debilitating crises" 8/ resulting from: (i) the most widespread persistent and destructive drought in memory; (ii) an extremely unfavourable international economic environment; and (iii) dramatic increases in Africa's external debt, interest rates, and debt service costs. These factors exacerbated the already weak underlying structures of African economies in a degenerative and vicious downward spiral of crises and the further entrenchment of underdevelopment. The implications and ramifications of these crises span the immediate, short, medium and long terms such that measures to tackle the associated problems must similarly cope with these various phases. A concensus has emerged as to what form these measures should be. Accordingly there is a general and legitimate view that Africa and its concerned development partners must now move from the stage of questioning and diagnosis to that of effective implementation of the established priorities at all levels: national, subregional and international.

9. The impact of the UNDP Fourth Programming Cycle with its country and regional programmes, as indeed all other programmes of assistance to Africa for the immediate future, will be judged by the extent to which it will have contributed to the successfull implementation of these priorites. However, given the limited resources and timeframe of UNDP's Regional Programme, of approximately $200 Million for the period 1987-1991, and taking into account the overriding importance of attaining tangible results, it is believed that the impact would be maximised if the orientation of the Programme is judiciously situated within the accepted regional strategy and if its operational elements are derived from the priorities contained in that strategy.

10. In the next section, the various threads which constitute the emergent consensus on policy prescriptions for the African development problem are drawn together. This will serve as a backdrop for the justification and better understanding and appreciation of planned activities concerning the lessons learned from the impact, or lack thereof, of the Regional Programme during the current cycle of UNDP's proposed new approaches for programming and of the orientation, areas of concentration and recommended priorities for action during the Fourth Regional Programming Cycle which are successively treated in the subsequent sections.

II. EMERGENCE OF CONSENSUS ON AFRICAN DEVELOPMENT POLICY ISSUES

11. As a result of the studies mentioned above and other observations, all are now virtually agreed that the root cause of Africa's development crisis is not the drought-induced emergency nor the excessively high levels of debt service ratios. While these factors have had a dramatic adverse impact on the availability and production of food, foreign exchange earnings, energy supplies, the ability of governments to mobilize domestic financial resources, balance of payments, industrial capacity utilization and the problem of refugees and displaced persons, among others, they are only symptoms of a deeper underlying cause which hinged basically on the long neglect for a much-needed reform of the basic structures of African economies.

12. The major elements of that reform are already implied in the strategy underlying the Lagos Plan of Action and the Final Act of Lagos as well as in the major documents referred to above. First and foremost, there is a need for a substantive shift, in the long-term, from external to internal demand stimuli so that the provision of the benefits of development, ceases to depend solely on the exploitation and export of a narrow range of products to markets outside the region not only because such markets are progressively diminishing as a result of changing demand patterns, among other factors, but primarily because, in the context of self-reliance and self-sustainment, the engine of growth must be internal. This in turn entails substantial expansion of capabilities at the national, subregional and regional levels for the identification, evaluation, extraction and management of natural resources and raw materials for processing to meet domestic needs. Domestic factor inputs must be developed and increasingly substituted for foreign ones. The training requirements for skilled and semi-skilled manpower for both public and private enterprises as well as the supply of technology, machinery, equipment and raw materials, are as compelling in their urgency as they are formidable in their scope.

13. The strategy recognizes the special roles to be played by food and agriculture and industry as the two leading production sectors; one exerting strong growth promoting effects on the other and together they react on, and are influenced by, other sectors especially transport and communications, other services such as banking, finance and insurance, etc. in mutually reinforcing way.

14. The focus of consensus for immediate action is that there should be drastic changes in attitudes and fundamental improvements in domestic policies. In particular there should be far-reaching changes in the management of economies with due regard for efficiency and effectiveness. Realistic market-based prices and exchange rates should be adopted to encourage investment, production and trade. Incentives should be instituted to promote greater individual or private initiative. Obstacles to the operations of producers, especially small farmers and businessmen will have to be dismantled. Measures will have to be taken to shift the internal and international terms of trade in favour of agriculture. Education and training curricula will need to be reoriented and made more relevant to self-reliance and self-sustainment.

15. With regard to external assistance and support, the African Heads of State and Government were quite explicit in their Declaration on the economic situation in Africa. Africa was fully aware of its responsibility for adopting measures for its economic recovery and rehabilitation. However, the magnitude of the problems made it imperative for the international community, including in particular the developed countries and international development and finance institutions as well as United Nations Development System, to support Africa's own effort in recognition of the region's multiple difficulties. The assistance required needs, however, to be very positive in terms of its magnitude, terms and conditionality and must above all operate in consonance with the established priorities especially in respect of domestic policy reforms and structural development needs.

16. The foregoing considerations underlie virtually all current proposals for practicable measures for action. They are definitely basic to the Priority Programme adopted by the 21st Assembly of Heads of State and Government of the Organization of African Unity.

17. Thus for the five years to 1990, the principal task is food production and agricultural rehabilitation, including drought and desertification control. This is in recognition of the dominant and crucial role the agricultural sector plays in all African economies. Indeed efforts to resuscitate the African economy as a whole will critically depend on the immediate success of the rehabilitation and revitalization of African agriculture. The Priority Programme puts substance to this recognition by commiting governments to increase gradually the share of agriculture in national total public investment to between 20 and 25 percent by 1989.

18. While special attention will in this way be given to agriculture, the Priority Programme proposes parallel and effective support action to be taken in other sectors especially industry, transport and communications, financial, administrative and other services. There are also specific proposals for attaining lasting solutions to Africa's growing indebtedness, the awesome level of which might determine the success of all efforts to restructure and transform the African economies from their current dependent status to a fully

self-reliant and self-sustaining one. A common platform is to ensure that the proposals of the Priority Programme are taken within the framework of enhanced subregional and regional co-operation and a more effective and co-ordinated African position in international economic relations.

III. REGIONAL SOLUTIONS TO NATIONAL PROBLEMS

19. This leads us to a more specific consideration of the importance of the regional approach to the solution of national problems and the essential role of UNDP's Regional Programme in this approach.

20. As stated above, within the context of the long-term development strategy for Africa, the dynamics of development and growth would be based primarily on the collective resources and potentials of the region as a whole. Out of the 50 States that constitute the membership of the Economic Commission for Africa, only 4 countries have populations of more than 30 million, 9 have populations of between 10 and 30 million; 13 have populations of between 5 and 10 million; another 13 have populations of between 1 and 5 million and 11 have populations of less than 1 million. Herein lies the imperative of co-operation. These small population sizes, combined with very low income levels, as well as the uneven distribution of natural resources render the expected transformation beyond the capability of individual African countries.

21. Since the nature of the colonial economic legacy has been such that while these countries have, in the majority of cases, existed as contiguous political units, they were, in reality separate and isolated economic entities with minimum structural links among them and there is need to create markets that transcend traditional political boundaries and which are large enough to support viable production in agriculture and industry, increase the capacity to absorb and adapt technology, create viable transport networks, pool manpower and financial resources and promote the exploitation of complementarities. In other words, the pursuit of national goals of development is inextricably linked to, and its success heavily dependent on, a corresponding strategy of regional economic integration and co-operation which calls for the establishment and/or strengthening of multinational institutions to promote development and undertake joint co-operative efforts. Put conversely, African economic co-operation is an essential supplementary tool for promoting a process of internally - generated, self-sustaining development. No country can, by itself, achieve the objective of economic self-reliance or generate a process of inward looking structural transformation. Indeed, in certain cases and under certain conditions national viability may depend on collective activities.

22. More than two decades of experimentation with integration arrangements within the region has now led to the realization that the approach to integration must be pragmatic and gradual. The Lagos Plan of Action and the Final Act have set the ultimate objective of economic co-operation in Africa

as the establishment of an African Common Market by the year 2000. The attainment of this objective is rooted in the promotion, co-ordination, harmonization and the gradual integration of existing and future geographically limited economic groupings of countries and the establishment and use of multi-national governmental and non-governmental institutions to promote development by jointly undertaking co-operative efforts.

23. Already several economic communities, organized along subregional lines, operate at various stages of integration. Some regions have more than one such organization; for instance in West Africa, the Economic Community of West African States (ECOWAS) exists side by side with, and embraces the membership of other communities as the West African Economic Community (CEAO), the Council for the Entente and the Mano River Union. In Central Africa, the latest of the economic communities to be established in Africa, the Economic Community of Central African States embraces the five States namely, Central African Republic, Congo, Chad, Gabon and the United Republic of Cameroon that constitute the Union Douanière des Etats d'Afrique Central (UDEAC), to other States of the Central African subregions into what will eventually become a Central African Common Market. The Economic Community of the Great Lakes Countries (CEPGL) comprising Burundi, Rwanda and Zaire has also been established. In East Africa, the East African Economic Community established between Kenya, Uganda, and Tanzania, and which collapsed in July 1977, has since been replaced by the Eastern and Southern African Preferential Trade Area (PTA). Cutting across the memberships of these multipurpose organizations, are about 130 intergovernmental, multisectoral and single sector economic organizations and institutions that are meant to promote technical and economic co-operation in Africa. In addition, there are institutionalized Conferences of Ministers and Officials on a number of specific areas.

24. Over and above these organizations and institutions are the Multinational Programming and Operational Centre (MULPOCs), each of which has been established by the African Governments themselves in each of the five subregions of the continent to assist governments to restructure national economies within the framework of the broader objectives of subregional economic co-operation and integration; relate national development programmes to subregional and regional programmes; and in general make economic co-operation and integration part and parcel of national socio-economic policy.

25. The institutional machinery for promoting the progressive integration of African economies can thus be said to have been well and truly put in place. The existence of this fairly elaborate machinery has however not, by itself, ensured progress towards effective regional economic integration. Progress has to date been particularly slow among some of the major economic groupings largely because of undue pre-occupation with trade facilitation and liberalization among member countries. While this approach has invariably been the raison d'être of economic groupings among industrialized countries

the underlying assumptions, which guarantee the efficacy of this approach, do not apply to African countries. These include: the existence of many units of production each producing and selling a relatively small share of the national output; and economy operating at near full employment with plants expected to operate at the margin so that new investment is also marginal compared to current productive capacity; an ample supply of highly motivated entrepreneurs with an extensive knowledge of markets for inputs and products at home and abroad; and the equitable distribution of the benefits of co-operation among participating countries because the capacity to derive those benefits is itself fairly equitably distributed.

26. On the other hand, Africa is characterized by an inadequate supply of competent entrepreneurs in both the public and private sectors; scarcity of skilled manpower; limited familiarity with the sources of raw materials, limited range of choice of technology; limited inter-industry integration; and limited domestic markets in relation to plant size. Therefore, economic co-operation and integration within subregional groupings means co-operation primarily in the creation and utilization of new productive capacity, particularly for the production of intermediate and consumer goods. The requirements for this entail much more than mere trade liberalization. There is a glaring need and ample scope for co-operation and inter-country specialization in the development of basic industries, production of food crops and livestock, development of science and technology, exploitation and utilization of natural resources, human resources development and the creation of transport and telecommunications networks. There is also need for the mobilization and redeployment of savings through multinational banking, insurance, consultancy and other services, the standardization of design and procurement practices etc. The benefits that can be derived from joint inter-State planning, project identification and design are obvious.

27. The Regional Programme of UNDP is designed to make a significant contribution to the implementation of the regional strategy described above working through and with existing intergovernmental organizations and institutions.

28. The criteria which will have to be met for projects to be included into the Regional Programme will be the direct promotion of regional economic integration, commitment by the countries concerned, politically and materially, to achieve long term improvement of regional co-operation for the benefit of the people in the respective countries, primarily LDCs which, because of their size, geographic and economic conditions as well as their low level of development belong to the more disadvantaged countries.

29. In this way and within the established areas of concentration of the Regional Programme outlined below, the Regional Programme will intervene at the inter-country, subregional and regional levels to promote collective self-reliance and self-sustainment.

30. It is evident that there are strong forward and backward linkages between the Regional Programme and the various UNDP country programmes such that the two sets of programmes are mutually reinforcing. For example Governments can delegate research and development activities to regional institutions if this seems to be the most promising approach. However, the results of the research activities will only achieve practical meaning if they are channelled back into the national development processes and trigger the adjustments which are needed at the national level to either continue to promote a regional operation or to switch to a national response.

IV. LESSONS FROM THE REGIONAL PROGRAMME 1982-1986

31. As the Third Regional Programme (1982-1986) is soon coming to an end, is worthwhile to look back to the time when it was formulated, to recall its objectives, to review the means chosen to achieve these objectives and, finally, to evaluate the results obtained so far. One of the major aims at that time was to respond to the extent possible to the Lagos Plan of Action and its emphasis on seeking regional solutions to common national problems. Support to many intergovernmental organisations and institutions was included as part of the programme. Although UNDP's financial difficulties resulted in programme reductions of 45% and considerably interferred with the programmatic approach, the institution-building aspect of the programme was probably preserved and is the one major common denominator of the programme (1982-1986).

32. Therefore, an evaluation of the Third Cycle would do justice to the subject if it were to concentrate on the assistance and its impact on intergovernmental organisations and institutions, which would cover about 70% of the programme. However, it might be too time consuming to evaluate the assistance provided to each of these over 70 organisations and institutions, and it might also not be necessary. UNDP would like an answer to the question, as to where and why assistance to some organisations and institutions succeeded in some cases and failed in others and deduct some principal lessons which should be taken into consideration for the next Cycle. For these reasons the evaluation will be carried out as a programme evaluation using, as examples, a variety of selected intergovernmental organisations and institutions.

33. UNDP is planning to use for the evaluation a very small team of consutants who should be fielded by the end of January 1986. Their report would be due in March, early enough to be included into the papers which will be prepared on the Fourth Cycle Regional Programme for the attention of the next ECA Conference of Ministers at its twelfth meeting scheduled for April 1986 together with the final draft of the Orientation Paper taking into account comments received from UN Executing Agencies, UNDP Resident Representatives and others invited to comment. The conclusions of the report will be most relevant for the process of project selection for inclusion into the Fourth Cycle and would also become part of the final Regional Programme document.

V. NEW APPROACHES FOR ASSISTANCE TO REGIONAL PROJECTS

34. In accordance with its mandate the Fourth Cycle Regional Programme should restrict itself to truly regional concerns and assist African countries to make progress towards regional economic integration.

35. The current Regional Programme has provided, in many instances, general support aimed at building-up or strengthening intergovernmental organisations and institutions. It is recognised that this process of institution building and strengthening is not complete and needs to continue. However, instead of retaining these purposes as main objective of UNDP assistance the emphasis will shift, to the extent possible, to programme assistance with the focus on specific, agreed activities, in line with the Regional Programme's selective areas of concentration. In this way institution and capacity building will be realized as deliberate and important by products of programme assistance. One important implication of the shift to fewer and larger projects will be that not all of the existing Intergovernmental organisations and institutions can be supported by the Fourth Cycle Regional Programme in a meaningful way.

36. Another new approach will be the shift, where appropriate from "horizontal" to "vertical" assistance, which means selection of specific, agreed upon activities and "vertical" follow-up within the project down to the ultimate purpose of the assistance, as opposed to broad, "horizontal", general institution building. Since all development aid is ultimately meant for people, as the intended beneficiaries, it is important, in project design and selection, to identify the envisaged target group. Projects have, in the past, seldom stressed this point sufficiently and project design has not evolved a direct and feasible way for the project to carry its results to the ultimate beneficiaries. This most important of all project aspects was usually left for the post project stage and the somewhat vague hope for eventual 'trickle-down' of project results to people. RBA is now seeking more a direct link, within the projects, to the 'grass-roots' level. This is obviously only possible in large and more complex projects. However, the resulting reduction of the number of projects would be desirable also from the standpoint of effective UNDP and Agency managment and monitoring and is therefore seen per se as a positive, new aspect of the next Cycle.

37. While RBA is seeking the above mentioned new approaches to increase the impact of the Regional Programme, it is determined to ensure overall continuity of its assistance. A possible analogy which could illustrate this merger of continuity and new approach is a stair, with a succession of steps following each other, yet with each one at a distinct and different level.

38. In the design and implementation of programmes in the areas of concentration, the existing Intergovernmental Organisations and Institutions will be major partners. New partners in development, with experience with ultimate beneficiaries and "grass-root" level work will be invited for the

design, appraisal and implementation of Fourth Cycle projects. Therefore RBA will invite NGO's to contribute non-conventional, innovative approaches in the design and implementation of regional projects. They will be asked to comment on the Fourth Cycle Orientation paper and make specific proposals, as to how its objectives could be achieved. UNDP will issue guidelines for the preparation of these proposals. Depending on the nature of the project and the agreement of the governments concerned NGO's may also be asked to assist in project implementation. However, for the implementation of the Regional Programme 1987-1991 African intergovernmental Organisations and institutions are expected to be major partners.

39. The process of consultation with Governments and UN Executing Agencies concerning the Fourth Cycle Programme will follow established practices and involve Governments, UNDP Resident Representatives and UN Executing Agencies, so that an agreed draft Programme can be presented to the UNDP Governing Council in February 1987.

VI. AREAS OF CONCENTRATION FOR THE FOURTH REGIONAL PROGRAMMING CYCLE

40. The Fourth Programming Cycle will be UNDP's response to the call made by African Governments for the international community to join them in their own efforts to end stagnation and decline and to regain the momentum for rapid and sustainable growth and development. As already indicated, the regional programme is, by its nature, expected to intervene at the intercountry, subregional and regional levels. The main aim, therefore, in the light of requirements of the strategy for African development, is to contribute directly to the promotion of regional economic co-operation and integration and the attainment of collective self-reliance and self-sustainment. There is no doubt as to the magnitude and multiplicity of problems and constraints confronting African governments in this area. It would have been most desirable if an all-out attack were made to tackle all the problems simultaneously in their multifaceted dimensions. However, resource and time limitations dictate that a selective approach must be adopted. UNDP's intervention, therefore, will be in those areas which are likely to have the greatest growth and development-promoting effects within the established priorities, resources and timeframe.

41. While a variety of operational measures will need to be taken in order to carry out the activities in the selected areas, the one most outstanding and common to all will be the development of African human ressources in the following areas of concentration, which will serve as the bases for determining the operational content of the Fourth Regional Programming Cycle:

1. Research and Development for Food Production

42. Increased and enhanced co-operation between countries with the objective of augmenting the productivity and production of food through research and

development activities and the practical application of research results in agriculture and related science and technology areas.

2. Productivity and Management for Production of Goods and Services

43. Increased productivity and production of commodities and services. This will be done, inter alia, through the enhancement of planning and operational activities, training in management practices in public and private enterprises, provision of high level consultancy services and promotion of closer relationship between financing institutions and public and private enterprises. Experience gained in regional development in other parts of the world will be examined and, where applicable, used in the design and implementation of the programme.

3. Energy, Water, Communications and Transport

44. Strengthening regional co-operation to increase the conservation, availability and sound management of cost-effective water supply systems and conventional and non-conventional energy resources as well as enhancement and integration of transport and communication between African countries and sub-regions. Particular emphasis will be placed on maintenance of existing facilities.

45. Human resources constitute the most pervasive and vital input to development. In the context of the Lagos Plan of Action, the development and effective utilization of human resources will be pivotal not only because of the need for skills to design, institute and sustain the kinds of internally-generated and self-sustaining processes of growth and development called for in the Plan, but also because ensuring productive participation of all segments of the population in all aspects of development is the ultimate objective. The quality and quantum of available manpower in any country are critical and decisive factors in national development. Equally, the manner in which the available human resources are mobilized and utilized determine the weight of their contribution to, and their effectiveness in bringing about, socio-economic development.

46. There is a glaring need for the continuous development of manpower to meet the present and future demands of African economies for trained and skilled personnel and to provide a skill base which is fundamental to the development of the strategic areas enumerated above.

47. To enhance productivity and efficiency in all sectors, including the informal one, special attention must be given constantly to the upgrading of skills so that work forces can respond with flexibility and adaptability to changes in technological and environmental conditions.

48. The overriding importance given to the food and agricultural sector in the Priority Programme adopted by the 21st Assembly of African Heads of State and Government has already been mentioned. It is also stated in the "Second Special Memorandum" by the ECA Conference of Ministers that the war to regain the momentum for economic growth and development will have to be waged first and foremost in the food and agricultural sector since it is the poor performance in this sector which has been at the root of the economic backwardness, stagnation and decline in many African countries. "The Joint Programme of Action" of the World Bank is equally emphatic on this. It says, "Improving the performance of the directly productive sectors, particularly agriculture must be central to all programmes to restore African economic growth. Agriculture has the potential to reverse the increasing dependence on food imports, to produce the largest increase in export earnings in the short- and medium-term, to improve the standards of living of the bulk of the population, to provide many of the inputs for the industrial sector and much of the demand for its outputs, and to strengthen the domestic income and tax base to finance the education, health and infrastructural programmes that will ease the basic constraints on African development".

49. The potential for substantial increases in agricultural productivity and production is known to exist. However to harness this potential the right policy mix needs to be applied in the first instance. As a minimum, such a mix should include ensuring the adequate supply of farm inputs to farmers at accessible prices, establishment of an appropriate producer pricing policy, adequate marketing, infrastructural and storage facilities, facilitating access to credit and land resources, devising adequate incentives and effective extension services.

50. It is to be understood, however, that the required developments will not take place if the linkages between agriculture and other sectors, notably industry, transport and communications and administrative and financial services, are not enhanced in a fully-defined package of support to the agricultural sector. Of major importance for sustained revival, however, is the extent to which research and development in agriculture and related science and technology strengthened and the results thereof are disseminated and applied at the production level. There is tremendous scope for regional co-operation in this area particularly with respect to the co-ordination of efforts, which are now hopelessly dispersed and fragmented, for the effective delivery and utilization of research results by peasants and small farmers. The "Second Special Memorandum" was quite specific in its recommendations on this. Support at the regional level would focus especially at the co-ordination of work on the development of quick-maturing as well as drought-, disease- and pest-resistant animal species. Particular attention would need to be given to the exploration and development of new farming systems and innovations in new crops adapted to different agro-ecological zones. Another area needing support would be work on post-harvest loss-reducing technologies and marketing practices. Yet another area would be

work on the application of new technologies, genetic engineering and bio-technology especially for increasing food production and enhancing preservation, protection and processing.

51. There is, as already stated, a multiplicity of institutes which have been established by the African governments which can address themselves to the crucial areas mentioned above. Most of these institutes are, however, far from realizing their full potential largely because of the fact that governments have not adequately matched the political commitment with which they established the institutes with the required material and financial support. There has further more been a severe lack of co-ordination of policy related to research and development activities so that efforts have frequently been dissipated. The mechanism for the transmission of the information, service and research and development results generated at the regional level is also often defective so that the output of institutes seldom reach the ultimate beneficiaries who are the small farmers, including, especially, women, in member States.

52. While any programme of assistance to raise production and productivity at the regional level must harness and build on the potential that exists in these institutes, the success of any such programme depends to a great extent on the degree to which solutions to these obstacles are clearly taken into account in programme and project design and formulation.

53. It is known that inspite of Africa's basic long-term structural constraints substantial increases can be realized in the production and productivity of the goods and services sector if significant improvements are made in the management of both public and private enterprises. The systems of public administration, management and finance have progressively weakened over the last decade. The "development oriented" systems that were supposed to replace the custodial system inherited at independence have largely failed to materialize. Such failure has become particularly pronounced and costly when one takes into account the fact that the last two-and-a-half decades have witnessed a considerable expansion in the size of the public sector since post independence development strategies and policies have given a prominent place to the role of the State in promoting socio-economic development. The net result of all this has been poor overall performance of the public sector, with negative repercussions on the development process.

54. Support for much-needed reform in this area is urgently called for particularly in the context of measures for improved management of public and private enterprises. Support is needed to improve and rationalize the operation of public enterprises and improve the quality of services generally through inter-alia the adoption of appropriate employment strategies and the implementation of viable recruitment policies to ensure that employees are equipped with the proper skills and the right attitudes. There will be need to strengthen and reform public and private enterprises with a view to transforming them into production-oriented and productivity-conscious

structures. Special attention will have to be given to measures to achieve genuine decentralization of institutions and administrative authority and relaxation of constraints on the private sector in a manner that would increase efficiency and productivity and ensure that the majority of the population play their part in a decentralized economy and society and actively participate in all aspects of the process of socio-economic development.

55. In all these of course, advantages can be taken of existing collective self-reliance institutions in the region which can effectively organize training activities and provide consultancy services so as to enhance the production and productivity of public and private enterprises of member States but which are presently weak because of shortage of resources and other imposed constraints.

56. It is to be noted however that no amount of external intervention will bring about any increased measure of productivity if it is not matched by corresponding efforts made at creating a more favourable environment for entrepreneurship. In particular all constraints that tend to stifle private sector initiative should be dismantled. Instead, this sector should be encouraged to play its crucial role in the development process through the judicious use of adequate incentives.

57. In the foregoing paragraph's the meaning, potential points of intervention for a Regional Programme of Technical Assistance as well as fundamental, structural and policy constraints, to be considered in project design for the first two areas of concentration have been dealt with. The following part turns to the last area of priority "water energy and transport and communications", which in multiple ways is related to the first two areas of concentration.

58. The persistent drought and desertification problem in Africa have sufficiently demonstrated the need for irrigation which is an important input for increasing agricultural productivity and production. Some critical areas deserving attention are therefore water resources, development and management, irrigation cropping systems, especially the development of micro-irrigation and the environmental implications of irrigation and drainage. The joint development of river and lake basins, in particular, offers scope for increased exploitation of Africa's water resources. A programme of assistance could be worked out in this area for groups of countries and for subregional economic groupings and organizations. An area for urgent external support is in multinational measures designed to role back the desert similar to the "green belt" programmes implemented in some North African countries. A most urgent need is to increase the effectiveness of operation and maintenance facilities. This is necessary to prolong the life of existing schemes and provide better services to users. Increased attention should be paid to new manual pump technology, improved designs of wells and boreholes, village level operation and maintenance and co-operation in the manufacture and distribution

of spare parts. There is also need for the wider dissemination of experience in implementing water projects so as to avoid the repetition of costly mistakes and the duplication of efforts.

59. The successful development of water resources however also calls for parallel measures to be taken to improve planning procedures for the water sector especially with regard to integrating sectoral master plans for water with national development planning. Institutional weaknesses arising from fragmented government departments dealing with the water sector, lack of trained and skilled manpower, lack of equipment, tools and spare parts and lack of finance need to be addressed. There is also the need to make rational decisions on balanced development between commercial agriculture, small-scale farming and pastoral development as to avoid the abandonment of one form in favour of the other.

60. While irrigation has been regarded as a panacea for drought-prone countries. Experience has revealed poor performance and failure to reach expected targets. It is therefore necessary to be cautious in planning for the development of irrigation. Small-scale schemes could be seen as providing an opportunity to acquire skills and develop capabilities for expansion and future planning of irrigation projects specially in those countries fringing the Sahel.

61. Problems concerning the optimum use of shared water resources and the equitable distribution of costs and benefits are extremely complex. Nevertheless, the benefits of joint development of international river basins encompassing multi-facetted activities such as: irrigation, navigation, municipal and industrial water supply, hydroelectric power, flood control, water quality, drainage, recreation and general environmental conservation is well recognized.

62. African countries continue to face major difficulties in their efforts to adjust to the widening gaps in their external payments position which has to a large extent been due to rising costs of energy imports. The development of all forms of energy resources is therefore a highly relevant goal not only to ease balance of payments problems but also to arrest the process of environmental degradation and desertification and to accelerate rural transformation.

63. Support at the regional level is particularly needed in policy formulation and in the assessment of available resources. Measures should also be taken to accelerate the development and utilization of energy substitutes; and there is need for closer co-operation among countries to make greater use of established centres of excellence.

64. The importance of co-operation in the development of transport and communications links is widely recognized and needs no emphasis in a region of such size, numerous sovereign States, many of them land-locked or island countries, and a widely dispersed population. Within the framework of the United Nations Transport and Communications Decade for Africa, African governments have joined forces to expand, co-ordinate and improve transport and communication infrastructure and services as a means to improve subregional and regional integration.

65. The foregoing paragraphs illustrate the orientation and areas of concentration and possible points of intervention of UNDP's Regional Programme during the Fourth Cycle. The choices made, as already explained, are necessitated by the limited time and available resources at the disposal of the Regional Programme in the face of multivarious demands, all of them priorities. By identifying these areas of concentration, it is hoped that the Regional Programme will have a maximum impact on the immediate needs of the African region and its people. It should however be understood that these areas of concentration are not to be seen in narrow sectoral confines. They relate to, and are related to, all aspects of the African development problem and it is in this light that they will guide the programming exercise.

FOOT NOTES

1/ E/CN.14/ECO/90/REV.3

2/ E/CN.14/CONT./81/01

3/ "ECA and Africa's Development, 1983: 2008 a preliminary perspective study"

4/ E/1984/68

5/ E/1984/119

6/ E/ECA/CM.11/80

7/ E/ECA/CM.11/77

8/ Adebayo Adedeji "The paralysis of multiple debilitating crisis".

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RE. UNDP/WB-INT/81/026 HANDPUMPS PROJECT.
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LOGY IS NOT NECESSARILY THEIR MAIN FIELD.
1) COMITE INTERAFRICAIN D'ETUDE HYDRAULIQUES (CIEH)
B.P. 369 OUAGADOUGOU, BURKINA
2) COMITE PERMANENT INTERETAT DE LUTTE CONTRE LA SECHERESSE DANS LE SAHEL (CILSS B. P. 7049 OUAGADOUGOU, BURKINA
3) L'ECOLE DES INGENIEURS DE L'EQUIPEMENT RURAL (EIER), OUAGADOUGOU BURKINA
4) L'ECOLE DES TECHNICIENS SUPERIEURS DE L'HYDRAULIQUE ET DE L'EQUIPEMENT RURAL (ETSHER), OUAGADOUGOU, BURKINA
5) UNIVERSITY OF SCIENCE AND TECHNOLOGY (UST) FACULTY OF ENGINEERING B.O. BOX KUMASI, GHANA.
6) CENTRE DES METIERS DE L'EAU D'ABIDJAN, SODECI, 1 AVENUE CHRISTANI 01 B.P. 1843 ABIDJAN 01, REPUBLIQUE DE COTE D'IVOIRE.
7) AFRICAN REGIONAL CENTRE FOR ENGINEERING DESIGN AND MANUFACTURING (ARCEDEM) 24 MORENI ROAD, OFF ARE AVENUE NEW BODIJA PMB 19
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THE WATER CRISIS IN AFRICA

INTRODUCTION

1. Approaching the mid-point of the International Drinking Water Supply and Sanitation Decade and eight years after the United Nations Water Conference in Mar del Plata, the inescapable conclusion to be drawn is that progress in the Africa region, and particularly in countries south of the Sahara, has been lamentably slow in providing the vast majority of the population with basic needs in water and sanitation and in overcoming the problems that impede the acceleration of national water and sanitation programmes.

2. This statement does not ignore the substantial progress that has been made in some sub-sectors and in some countries. Many successful projects have been launched and many substantial improvements have been effected through the joint efforts of governments and external donors. Sadly, the combined effect of a world economic recession, which has hit most severely the African countries south of the Sahara; rapidly rising rates of population growth; rural-urban migration and natural calamities such as floods and drought; has been to undermine the little progress made.

3. In addition, the changing pattern of external financing has seen not only a decrease in real terms of the total allocation to the water and sanitation sector but also a shift towards those projects which can readily be subjected to benefit-cost analysis. As a result, urban water supply, hydropower, irrigation and transportation schemes have been easier to fund than rural water supply and sanitation programmes for which there is little chance of cost recovery. Furthermore, the emphasis on projects rather than programmes has meant that, even in countries where external aid has been substantial in the water supply and sanitation sector, little has gone to building up the necessary national government institutions to a point where they can sustain the growth in these programmes called for by the Mar del Plata Action Plan and the Decade.

4. At the present time, the emergency food programmes in the drought-affected countries and the almost universal debt and balance of payment problems take precedence in national and international priorities. Despite the fundamental nature of water resources development in national economic development, and the obvious links between water and sanitation and emergency and post-emergency planning, it nevertheless continues to be extremely difficult to awaken the consciousness of both national governments and the international community in affording higher priority to medium- and long-term water development programmes.

5. In this context, this report sets out to analyse some of the fundamental issues which affect water resources development and, in particular, water supply and sanitation in the African region. Given the global economic situation which constrains the total funds available, the most important single target has been identified as improved management. This implies improved management by external donors of the limited funds available for disbursement to developing countries to ensure their most cost effective use. It implies improved management at the policy and planning level of national governments of the total funds available to them to ensure balanced development. It also implies improved management, at every technical level, of the manpower and financial resources available for the phased implementation of long-term development programmes.

6. Within this "blanket" concept, a strategy is developed to revive interest in this particular Decade among so many, to improve co-ordination and planning, to identify the most important priorities and to break the dead-lock between countries who identify finance as the major constraint and donors who point to there being insufficient "bankable" projects and a limit to the amount of external financial assistance that countries can absorb.

7. Africa is a special case in that unless there is an immediate renewed commitment to the goals of the IDWSSD, the remaining years of this decade will see the present near stagnation turn into a deterioration on a massive scale. The recent drought has shown that not only is it vastly more expensive to deal with emergency situations but also that the prolonged neglect of basic infrastructural requirements makes the task of responding to the needs of the millions of deprived people that much more difficult and slow. The target is to bridge the gap between emergency and long-term programmes in the drought-affected countries with the same measures that will also assist the less-affected countries to accelerate their provision of basic needs and better living conditions to their exploding populations.

REGIONAL OVERVIEW OF CONSTRAINTS

8. The wide variation in physical, economic and social conditions among countries of the region makes it difficult to identify a single set of constraints with universal application. Nevertheless, the shortage of funds and the criti situation make it imperative to attempt to establish some of the root causes of the present situation.

9. Previous reports have similarly identified constraints.[1,2/] The report of the WHO consultation in 1984, for example, recognized nine major constraints:-

(i) low government priority for the sector;
(ii) imbalance between coverage in urban and rural areas;
(iii) the need to integrate sector institutions;
(iv) operation and maintenance inadequacies and the need for rehabilitation;
(v) human resources;
(vi) inadequate health impact of Decade programmes;
(vii) ill-considered community participation and choice of technology;
(viii) failure to attract more external finance;
and (ix) water resources management.

10. To these the following can readily be added:-

(x) weaknesses in planning;
(xi) the project approach and "cheque-book"aid;

(xii) lack of government policies on many water-related issues; (including population growth and movements, rural water supply financing, soil and water conservation and rural sanitation);

and (xiii) lack of recognition of the economic benefits, both direct and indirect, which accrue from all water resources development activities.

The last of these has an important bearing on the first but it is important enough to be identified separately.

11. Whereas the constraints identified above are undoubtably important, it can be seen that already there is a diffusion in the message to be read from them. Some are more important than others and they cover a wide spectrum of needed action from different groups. In addition, two recent events threaten to complicate the picture even further. The African emergency programme is diverting attention from the long-term measures in favour of necessary but interim, contingency measures and, secondly, the focus on food production as a major regional strategy is tending to ignore the vital role of water development in agriculture and man's even greater need for water.

12. Consequently, a list of recommended action to be taken tends to grow without having a clear-cut impact. It is an unfortunate fact that were millions of people to be dying from cholera or some other water-related disease, world attention would be focussed on this aspect of the problem and it would attract massive support. Instead, even more people are dying a slow death from disease, malnutrition and poverty. Comprehensive water resources development programmes can combat disease, increase food security and raise the living standards of the rural and urban poor. It is this message which is not getting across.

13. The Mar del Plata Action Plan contains one of the most comprehensive lists of measures to be taken by the developing countries.3/ It is known that in the Africa region very little heed has been taken of these guidelines. The reasons behind this lack of implementation are not difficult to discern. There is simply not enough money, not enough manpower, not enough planning and not enough co-ordinated effort going into the development of phased programmes. The scale of the problems in relation to the resources available forces short-term or contingency planning and an ad hoc approach to problems as they arise.

14. The provision of additional financial resources alone will not solve the problem. Very often the organizational weaknesses will not allow expanded programmes and it takes time to build up human resources. The massive investments during the 1970's were not matched by the strengthening of national capabilities. Too much emphasis was placed on external technical assistance with staff recruited specifically to implement projects in the absence of experienced national staff. What training programmes there were seem to have been largely ineffective, and trained staff have been dissipated among the international organizations, the private sector or the upper echelons of the Civil Service.

15. Given a continuing training programme and an expanding government organizations, the so-called "brain drain" would not be too serious for the region as a whole. As it is, many government departments have remained with a complement totally inadequate to meet the challenges of the 1980's. There are still serious manpower deficiencies in almost every sector. The aid projects have made constant demands for counterpart staff which have steadily eroded the organizational and planning side of government. There are even greater deficiencies in support services such as accounts, procurement, stores, transport and operation and maintenance. Thus the paradox arises of there being external assistance often available but the funds to efficiently plan, implement, operate and maintain projects are not.

16. In order to seek solutions to the impasse, the root causes of the present situation have to be simplified even further. Three basic groups of factors can be identified:-

(i) economic factors;

(ii) internal constraints;

and (iii) problems of strategy.

ECONOMIC FACTORS

17. Bearing in mind that an increase in financial resources alone will not break the impasse, there is no doubt that lack of finance is identified by nearly all countries as the most important constraint. Not only has there been a slowing down of external support but also there was a considerable overestimation of the proportion of costs which could be covered by contributions from African countries.

18. The expectation that 80 per cent of the funds could come from internal sources 4/ was clearly overoptimistic even at the outset of the Decade. 5/ Given the economic problems of the majority of African countries south of the Sahara, there is no hope of this situation changing in the foreseeable future. If it is accepted that the goals of the IDWSSD and of the Mar del Plata Action Plan have substantial direct and indirect economic benefits in addition to the obvious social benefits, water resources development deserves a greater share of external aid, particularly soft loans and grants for the rural sector.

19. In practice, this implies that the major donors are urged to consider increasing the level of support to water resources development and especially to water supply and sanitation. They should be urged further to consider the problems of cost recovery in the rural areas and to aim at a system of cost-sharing where capital costs are borne by the donor and the substantial operation and maintenance costs by the governments or beneficiaries of new schemes.

20. While this concept is increasingly accepted in recent schemes, the costs of operation and maintenance over the life of the capital installations were largely ignored or underestimated previously, distorting the proportions of costs borne ultimately by government and donor.

21. Secondly, external donors should be encouraged to contribute towards programmes rather than just projects. This implies a more careful appraisal of component projects in the context of the government's long-term planning objectives to ensure that the necessary manpower, logistical support, operation and maintenance and other support services are growing at a rate commensurate with the overall programme. If not, additional support to build up the government's capabilities should be considered as part of the aid package.

22. From the donor's point of view, the desire to commit funds to readily identifiable projects, which can be executed in the shortest possible time, is understandable. In the past it has led to a tendency towards "cheque-book" aid where the completion of a number of projects has taken precedence over analysing how effective the aid has been or monitoring the follow-up. The extreme case is the "turn-key" project, executed almost entirely by external consultants and contractors and handed-over on completion with a minimum of training or safeguards as to the future running of the scheme.

23. At the very least there should be greater dialogue between donors and the technical departments involved in the future running of schemes. All too often, talks between donors and government are restricted to the ministries of finance and/or planning with little substantial technical analysis of how a project is going to work, its dependence on other inputs and the inter-relationship with other ongoing or planned projects and programmes.

24. As has been seen in both Kenya and Tanzania, for example, the multiplicity of projects gives a superficial impression of great progress. The underlying structural weaknesses, however, soon manifest themselves in the inability of the government departments to achieve targets, to keep the projects working and to execute planned follow-up activities. USAID, SIDA and NORAD all identified deficiencies in project management, cost escalation, inadequate operation and maintenance and delays in completion as factors in the slowing-down of Kenya's water programme.6/ These are symptoms of basic structural weaknesses in the government departments responsible for the water programmes. The failure to recognize these weaknesses reflects as much on the donors as on the departments concerned.

INTERNAL CONSTRAINTS

25. In analysing the present constraints facing national governments a number of factors common to most can be cited. The years immediately following independence were characterized by a general lack of technical staff, small and fragmented organizational units, a much lower level of activity in terms of expenditure on water programmes and very little activity in the rural areas. The late 1960's and early 1970's saw an unprecedented increase in water resources development but with a strong dependence on expatriate staff in view of the shortage of trained national staff. By the mid 1970's, however, training programmes had filled many of the posts and there was a strong feeling among donors that most countries could dispense with expatriate staff who were supporting the government programmes.

26. Even then, the warnings were sounded that many government institutions were barely able to cope with the rapid expansion of programmes and influx of external aid. Most departments had not been strengthened to take into account the expanded programmes. Services like transport, operations and maintenance, stores and procurement were woefully inadequate. Project staff were often competing with each other for essential materials and services. Because of the large number of ongoing and new projects, ad hoc strengthening and recruitment took place just to continue the momentum of project initiation. Out-moded accounting and procurement procedures produced delays and bottlenecks. Vehicle servicing facilities were neglected to the extent that large percentages of vehicles were off the road for three to six months. The complexity of operation and maintenance increased as the variety of machines, equipment and vehicles began to reflect the preference of donors. The management problems were immense and yet few technical managers had the experience or training to deal with them as they arose more and more frequently.

27. At the same time, cosmetic improvements abounded. There were amalgamations of fragmented units into new ministries. There were new buildings to reflect the importance of the development programmes. Political commitments were made to spread the benefits of the programmes to the urban and rural poor. Impressive lists of development projects could be produced to reinforce the stated high priority of water resources development.

28. But the costs of these and the other sectoral activities were increasing dramatically. Oil price rises doubled the running costs of the programmes. Inflation led to cost escalation and higher maintenance costs. Burgeoning debt problems and balance of payments deficits made it impossible to service the expanded programmes and to strengthen the government departments. Wage freezes for government staff or minimal increases far below the rate of inflation further reduced the incentives to deal effectively with the impending crisis.

29. The remainder of the narrative is well-known. Since the United Nations Water Conference in 1977, the economic problems have grown worse for African countries south of the Sahara. There has been a reduction in external aid in real terms and there have been further oil price rises. The momentum of the earlier years has been impossible to sustain. There has been drought and desertification. Populations have continued to rise and there has been a steady influx of people from the rural areas to swell the urban populations.

30. Perhaps the single most important message to be learnt is that there have been gross deficiencies in management. Those people charged with managing the water resources development programmes and those charged with administering external financial aid to developing countries have failed to adapt to the changing circumstances. The pressures to produce results, to initiate projects and to disburse allotted finance within prescribed time limits and under inflexible rules, have continued to direct scarce resources into new projects instead of into consolidating ground gained and into strengthening services.

31. It is, of course, a primary task of managers to adapt plans to changing priorities. Many acknowledge that they need to strengthen their staff, to improve operation and maintenance and to upgrade the supporting services. They cannot get the necessary financial support from their governments, however, and the donors have in the past been supremely disinterested in supporting what they consider to be a government commitment. It has required great courage to call a halt to investment in development projects until all the support can be guaranteed and few managers have risked the political outcry it would entail.

32. Only the senior managers and decision makers are in a position to adapt to the changing circumstances. It is a failure of management to ignore what can and what cannot be done with the means available. It is also the responsibility of donors to ensure that their aid is effective and not adding further to a country's financial burden.

PROBLEMS OF STRATEGY

33. Given the present situation, it becomes a question of searching for a strategy to seek the way forward. The project approach after twenty or so years can be seen to have largely failed in terms of the massive investment and the measurable benefits. There are other strategies which have also been seen to have severe drawbacks.

34. The IDWSSD, for example, was launched with the objectives of improving water supply and sanitation. The ministries of health were seen as the targets for the sanitation programmes. It is well known, however, that sanitation is low on the list of priorities of ministries of health in developing countries simply because of the many other priorities such as inadequate medical facilities for curative as opposed to preventive medicine. Furthermore, few ministries of health are equipped with the appropriate construction units for field programmes such as rural and urban sanitation. As a result, with few exceptions, the sanitation side of the Decade programmes has lagged far behind the water side.

35. A preoccupation with economic analysis and with benefit - cost analysis has meant that only those projects with clear-cut returns or revenue are eligible for assistance. Because of the difficulties of applying benefit - cost analysis to unquantifiable social and health benefits, water supply and sanitation are only included as infrastructural components of rural development programmes with consequent severe restrictions on their size and cost. Equally, the strengthening of government capabilities has been minimal and largely restricted to agricultural and urban water supply departments. Operation and maintenance costs were frequently neglected.

36. Recent trends have seen attempts to seek full or partial cost recovery from the rural communities. This seems to have been more successful in West Africa than elsewhere but it is doubtful whether more than the costs of routine operation and maintenance can be recovered and capital installation costs will

still be subject to complete subsidy. Bearing in mind the scale and costs of most rural water supply programmes in the context of Decade targets, it raises the problem of finding grant aid for such programmes unless governments are willing to face up to covering loan repayments and possibly operation and maintenance costs from general revenue or indirect taxation.

37. Too little emphasis has been placed on the catalytic nature of rural water supply programmes. Often they are the start of community participation in a wide range of economic activities. The health benefits of water, sanitation and basic hygiene programmes have an unquantifiable financial value. The release of time spent in the drawing and carrying of water opens the possibility of using the time for further economic benefit. Micro-irrigation, soil and water conservation and cash crop cultivation can also be stimulated by water development programmes.

38. An alternative strategy for Africa was advanced by the Department of Technical Co-operation for Development (DTCD) in May 1984 as a proposal for action for the United Nations system.7/ Recognizing the present situation and the many unfavourable aspects of Africa's climate and availability of water resources, DTCD suggested that, for the remaining years of the Decade, areas should be identified which should be given priority in each country and assistance should be given to governments to prepare "bankable" projects. The United Nations system, in the first instance, should identify a number of area types which may be considered to have priority in a developmental and social context, and assist and co-operate with government in the physical identification of projects and in project preparation.

39. While the proposal has merit in seeking to use limited resources in achieving the maximum benefit, two drawbacks are immediately apparent:-

(i) it assumes that a survey of priority areas would allow a categorization to be developed which would short-cut the more normal procedure of priority identification at national level;

and (ii) it perpetuates the "project" strategy without assisting in the build-up of national capabilities.

40. Where countries have not prepared water resources development master plans within the overall national development plans, technical support teams could undoubtably assist in defining priority projects. It seems unnecessary, however, to constrain these within a philosophical framework and to attempt to categorize where the physical, social and economic conditions are so varied.

AN ALTERNATIVE STRATEGY FOR THE FUTURE

41. In the light of the identified constraints and the problems of current strategies, an alternative approach for the Africa regions can be tentatively proposed. For convenience, it has been described as a ten-point plan, although there is nothing sacrosanct about the ten points and the essence of a good strategy is that it should be able to adapt to changing circumstances.

42. At the mid-point in the Decade, however, it is put forward as a means of accelerating progress over the next five years. Hopefully, some of the major constraints can be removed or their effects lessened in the short-term. Clearly solutions to many of the problems of human resources development are long-term and similar constraints will still be apparent in 1990. The target audience for the strategy are developing country governments, the United Nations system and external donors.

(i) PUBLICITY

43. The first objective is to improve the public information campaign - a process which has already started - but with a direct focus on Africa which conveys the message that the Decade is about helping people to help themselves. The Decade goals do not have to be revised but there should be more emphasis on what can be done (building on the success stories so far), how it can be done (community participation, low-cost technology) and how external assistance can be used to supplement government programmes if the people themselves are willing to organize themselves.

44. The social benefits of improved water and sanitation services are well-known. The economic benefits need to be stressed. The range of technology available is not fully appreciated and the way in which external financial support is solicited is not understood generally. If people clamour for improved water supplies at community level, governments will be forced to recognize the sector as needing more priority at national level.

45. To this end, the United Nations system, and notably UNDP, could assist in mounting national campaigns in receptive countries on conserving water resources, on self-help methods of improving water supplies and on basic hygiene. These campaigns should be closely tied to national programmes through which the necessary financial and material support can be channelled.

46. At the international level, the fundamental nature of water and sanitation programmes as a basis for agricultural and economic development in the rural areas should be stressed to donors. The current emergency situation and the widespread food deficits are ample evidence of the breakdown of traditional agriculture over wide areas as a result of poor or non-existent water management. We cannot change the rainfall patterns yet, but much can be done to make the best use of what little rain falls. Sanitation in its broad application to personal and community health care is closely tied to water availability and an understanding of the way in which water-related diseases are spread.

47. It is important that the key role of water and sanitation is not overlooked in the campaign for food self-sufficiency and in the change-over from emergency to long-term development assistance.

(ii) FUND MOBILIZATION

48. A fundamental problem which has to be faced is that not only is it extremely difficult to solicit additional funds to be earmarked for Decade programmes but also the number of projects which could benefit from external aid are limited by the constraints mentioned above.

49. Possibly the most beneficial policy to adapt would be two-pronged:-

(i) there should be a more equitable distribution of available funds so that Africa south of the Sahara receives at least as much as other regions;

and (ii) there should be an immediate emphasis on improving the national facilities for implementing water and sanitation programmes including manpower development, management training, supporting services and operation and maintenance.

50. Some of the large donors still contribute far less than the target 0.7 per cent of GNP as development aid. The benefits of economically stable developing countries in Africa will be rapidly seen in expanding markets for manufactured goods on which many of the richer trading nations depend. If only in self-interest, there is merit in increasing the amount and effectiveness of development aid. It is, after all, far cheaper than emergency aid.

51. UNDP at the outset of a new funding cycle could also be requested to persuade governments to utilize country IPF's on project identification and preparation, particularly in water and sanitation. If, as seems likely, funds continue to be strictly limited, UNDP assistance could be used as "seed money" or as a catalyst in starting the project cycle, with other major donors, including bilaterals, providing the bulk of the funds required for implementing projects and programmes

52. If the national programmes were put on a sounder foundation with conspicuous efforts made to remove the constraints and bottlenecks by national governments, there would be a greater willingness on the part of the donors to increase their assistance to water and sanitation programmes. The initial emphasis in the fund mobilization drive, therefore, should be to convince donors that support for structural changes and infrastructural strengthening is a sound investment for the future and of lasting benefit to the recipient countries.

(iii) ORGANIZATION AND MANAGEMENT AT NATIONAL LEVEL

53. The most controversial and sensitive issue is that of improving organization and management at national level. There are good managers and bad managers, all beset by great difficulties and numerous constraints; some with good organizational structures and others with poorly co-ordinated and fragmented units. The "track record" and productivity of most managers and units are understandably below what is required.

54. At the same time, because the managers are sensitive about their poor performance, undue emphasis on this aspect can be counterproductive, with personal and national pride preventing change.

55. In seeking to assist from outside, training and incentives should be used to improve output rather than criticism and comparisons with other countries. Once basic managerial skills and techniques are acquired, production targets can be used to improve performance. Governments should be prepared to reward good performance and penalize persistent poor performance. It is extremely difficult within the Civil Service but not impossible.

56. Initially, management training should be a high priority for all governments, transferring skills from the private sector and from industrialized countries. Short training courses for senior managers and training officers should be followed by in-service training for middle-level and junior managers. Reporting systems and both internal (departmental) and external (inter-ministerial) monitoring and evaluation should be implemented and adhered to.

57. It is, of course, impossible to radically improve the efficiency of the Civil Service overnight and many changes are necessary to streamline the bureaucratic procedures which are strangling the economies of the poorer countries. Given the present crisis situation, however, it is not a luxury but a necessity for governments to reform their Civil Service. The water and sanitation sector is but a small part of central government. Nevertheless, it would benefit immensely from any improvements in efficiency.

58. Management consultants have been used in the past but often their recommendations have been ignored or the structural changes suggested have been impossible to implement without changing the Civil Service regulations. One solution is to consider the establishment of parastatal utilities for the water industry, as is done for the large municipalities, but with an expansion to cover rural water supply and sanitation. This would allow a more commercial approach to management and productivity and the necessary improvements in efficiency without too great an immediate change in government policy. It would also allow the introduction of incentive schemes for high productivity in areas like general target achievement, borehole drilling, well construction, maintenance of plant and equipment and early project completion.

59. A prerequisite for all improvements in organization and management is a thorough manpower survey with recommendations for strengthening key areas, career development and training. Both external and internal training should become a major part of all ongoing programmes, and not just relegated to junior administration officers instead of being a prime managerial task. In the field of manpower development, the United Nations system could and should make a major contribution.

(iv) PLANNING AND PROJECT PREPARATION

60. Despite the emphasis on water master planning in some countries, there have been fundamental misconceptions as to the aims and methods of master planning. At its simplest, master planning aims at assessing the resources of a country and defining the optimum future development strategy, taking into account physical, technological, economic, organizational, legal and political constraints. All too often master plans have foundered on inadequate data bases and been unable to progress much beyond the inventory phase; or they have simply listed possible development options or projects without linking these to the national development plan.

61. The International Hydrological Decade and subsequent International Hydrological Programmes have done much to improve the collection and analysis of hydrological and meteorological data within developing countries. Unfortunately,

because of economic and political problems, networks have been neglected and the quality of data has deteriorated in many areas in recent years. Since master planning is largely a forecasting exercise, its success depends ultimately on the quality of data being fed into the mathematical models being used for design purposes. Even in the rural sector, water supply and sanitation options will depend on basic data covering streamflow, spring yields, ground-water levels and drainage characteristics. It is essential, therefore, that the work on assessing the resource base is not neglected even though the economic benefits may only be seen in future years.

62. Given a knowledge of the resource base, the next step is not a catalogue of options but a definition of priorities and targets on the basis of national development plans. This involves a constant dialogue with the national planning authorities to determine the support government will be able to give to the sector over a specified planning period. It will reflect the degree of manpower development and improvement of support services which can be expected and also the level of external support, since donors' priorities will be largely dictated by the government's set priorities.

63. At this stage, it should be possible to assess the relative size of the various programmes (urban water supply, rural piped water supply, ground-water development, urban and rural sanitation, irrigation, hydroelectric power, water quality and pollution control, river basin development etc.) and to prepare various scenarios over the planning period. Since planning is an iterative process, the dialogue with central planning must be maintained since the constraints which will become apparent can only be removed by policy decisions. For example, if essential materials can only be obtained overseas, the necessary exchange control permission will be needed to import the items. Similarly, if an expanded borehole drilling programme is envisaged it is not only equipment but trained drillers who are required. The recruitment and training of staff will require an additional input from central government resources.

64. The complexity of the planning process requires that a planning unit with project economists as well as engineers be established as the central co-ordinating unit for the sector. Vertical integration with ministries of finance and planning and down to field operation level as well as horizontal integration with ministries of health, agriculture, rural development and urban development is essential. Since many of the rural water supply and sanitation projects may be implemented within rural development or agricultural programmes, close liaison with other planning units must be maintained in order to forecast realistically.

65. There is no doubt that existing sectoral planning units need to be strengthened and linked closely with management. Failure to plan adequately has certainly constrained progress by depriving decision makers of an essential management tool. Once again, the United Nations system could assist in the short-term with technical assistance and in the long-term with training. Governments, for their part, should recognize the essential role of the planning units and establish the necessary mechanisms for integration and dialogue.

66. Project preparation is made infinitely easier within the context of an efficient planning organization. For specialist skills, the United Nations organizations and agencies can be called upon to render assistance. Unless the programmes are defined within an overall strategy, project preparation risks being a futile exercise and unplanned or unco-ordinated projects may do more damage than good.

(v) CO-ORDINATION

67. Lack of co-ordination is apparent at the international as well as the national level. Water and sanitation programmes are fragmented among numerous government departments and responsibility for external assistance is fragmented among United Nations organizations and agencies, bilaterals, multilaterals and non-governmental bodies. The IDWSSD Catalogue of External Support 8/ lists 90 bilaterals, development banks and funds, United Nations organizations, volunteer organizations and non-governmental organizations which contribute actively to water supply and sanitation activities. While one of the achievements of the Decade has been undoubtably to encourage team-work and co-ordination, much needs to be done to eliminate duplication and overlap if the limited funds are to be used effectively.

68. At country level, while responsibility for overall co-ordination of the aid programmes rests with governments, informal consultations among donors can help in balancing inputs between different sectors, in complementing different projects within a programme and in identifying particular constraints which need attention by governments. The role of the Office of the Resident Representative of UNDP as a co-ordinator and reference centre for information on past, present and future projects is invaluable, even though the size of UNDP programmes may have dwindled in comparison with bilateral and multilateral assistance. The use of country IPF's to fund pre-investment studies or project identification missions for projects which might ultimately be funded from non-United Nations sources has already been mentioned as a more effective use of limited resources. It will, of course, encourage more co-ordination and co-operation among donors.

69. While the World Bank prefers to use its own staff for project preparation and appraisal, other banks and funds which do not support as large a technical staff for such purposes may be more willing to use United Nations expertise in project identification and preparation.

70. This could take the form of interdisciplinary missions fielded by the United Nations organizations and specialized agencies. If the concept of utilizing UNDP funds for catalytic projects such as these is strongly supported by UNDP, governments would be more willing to see portions of IPF's set aside for this purpose.

71. At the same time, there is a need to improve co-ordination within the United Nations system, particularly at the regional level. Although the ACC Inter-secretariat Group for Water has done much to foster co-operation and the harmonization of programmes, the contribution of the larger organizations such as World Bank, UNDP and UNICEF falls far short of what is necessary to ensure effective co-ordination.

72. At the regional level, the Economic Commission for Africa has the mandate to perform a co-ordinating role. General Assembly resolution 32/197 of 20 December 1977 calls upon the regional commissions to exercise team leadership and responsibility for co-ordination and co-operation at the regional level and requested adequate budgetary and financial provisions be made to enable the regional commissions to carry out their activities. Unfortunately, such additional resources have not been made available and there have been consequent difficulties in establishing the necessary inter-agency liaison mechanisms in the African region.

(vi) WATER, ENVIRONMENT AND FOOD PRODUCTION

73. In the light of the current food deficit in Africa and the designation of food and agriculture as Africa's top priority by the 21st Meeting of Heads of State of the Organization of African Unity in Addis Ababa in July 1985, 9/ it is appropriate to examine how the IDWSSD can contribute towards increased food self-sufficiency.

74. The most obvious benefits of improved water supply and sanitation facilities are in the health of a community and in the release of time spent in drawing and carrying water for more productive activities, especially food production. There are less obvious benefits which have been mentioned above; the catalytic nature of water supply schemes in a wide range of economic activities; the use of water supply schemes as an incentive for adoption of improved farming technique. and their use as an incentive to introduce a large variety of soil and water conservation techniques.

75. Soil and water conservation, including anti-desertification measures, is the key to improved agricultural production, if not to survival, over the vast areas of Africa which suffer from seasonal rainfall. Of course, there must be enlightened pricing policies, ready markets for agricultural surpluses and good transportation facilities to support increased production. If water retentive soils and sufficient moisture for the growing season are absent, however, no amount of external inputs are going to increase production.

76. In the drier areas, soil and water conservation are linked closely with security of water supplies and security of food production. A certain widening of the aims of the IDWSSD is called for to ensure that water and sanitation are seen as essential components of the fight against desertification in the marginal areas, and the areas of seasonal rainfall with a potential for rain-fed agriculture must be the priority targets for the remainder of this Decade.

INTEGRATED RURAL DEVELOPMENT

77. The areas of greatest need are thus seen to be the rural areas of seasonal rainfall and in particular those areas which are marginal for rain-fed agriculture. Only by increasing the productivity of these areas can the rural-urban migration be slowed down. The preferred strategy for these areas is integrated rural development with water supply and sanitation not just a service component, like rural access roads, but a fundamental part of the development process. There are numerous rural water supply projects going on at the present time which are barely related to agricultural development or to soil and water conservation.

78. The concept of using integrated rural development programmes whenever possible for the implementation of priority water supply and sanitation projects will necessitate much more work at the planning stage to ensure the proper phasing of the water supply and sanitation inputs within the rural development programme. This will enable these components to complement the other efforts to improve the rural economy and greatly increase the impact of the water and sanitation projects.

79. This strategy will only be successful, however, if sufficient funds are set aside for water and sanitation in a rural development package. A rigid adherence to benefit-cost analysis where only the quantifiable benefits are counted will naturally limit the proportion of total costs allocated to so-called "services". If economic analysis of projects is going to be used as a tool in the project cycle, it should be refined to include estimates of the non-quantifiable benefits.

80. Furthermore, there is no reason why a number of donors and types of financial aid cannot be combined within a single rural development programme. Thus, the components with large social or unquantifiable economic benefits could be funded by grants and the components with direct economic benefits by loans.

81. To reduce the costs of rural water and sanitations, much more emphasis should be placed on low-cost techniques. There is a great disparity in unit costs from country to country. The difference cannot be explained entirely by different physical conditions. Inefficient use of costly borehole-drilling machines, for example, results in high drilling costs and low productivity in many countries. Efficient use of resources is an aspect of good management, of course, but dissemination of experience from one country to another can enable managers to improve their operations.

(viii) URBAN WATER SUPPLY

82. The second priority area for the remainder of the Decade must be the urban areas because of the large concentrations of populations and the increasing rural-urban migration. It has to be recognized, however, that in spite of the greatest need in the urban fringes where the poorest sectors of the urban population reside, renewal and upgrading of the main urban supplies will continue to take precedence even though such projects will not immediately benefit the areas outside the central distribution systems.

83. In many cases, urban fringe areas may have to be considered as rural water supply and sanitation schemes, with low-cost technology and separate water distribution schemes. Opposition from urban planners and municipal water supply authorities can be expected, however, and strong pressure will be exerted to delay the supply of the fringe areas until proper housing and proper distribution systems can be built.

84. One of the delays in upgrading and expanding main urban systems stems from poor management of existing systems. Design of the new systems may be delayed by poor water auditing, poor leak detection, poor metering and poor accounting systems. Improvements in all these areas are essential prerequisites of urban

water supply projects but many augmentation schemes have gone ahead on scanty data for projecting future demand. Bearing in mind the huge costs of large urban schemes, there is a real danger of over- or under-design, both of which imply a waste of resources.

85. A priority area for urban water supply programmes, therefore, is the establishment of efficient water auditing systems and these should be made mandatory before augmentation or renewal schemes are considered.

(ix) IRRIGATION

86. Irrespective of the poor past performance of the irrigation sector in Africa south of the Sahara in recent years, irrigation schemes are seen as a major means of increasing food production in the drier areas, and national governments will continue to place such schemes high on their list of priorities. Often the schemes proposed are small; lacking access roads; remote from markets; lacking soil conservation in the upper catchments and thereby prone to flash flooding and high sedimentation rates; in areas with little or no tradition of water management;and the governments have no clear idea of what crops to grow. Inevitably, the high capital costs of building conventional schemes means that only high value cash crops can yield the return required to justify the investment. Such cash crops can be used for export or for import substitution but this is a long way from the initial intention of increasing staple food production in the drier areas.

87. At the same time, irrigation schemes need high levels of management to ensure economic viability. The absence of such skills has already been highlighted and it is even more acute in the irrigation sector and in countries with little experience of irrigated agriculture.

88. An alternative strategy is to concentrate on small-scale or micro-irrigation, closely integrated with soil and water conservation, and starting in the upper catchments of river basins. Thus catchment protection, the more efficient entrapment and utilization of available rainfall, and the acquisition of basic skills of water management become forerunners of the eventual use of middle and lower catchments for future irrigation schemes. The benefits of river control and reduction in sediment loads will be seen in a wide variety of development activities such as road construction, water supply and hydropower, as well as irrigation.

89. In adopting this strategy, the links between the water supply and sanitation programmes of the IDWSSD and integrated rural development become clear. Better water management of the upper catchments makes the provision of water supplies that much easier, and sanitation programmes can be incorporated in the rural development package. The combined effects of the package will be increased food security and better environmental protection.

(x) PASTORAL REGIONS

90. The semi-arid areas of the Sahel, the fringes of the southern subtropical desert and the lowland areas of East Africa are pastoral regions. In these areas, the sparse populations and difficult physical conditions make the provision of water supply and sanitation a lower priority in terms of numbers of people who can be served in this Decade. Because of the effects of the recent drought and the vulnerability of these areas to periodic failure of seasonal rains, many of the current emergency measures are directed towards the pastoral regions and the interface between them and the areas of marginal rain-fed agriculture.

91. The provision of additional water supplies alone is known to be a mistaken strategy. They can upset the delicate balance between migration and forage regeneration and also the traditional pastoral systems, which are often well-adapted to climatic conditions. Such traditional systems are aimed at milk production and not beef production, which has led to some misconceptions as to their efficiency. 10/

92. At the present time, there is no clear strategy for water supply in the pastoral regions. Whereas the provision of secure water supplies can reduce the waste of energy in trekking to water and control the intensity, evenness and period of grazing, 11/ the provision of water supplies in the pastoral regions is not a simple matter and it has to be done in harmony with livestock and range management programmes.

93. One of the priorities for the pastoral regions is the improvement of operation and maintenance of existing and new supplies. Another is more research into traditional pastoral systems, the management of water supplies and the ways in which a transfer to beef production can be accomplished.

94. Allied to this, WMO should be encouraged and supported in their research programmes on drought forecasting in Africa. Ultimately, the prediction or forecasting of failures in seasonal rains will be the most useful management tool for the drought-prone areas.

CONCLUSION

95. This report sets out an assessment of the water supply and sanitation situation in Africa in relation to the mid-point of the IDWSSD and the needs and priorities for the future. An alternative strategy is proposed for the remainder of the Decade which is not so much a discussion of new ideas but a modification of the order of priorities in various areas.

96. In the ten priority areas, an attempt has been made to indicate where emphasis should be placed for all those involved in Decade activities. These are based on an overall assement of constraints and priorities for the Africa region but, clearly, individual countries may need different combinations of the suggested priority measures to accelerate their own programmes.

97. Since the United Nations system has initiated the Decade for member States, it is now the responsibility of the system to seek the way forward to consolidate ground which has been gained and to accelerate progress. It is hoped that this report will contribute towards a more successful programme for water supply and sanitation for the remainder of the Decade.

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(18)

Summary Translation

CEAO (West African Economic Community)
Donor Meeting - 2nd rural Water Supply Program
Final Report

The meeting took place in Cotonou, November 9-10, 1987 and was organized by CEAO. 12 institutions were represented, among them: Ministry of Finance, Benin, West African Development Bank (BOAD), African Unity Organization (OUA).

The goals of the first RWS program were successfully achieved. Representatives of BOAD, African Development Bank and Kuwaiti Fund expressed their readiness to finance CEAO in the 2nd Program. They stressed the excellent cooperation between CEAO and their institutions.

Topic of the meeting: Fundraising for 2nd RWS Program

National Projects

Benin: Cost of project: FCFA 3.6 billions
Kuwaiti Fund will lend FCFA 1.5 billions, 2 billions to be found.

Burkina Faso Cost of project: FCFA 2,1 billions
Kuwaiti Fund ready to lend 1.5 billions subject to feasibility study justifying that simple water supply systems will be chosen and that no operating or maintenance problems will arise.
African Development Bank ready to participate with FCFA 1.8 billion subject to study and formal request form Government.

Côte d'Ivoire Cost of project: FCFA 1.8 billions
African Development Bank ready to finance, providing the RWS sector solves its institutional problems.

Mali: Cost of project: FCFA 4.3 billions
Kuwaiti Fund approved FCFA 2.5 billions loan to build 423 wells and 20 ponds.
CCCE (Economic Cooperation Central Fund) is interested in financing some components.

Mauritania: Cost of project: FCFA 8.5 billions
Kuwaiti Fund satisfied with feasibility study. Will lend FCFA 1.5 billions and more.
African Development Bank interested too. A request for 40 boreholes is being examined.
World Bank also engaged, however, no detail known yet.
Still big sums to be found.

Niger: Cost of project: FCFA 5.5 billions
Kuwaiti Fund approved FCFA 2.5 billions
BOAD approved FCFA 2.180 billions
CCCE still identifying the project.

Senegal: Cost of project: FCFA 22 billions
BOAD approved FCFA 2.422 billions
Kuwaiti Fund would in principle lend 1.5 billions
BADEA, BID both interested.
Still, enormous gap.

OPEP Fund informed that they are ready to disburse and are awaiting requests.
BADEA also ready to lend for national projects.
FED (within Lome III convention) ready to support national projects.
Other EEC fundings possible.

CPogany:3/24/88

DATE: March 18, 1988
TO: Distribution
FROM: Jean H. Doyen, Chief, AFTIN
EXT: 34760
SUBJECT: West Africa Regional Fund Raising Meeting
CEAO Rural Water Supply Program

I am circulating for your information the final report on the West Africa regional fund-raising meeting held in Benin, November 9 and 10, 1987. The meeting was sponsored by the CEAO (Communaute Economique de l'Afrique de l'Ouest) to renew support for their Rural Water Supply Program.

Distribution:
Messrs. Watson (AF5IN), Pellegrini (AF4IN), Soto (AF1IN), Arlosoroff (INUWS), Heyland (SDT, Abidjan)

(1) ~~EP - Rough Trans. please~~

(2) ~~D. Gubler~~

EHewitt:

COMMUNAUTE ECONOMIQUE
DE L'AFRIQUE DE L'OUEST
(C.E.A.O.)

SECRETARIAT GENERAL

REUNION DES BAILLEURS DE FONDS DU 2ème PROGRAMME HYDRAULIQUE VILLAGEOISE ET PASTORALE

COTONOU, 9-10 NOVEMBRE 1987

RAPPORT FINAL

Les 9 et 10 Novembre 1987 s'est tenue à Cotonou, en République Populaire du Bénin, la réunion des bailleurs de fonds du 2e Programme hydraulique villageoise et pastorale de la CEAO.

Douze Institutions étaient représentées.

La liste des participants se trouve en annexe 1.

L'allocution de bienvenue a été prononcée par Monsieur Mohamed Abdallahi OULD MOHAMED AHMED, Secrétaire général adjoint de la CEAO en présence de son Excellence Monsieur Barnabé BIDOUZO, Ministre des Finances et de l'Economie de la République Populaire du Bénin Président en exercice du Conseil des Ministres de la CEAO. Etaient également présents à la séance d'ouverture, Monsieur Abou Bakar BABA-MOUSSA, Président de la Banque Ouest Africaine de Développement et Monsieur S. NSANZIMANA, Secrétaire général adjoint de l'Organisation de l'Unité Africaine.

Dans son allocution, le Secrétaire général adjoint de la CEAO, après avoir remercié d'une part les plus hautes Autorités de la République Populaire du Bénin pour l'accueil chaleureux réservé à tous les participants à la réunion et d'autre part les bailleurs de fonds pour leur contribution au financement du 1er Programme hydraulique CEAO dont les objectifs initiaux ont été largement atteints, a exprimé le voeu ardent que la réunion de Cotonou permette le bouclage du financement des sept volets nationaux.

Dans son allocution, le Président en exercice du Conseil des Ministres de la CEAO, a rappelé les résultats satisfaisants enregistrés dans la réalisation des volets nationaux du 1er Programme hydraulique CEAO grâce au concours financier et technique des bailleurs de fonds ici présents. D'autre part, il a insisté sur l'importance de l'approvisionnement en eau en milieu rural, et a souhaité plein succès à la réunion.

A la suite de ces deux allocutions, les représentants des Institutions suivantes Banque Ouest Africaine de Développement, Banque Africaine de Développement et Fonds Koweitien ont exprimé leur disponibilité à poursuivre leur soutien à la CEAO et à participer au financement du 2e Programme hydraulique.

.../...

Ils ont souligné par ailleurs, l'excellente coopération établie entre le Secrétariat général de la CEAO et leurs Institutions respectives.

Dans son message, le Secrétaire général adjoint de l'Organisation de l'Unité Africaine a exprimé le soutien de l'OUA à l'effort entrepris par la CEAO et a annoncé la contribution de l'OUA à hauteur de 200 mille dollars US.

Les déclarations des différents intervenants sont jointes en annexe 2.

Le bureau de la réunion a été constitué comme suit :

PRESIDENT : Fonds Koweitien de Développement Economique Arabe.

VICE-PRESIDENT : Banque Africaine de Développement.

RAPPORTEUR : Secrétariat général de la CEAO.

L'ordre du jour suivant a été adopté :

POINT UNIQUE : montage financier du 2e Programme hydraulique

Les débats ont porté essentiellement sur le plan de financement des différents volets et sur certains aspects techniques.

I/ VOLET BENIN :

Le coût du projet se chiffre à environ 3,6 milliards de F CF

Le Fonds Koweitien confirme sa participation au financement de ce volet à hauteur de 1,5 millions Dinars Koweitiens environ 1,[illegible] milliard de F CFA. Cette Institution souhaite recevoir dans les meilleurs délais, une note complémentaire relative aux composantes du projet qu'elle se propose de financer.

Le déficit de financement serait de l'ordre de 2 milliards de F CFA.

Par ailleurs, le Fonds Européen de Développement a annoncé

le financement dans le cadre bilatéral et hors programme CEAO d'un projet d'hydraulique villageoise dans la Province du Mono à hauteur de 1,4 milliard de F CFA.

II/ VOLET BURKINA FASO :

Le coût du projet a été estimé à 2,1 milliards de F CFA.

Le Fonds Koweitien attend du Gouvernement burkinabè et de la CEAO une étude de factibilité justifiant la réalisation d'ouvrages hydrauliques simples ne posant pas de gros problèmes de fonctionnement et de maintenance et serait prêt à considérer le principe du financement de ces ouvrages à concurrence de 1,5 millions de Dinars Koweitien

La Banque Africaine de Développement envisage favorablement de participer au financement de ce volet à hauteur d'environ 5 millions UCF soit environ 1,8 milliard de F CFA après examen et réception de la requête des Autorités du Burkina Faso.

III/ VOLET COTE-D'IVOIRE :

Le coût du projet a été estimé à 1,8 milliard de F CFA.

La Banque Africaine de Développement pourrait participer au financement de ce volet sur requête des Autorités de la Côte-d'Ivoire sous réserve que les problèmes d'ordre institutionnel relatifs au secteur de l'hydraulique rurale soient préalablement résolus et que d'autres bailleurs de fonds et notamment la Banque Mondiale ne prévoit pas de financer le projet.

IV/ VOLET MALI :

Le coût du projet a été estimé à 4,3 milliards de F CFA.

Le Conseil d'Administration du Fonds Koweitien a accordé au Mali un prêt de 2,5 millions Dinars Koweitiens (2,5 milliards de F CFA) pour réaliser un projet de 423 puits et 20 mares.

La Caisse Centrale de Coopération Economique s'intéresse au financement de certaines composantes du projet et en poursuit l'ins-

.../...

dans le cadre bilatéral et sur requête du Gouvernement du Ma

V/ VOLET MAURITANIE :

Le coût du projet est d'environ 8,5 milliards de F CFA.

Le Fonds Koweitien juge que l'étude de factibilité du proje est valable et se propose d'évaluer le projet dans les jours qui suivent. La participation du Fonds est de l'ordre de 1,5 millions Dinars Koweitiens et pourraît être éventuellement augmentée au vu des résultats de l'évaluation.

La BAD s'intéresse au financement du secteur de l'hydraulique rurale dans ce pays. Une requête pour la réalisation de 40 forages est en cours d'instruction et le principe du financement est acquis.

Une mission de la BAD se rendra en Mauritanie en décembre 1987 et permettra de définir la possibilité d'élargir ce projet à certaines composantes du volet mauritanien du 2e Programme CEAO.

La Banque Mondiale prévoit un engagement continu dans le secteur de l'hydraulique, mais son représentant ne disposait pas, lors de la réunion d'informations sur le contenu de la prochaine intervention et ne pouvait préciser si elle portait sur certains volets du Programme CEAO. Cette information sera fournie ultérieurement aux Autorités mauritaniennes.

Il apparaît donc un déficit de financement important ; la CEA et la Mauritanie devraient approcher leurs partenaires traditionnels afin de boucler le financement de ce volet.

VI/ VOLET NIGER :

Le coût du projet est évalué à environ 5,5 milliards de F CFA et son financement sera assuré par :

a) FONDS KOWEITIEN :

Cette institution a déjà procédé à l'évaluation du projet et son Conseil d'Administration a donné son accord pour participer au fi-

nancement à hauteur de 2,5 millions Dinars Koweitien, soit environ 2,5 milliards de F CFA.

b) BOAD :

La BOAD a également procédé à l'évaluation du projet conjointement avec le Fonds Koweitien. L'accord de prêt a déjà été signé et porte sur un montant de 2,180 milliards de F CFA.

c) CCCE :

La CCCE poursuit l'identification du projet dans le cadre bilatéral.

VII/ VOLET SENEGAL :

Le coût du volet a été estimé à environ 22 milliards de F CFA. Ce volet a été subdivisé en plusieurs parties pouvant être financées de manière indépendante.

La BOAD interviendra dans les régions de St-Louis et Louga à hauteur de 2,422 milliards de F CFA, montant approuvé par son Comité de Direction.

Le Fonds Koweitien considère que les études sont acceptables et constituent une bonne base pour l'évaluation du projet. Il s'intéresse à la composante puits, contre-puits et mares et se propose d'évaluer le projet dans les prochains jours. Il considère le principe de l'octroi de 1,5 millions de Dinars Koweitiens soit environ 1,5 milliard de F CFA qui pourrait être augmenté au vu des résultats de l'évaluation.

La BADEA procèdera prochainement à l'évaluation du volet conjointement avec le Fonds Koweitien. Le montant du financement sera défini ultérieurement.

La BID a confirmé son intérêt pour le projet. Une mission d'identification a eu lieu récemment. Sa participation sera définie ultérieurement.

Un déficit important de financement subsiste au niveau de ce projet.

.../...

Aussi, est-il recommandé à la CEAO et aux Autorités sénégalaises de poursuivre la recherche de financement auprès de leurs partenaires financiers.

VIII/ AUTRES INTERVENTIONS :

Le Fonds de l'OPEP a informé les participants qu'il démarre son programme pour les années 88-89 et qu'il reste attentif à toute requête adressée par les Autorités de chaque pays dans le cadre de leu priorités.

La BADEA a annoncé sa disponibilité à considérer la participation au financement du programme pour les volets nationaux et ce, après examen des requêtes adressées par les pays concernés, éligibles au financement BADEA.

Le représentant du FED informe que dans le cadre de la Convention de Lomé III, une aide communautaire dans le domaine de l'hydrqulique est prévue à l'intérieur des Programmes nationaux.

D'autres interventions des Communautés Européennes dans le secteur de l'hydraulique, sont possibles au titre de la coopération régionale. Ces interventions seront cependant soumises à la présentation d'une requête appuyée par plusieurs états.

Le Président

Pour le Fonds Koweitien
KADHI Mustapha,
Conseiller au Fonds Koweitien

Le Rapporteur

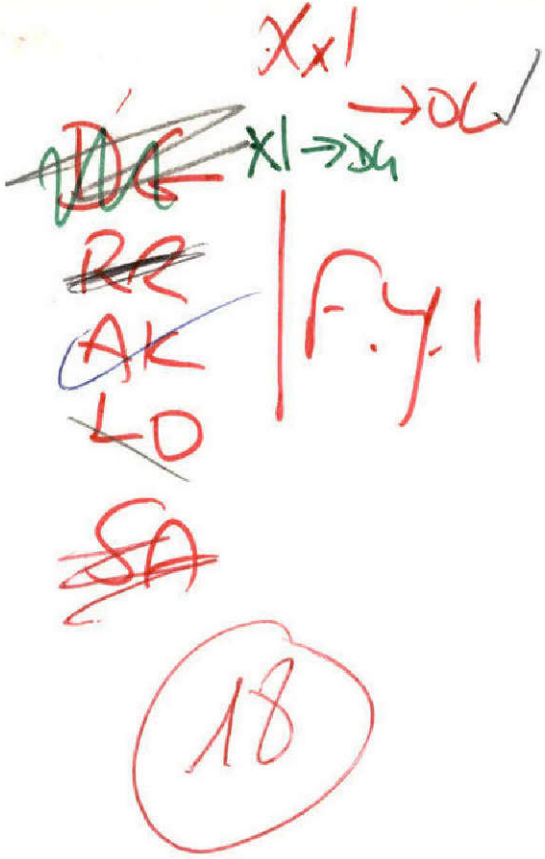
Pour le Secrétariat général
Mohamed Abdallahi OULD
MOHAMED AHMED.
Secrétaire général adjoint

ANNEXE

SITUATION DES PROJETS ET ETUDES FINANCES PAR LA BANQUE DANS LE SECTEUR DE L'ALIMENTATION EN EAU POTABLE

N°	Année d'approbation du Prêt	Intitulé du Projet Name of Project	Montant du Prêt (M F CFA) loans	Nbre points d'eau prévus ou réalisés No. wells	Situation actuelle Status
		I. Hydraulique villageoise et pastorale			
1.	1977	Hydraulique villageoise en Côte d'Ivoire	765	320 F + 60 F	Terminé en février 1980
2.	1977	Atelier de forage au Burkina Faso	700	1 atelier + 70 forages	Terminé
3.	1979	200 forages Liptako au Niger	370	163	Terminé en mars 1982
4.	1980	Brigades de nuits au Sénégal	573	-	Terminé : novembre 82
5.	1980	Hydraulique villageoise au Togo	560	150	Terminé : août 1984
6.	1982	Hydraulique villageoise FDR III au Burkina	1 000	350	En exécution
7.	1983	H.V. Atlantique et Sud du Zou au Bénin	1 186	201	En exécution
8.	1984	H.V. au Sud-Est de la Côte d'Ivoire	922	325	En exécution
9.	1985	H.V. dans l'Atacora au Bénin	1 550	250	En exécution
10.	1985	H.V. Houet/Kénédougou au Burkina	1 326	250	En exécution
11.	1987	H.V. Pastorale CEAO II au Niger	2 180	221	Démarrage imminent
		Sous total I	11 132	2 360	

N°	Année d'approbation du Prêt	Intitulé du Projet	Montant du Prêt (M F CFA)	Nbre points d'eau prévus ou réalisés	Situation actuelle
		II. AEP de centres secondaires			
12.	1979	Equipement de forages au Sénégal	500	10	Terminé 1984
13.	1981	AEP 4 centres secondaires au Niger	615	3	Terminé 1986
14.	1983	AEP 7 centres secondaires au Burkina	508	7	En exécution
15.	1987	Hydraulique rurale CEAO II au Sénégal	2 422	32	Démarrage imminent
		Sous-total II	4 045	42	
		III. Hydraulique urbaine			
16.	1981	Captage de Pout Nord au Sénégal	661	1	Terminé 1982
17.	1983	Adduction d'eau de Lomé (Togo)	1 200	1	En exécution
		Sous-total III	1 861	2	
		IV. Etudes			
18.	1985	Pompes à motricité humaine en zone UMOA/CEAO	38,6		Terminé
19.	1986	Hydraulique villageoise et pastorale à Diré, Goundam et Tombouctou au Mali	46,4		Terminé
0.	1987	H.V. et pastorale Autorité du Liptako-Gourma dans les arrondissements de Tera, Tillabery et Say au Niger	48,3		En cours
		Sous-total IV	133,3		
		TOTAL (I + II + III + IV)	17 171,3		


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THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: March 6, 1987

TO: Chief and Senior Economists, Eastern Africa
Chief and Senior Economists, Western Africa

FROM: Stanley Please and Ramgopal Agarwala, SOA

EXTENSION: 7-3075 and 7-3073

SUBJECT: Sub-Saharan Africa -- Long Term Perspectives Study

1. Attached is a copy of the presentation we made to the Board the other day on the above Study.

2. You will observe that the major driving force of the Study has been significantly amended, although much of the work on the building blocks remains unchanged. This refocussing has been primarily the outcome of discussions with people in the Regions and elsewhere. The persistant message that has come across in these discussions is the need to be able to see "a light at the end of the tunnel". Without this, why should African governments, donors, etc. be encouraged -- or whiplashed -- into ever-greater efforts in policy reform, increased external assistance and other politically difficult action.

3. In responding to this message we have strongly resisted being drawn into undertaking macro-type projection exercises. These, in our view, have become both professionally disrespected and operationally of little or no value. What has seemed more useful is to run with the theme of reducing and closing the gap between Africa and the rest of the world in terms of quality of life objectives -- life expectancy, literacy, etc. This refocussing is to be found particularly in Paragraph 20 of the attached presentation. We intend to make this a primary driving force for the Study. In particular, we hope to be able to demonstrate that as a matter of political realism -- rather than of principle when anything is possible -- the achievement of these quality of life objectives is only possible if the goods producing sectors are generating rising real per capita incomes. The achievement of these objectives is, therefore, placed within the framework of the structural adjustment emphasis on agriculture, industry, public investment programs, etc. In doing this the approach distances itself from what we regard as the unreality of the basic needs strategies of the 1970's. At the same time we believe the approach captures the desire of the development community in general, and of the Bank in particular, to ensure that the continuing and necessary concern over structural adjustment is made consistent with the broader issues of social and economic development.

4. We would welcome reactions from you and your collegues on this revised thrust of the study. We would also request that you bring to our attention any country-specific work on the social sectors which is relevant to the elaboration of our theme and the testing of its central hypothesis -- i.e. that the achievement of social objectives requires as a necessary condition the growth of incomes from the goods producing sectors. We would also welcome being put in touch with individuals in your departments who have a professional interest and/or operational experience in this area of development problems. We need their help and guidance.

cc: Messrs. Jaycox, ESAVP; Wai, ESAVP; Kraske, EA1; Amoako, EA1KU; Wiehen, EA2; Wyss, EAP; Colliou, EAPED; Thalwitz, WANVP; Koch-Weser, WA1; Serageldin, WA2; Alisbah, WAP; Landell-Mills, WA2DB; ter Weele, WAPED; Husain, OPSVP; North, PHNDR; Birdsall, PHNPR; Jamison, EDTPD; Dubey, CPDDR; Lamb, Shirley, Paul, PPDPS; Herz, PPDPR; Gulhati, EDIDR; Loh, WUDDR; de Ferranti, WUDOD; Cour, WUDDR; Burmester, AEPED; de Tray and Ingram, DRDDR; Sicat, DRDPE; Lele, DRDDS; Abadian, OEDD3; Burki, IRDDR; Shakow, IRDIE; Beckmann, IRDIO; Aklilu, ASPAA; SOA staff; Long-Term Perspectives Team.

0085:SP;3/6/87

Mr. Chairman, Members of the Board:

1. In a series of pan-African reports since 1981, the Bank has analyzed the factors behind Africa's economic crisis. These reports have consistently concluded that with a combination of policy reforms and adequate external assistance, Africa's economic decline can be reversed.

2. Over the years a consensus has been emerging both in Africa and in the donor community on the substance of this message. The consensus was most visibly recorded at the UN Special Session on Africa held in May 1986. The meeting accepted the need for "a radical change in development priorities" with "agriculture the leading sector". More importantly, a majority of African governments have begun to implement economic reform programs supported by the donor community. Donors have also more clearly recognized their supportive role and many have moved to convert words into action.

3. These positive developments are reviewed in the Draft President's Report to the Development Committee distributed to the Board on February 19, 1987. This Report emphasizes that for the first time in the 1980s, low income Africa registered a growth in per capita income in 1986. This is expected to be repeated in 1987. Per capita income growth also took place in middle income African countries with the exception of the oil producers, which have been severely hit by the price decline. In a large number of African countries, a situation of famine has been replaced by the more bearable problems of food surplus and food storage. While improved weather has clearly been of importance, the contribution of improved policies to these more encouraging outcomes is not in doubt.

4. The key issue before the development community now is the issue of sustainability -- sustainability of the process of policy reforms and the sustainability of growth over the long term for countries that do continue to commit themselves to policy reforms. It is this issue of sustainability that will be the focus of the study entitled "Long-Term Perspectives in Sub-Saharan Africa," which has now been launched and which is expected to produce its report early in 1988. As in past reports, the study will emphasize the critical importance of macro management and policy issues more generally but will give greater attention to the basic constraints on development and to the long term perspective for Sub-Saharan Africa.

5. As with the previous Bank African reports, this long term perspective study will be drawing and building on other work done both within the Bank and outside. Most importantly, Board members will be aware of the emphasis given in the Bank in recent years to the problem of population growth in Africa. Similarly, the Bank has undertaken or is in the process of undertaking major pieces of analytical work in the sectors of education, health, transportation, and urbanization.

6. The report will review the implications of the long term parameters facing Africa with regard to its demography, its natural and human resource endowments and external environment. It is now widely recognized that if Africa is to achieve sustained growth over the long run, its high and accelerating population growth rate must be brought down. However, even with the best of efforts in the area of family planning,

population will grow at over 2.5 percent a year between now and the end of the century and the resources required to meet the needs of this population for food, education, health, and jobs will be large.

7. Events of the past decade clearly demonstrate that the on-going process of social development in Africa cannot be sustained without adequate growth in the goods producing sectors -- agriculture and industry. Looking ahead, it appears that Africa's land-man ratio in the 21st century will be substantially lower -- both because of the increasing labor force and in many countries, soil erosion and desertification. In several countries, such as Rwanda and Kenya, land scarcity has already emerged as an important constraint. In the past, minerals have provided an important source of income in many African countries (most obviously in Zaire, Zambia, Botswana, Gabon, and Nigeria). A severe depletion of the known reserves will occur in many countries. Nor does the external environment appear promising for Africa's traditional exports. As elaborated in the report to the Development Committee, demand for most of Africa's primary products is expected to grow slowly and unless Africa dramatically improves its performance, its market shares are projected further to decline.

8. In this environment, if Africa is to achieve sustained growth, it must concentrate on improving productivity. That in turn will require sustaining policy reforms and introducing modern technology, particularly in agriculture and industry. Fortunately, over the last two decades many African countries have devoted a large amount of resources to education and there is an emerging group of people -- entrepreneurs, civil servants and technicians -- who can, if given a proper environment, contribute to this process of modernization.

but also through investments and education.

9. The essential prerequisite for sustaining policy reforms is internalization of the process -- in technical, political and institutional terms. The report will examine each of these issues.

10. Introduction of modern technology and focus on high potential areas has been the basis of agricultural progress in Asia, and Africa will have to follow a similar path. However, such a strategy raises a large number of difficult issues. Are there technical packages of seed, fertilizer, water, and extension advice suitable for Africa's needs? Can such packages be developed in a reasonably short time? What are the issues of land tenure, labor migration, and food trade that such a strategy will raise? Rights of access to land and land holding and land working systems which were relevant for slash-and-burn farmers and for nomadic pastoralists are unlikely to be suitable to the needs of intensive agricultural practices. Moreover, and related to the issue of land rights, environmental issues of erosion, desertification, and deforestation need to be analyzed as central issues of agricultural development in Africa. The primary importance of the role of women in the agricultural process must be recognized. Finally, it is possible that agricultural growth will not be evenly spread across countries and across regions within countries. There would probably be a need for greater mobility of labor and increased food trade within and between African countries. The report will examine the constraints on such movements that exist at present and the changes needed to promote greater intra-African mobility.

Not yet recognized?

11. In the area of industry, much policy discussion has concentrated on correcting major distortions in trade, exchange and financial regimes. These reforms are essential for better utilization and further development of industrial potential in Africa; but increasingly attention must focus on improving the potential and, here again, movement toward more modern technology must be an important part of the answer. This in turn would raise issues of training, provision of infrastructure, and creating a competitive environment.

Do foreign markets exist? (Year's study on Lagos)

12. As in other parts of the world, agriculture and industry in Africa will have to interact in a more mutually supportive manner: agriculture supplying raw materials for industries and demand for their outputs; industry supplying inputs for agriculture as well as incentive goods for agriculturalists. Within this framework of interaction, it is clear that with higher levels of incomes, industrialization will come to play an increasing role in development despite its initial dependence on a more prosperous agricultural sector. Similarly, with the issue of rural-urban balance: in the long run, urban areas will dominate, but to be sustainable the process of urbanization must arise out of an initial emphasis on rural development accompanied by secondary city development. The key issue here is the proper sequencing of development, and the report will analyze this issue in the context of African countries.

Shared, common past experience and "ends" assumed w/ efforts to direct migration

13. It is obvious that the process of technical and economic modernization will require substantial financial resources -- for investment in social as well as economic sectors. Most developing countries which achieved sustained growth in the last three decades, have required annual investment of the order of 20 to 25 percent of their GDP. Increasingly, public investment reviews would have to consider not only what needs to be reduced or eliminated, but where additional investments are needed to sustain long term development; a focus on a "positive list" for investment rather than on a "negative list".

but also maintenance of capital stock!

14. In Africa, projects on average seem to cost more than elsewhere. Some of these presumed high costs of projects may be due to policy related factors (e.g. price distortions, over design, etc.) and policy reforms can bring them down to some extent. However, because of its size, geography, population density and transport difficulties, it is possible that project costs in Africa will remain somewhat higher than other developing countries. Thus the investment rates which must be recognized as essential for sustained growth are likely to be higher in Africa than elsewhere. The report will examine the issues relating to resource mobilization -- both internal and external -- that will be essential to meet Africa's investment needs during the 1990s.

15. Finally, the study will emphasize problems of institutional development. The objective must be to create a dynamic environment which will enable all institutions to adapt to evolving international and domestic conditions and contribute more effectively to growth and development -- the traditional and the modern institutions; the small and the large institutions; the private and the public institutions.

16. To assist the study team, an external panel of distinguished and experienced African policy makers and scholars of Africa will be appointed. In addition, it is intended to have extensive discussions on early drafts

at least! long overdue

of the report with those in Africa and outside who are specialists in each of the areas.

17. This, then, is the framework within which the current study has been conceived and some of its major building blocks. What, however, are the longer term prospects which it envisages for Africa?

18. For the majority of countries, the agricultural potential and the increasing potential for industrialization leave us in no doubt that rising per capita growth in these goods producing sectors is a realistic prognosis. Experience over the past quarter of a century or more in several African countries demonstrates that this can be achieved. In fact, some of the best performers in the agriculture and industry sectors have been countries such as Rwanda and Malawi, which were less well endowed than others in terms of agricultural potential or with human resources. Their past success and the success of other better endowed countries such as Kenya and Ivory Coast resulted from avoiding major distortions in policies -- particularly pricing and investment policies. The lesson is clear that sustaining policy reform and deepening the process of structural adjustment to encompass the policy, institutional, technological, and other issues which will be addressed in the ongoing study, will generate rising per capita production for most African countries.

19. For those countries with declining incomes from mineral enclaves, such as Nigeria and Zambia, agriculture and manufacturing industry will have to grow even more rapidly if per capita production is not to fall. But in fact the natural and human resource base in most of these countries exists for such growth.

20. There is, however, a small group of countries, most obviously in the Sahelian region, where the prospects are clearly less promising even under the best imaginable domestic policy conditions. That these countries represent less than 10 percent of Africa's population makes their poor prospects of no less concern. But recent experience in Africa and elsewhere demonstrates that even within the constraints of national states and irrespective of internal, provincial, tribal, and other characteristics, considerable migration takes place either seasonally or more permanently. Meeting labor shortages in more rapidly growing and prosperous areas is frequently the most effective way in which incomes of people in less well endowed areas can be raised. Measures to increase this internal and external mobility are a delicate but important issue.

21. It is upon these realistic possibilities for increasing agricultural and industrial growth in African economies that the prospects for improving the quality of life of African people can be built. Already since independence life expectancy in Africa has risen from around 40 years to around 50 years and in many countries has risen even more dramatically to well over 50 years. The proportion of children enrolled in primary schools has doubled over the same period to over 70 percent with many countries achieving rates of 100 percent. Failure to do better has been the result primarily of lack of resources being generated from the directly productive sectors of agriculture and industry rather than from lack of commitment by governments. While many policy, financial, institutional and other weaknesses need to be addressed in the health, nutrition and education sectors, past African experience clearly suggests that within a

generation the gap between life expectancy in Africa and other parts of the developing and developed world can be substantially reduced and in some cases closed, and comparable advances made in reducing the education gap. Moreover, these social advances will eventually feed back to reduce the rate of population growth and to improve the human resource base for agricultural and industrial modernization and growth.

22. These are not pious hopes and unrealistic perspectives. But they will not come easily. They will require a sustained willingness of African governments to learn from experience -- to determine precisely what works and what does not work -- and then to take appropriate action. They will require, moreover, a sustained willingness of donors to provide adequate and appropriate external assistance, particularly if the global economic conditions continue to be unfavorable to Africa.

23. In this context, the operational purpose of the study should be emphasized. Previous reports have provided the framework within which African and donor governments have re-examined their policies and programs. The reports have also guided the Bank in formulating its role in assisting Africa both in terms of the Bank's lead role in the donor community and in designing its own operations. The implications for further adaptations of these policies and programs will be the driving forces behind the present study.

THE WORLD BANK
RESEARCH NEWS

*(1) - No book available (18)

Africa's Agriculture

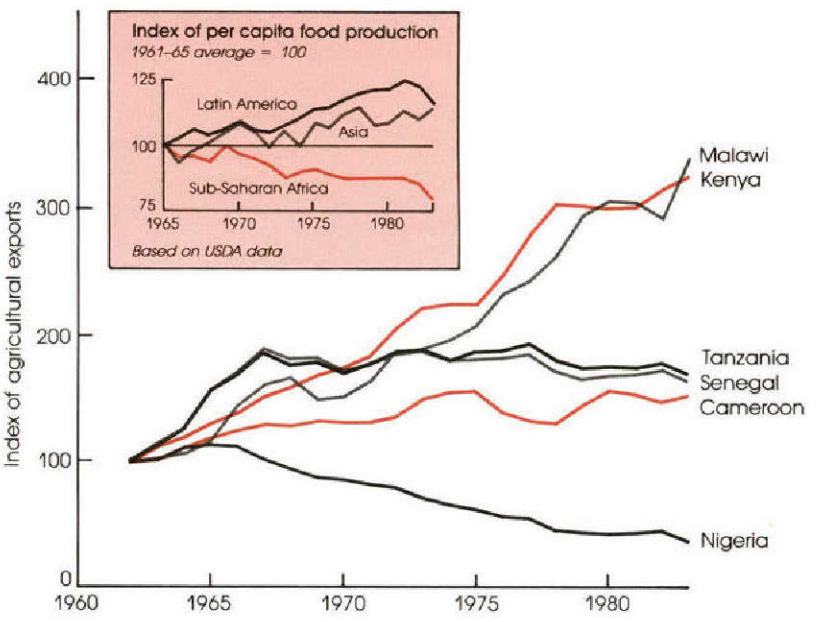
How can it best be managed?

Hypotheses abound to explain the failure of Africa's agriculture—and the pockets of success. But hypotheses are not enough for sound policy. What government officials and overseas donors need, if they are to devise policies to remedy the failures and repeat the successes, is a compelling explanation of agriculture's performance in Africa.

Coming up with such an explanation is easier said than done, because there are so many interacting forces and because their importance varies from one country to the next, one region to the next, one period to the next.

For starters, the world of the 1970s was more hostile toward African agriculture than was that of the 1960s. But in this hostile environment, some countries performed much better than others (see the chart). And within countries, some parts of agriculture did better than others. Moreover, with the added external shocks of the 1980s, some countries' responses were far more effective than those of others.

The slow growth of agricultural production



Three-year moving averages, using 1984 average prices

Questions are: Which of these seeming successes hold general lessons for getting Africa's agriculture on track? And which of them are merely the idiosyncratic outcomes of passing luck, good resource endowments, and irreproducible policy environments?

Past enquiries haven't come up with satisfactory answers—for two reasons. Either they have been general, looking at everything under the Sub-Saharan sun. Or they have been specific, dissecting one issue or country into findings of dubious relevance elsewhere. Even if relevant, the naysayers could always pooh-pooh the findings by saying: "Ah yes, that may be true there, but it has nothing to do with problems or policies here."

To begin to identify the causes of success and failure in Africa's agriculture and to distill some of the lessons,

What's inside

The Oil Windfall's Uncertainty
Industrial Location Policies
The Impact of Indirect Taxes
Fertility South of the Sahara

the Bank launched a major research project in 1984: Managing Agricultural Development in Africa. Supervising the work of more than 30 researchers involved in the project is Uma Lele, chief of the Bank's Development Strategy Division.

The project is a comparative study of six countries: Kenya, Malawi, and Tanzania in the East—Cameroon, Nigeria, and Senegal in the West. These countries have about 40% of the people in Sub-Saharan Africa. They received 36% of the net resource transfers and 32% of the Bank's commitments for agriculture and rural development in Sub-Saharan Africa in 1983.

The investigators are looking at three broad areas. The first is the political and institutional environment in each of the six countries—to establish the context for economic policy. The second embraces the parts of economic policy that affect agriculture—the uses of resource endowments and the responses to outside shocks. The third is foreign aid—how the policies and practices of the main donors have affected the development and performance of agriculture.

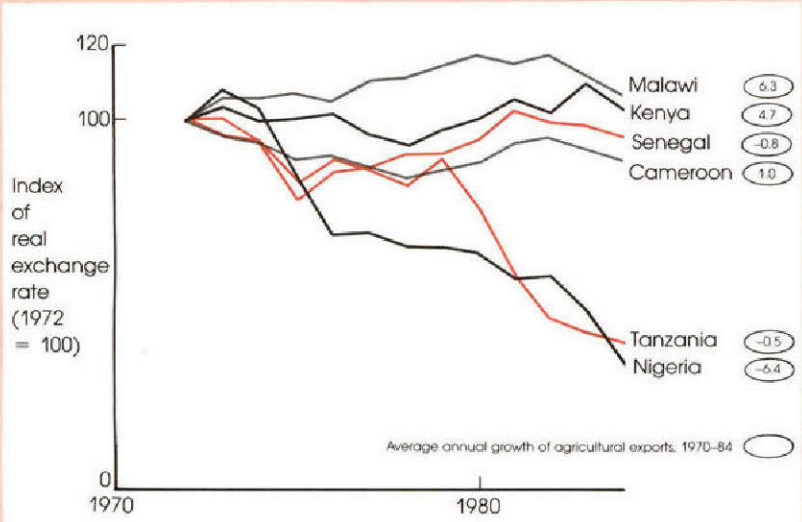
The effect of politics

The general view is that the economic and political interests of a few groups drive policy decisions in Africa. Is this true? Another view is that charismatic leaders may influence policy decisions more than (even well-organized) economic interests do.

Several specialists in African political and economic affairs are developing pictures of the way politics affect agricultural policy.

Their main task is to describe the political development of each country—

Exchange rates and agricultural exports



Trade-weighted exchange rates, using average 1970–72 weights

Indicative of what's being assembled for the project's data base is comparable information on agricultural exports and real effective exchange rates.

Nigeria and Tanzania let their real exchange rates fall (that is, their currencies became overvalued)—and their farm exports suffered. But even in Nigeria and Tanzania, exchange rates don't tell the whole story.

Technological problems have been critical in Nigeria: for example, the technical packages of fertilizers and planting materials have been inadequate for food and export crops. And institutional problems—typified by sudden shifts in emphasis from cooperatives to parastatals and back to cooperatives—have been critical in Tanzania.

How critical? The study is trying to assess the relative importance of the various sectoral and macroeconomic issues in determining the prospects for future growth in agriculture.

Small holders and large

Emerging from the study are some interesting findings on the structure of agricultural growth and its implications for long-term development.

Compared with the rest of Africa, Kenya and Malawi have done well in agriculture, with Malawi's exports growing a bit faster (6.3% a year during 1970–84) than Kenya's (4.7% a year). But the changing shares of small and large holdings in marketed output since the mid 1960s tell a more refined tale.

In Malawi the share of small holdings in marketed production was only 37% in 1965, but it fell to 19% in the late 1970s. One reason was a push to develop tobacco exports and capture the market Rhodesia lost after its unilateral declaration of independence in 1967. It was easier to meet the export market's demands for quality and quantity through the development of large estates.

In Kenya during the same period, the share of small holdings in marketed production rose from 42% to 55%. Part of the reason was the breakup of many large farms and estates, part the phased expansion of services to smallholders producing cash crops. Smallholders now produce well over half the country's tea exports and about three-fourths of its coffee exports. They are also the major producers of meat, maize, sugar, potatoes, and dairy products sold in the domestic market.

The changing shares of small and large producers are intertwined with issues of access to land, rights to cultivate export crops, and the availability of infrastructure and other public services. And the shifts have a big effect on the distribution of income.

Such shifts may also affect the long-run efficiency of the agricultural growth. Emphasis on large estates can buy rapid growth. But smallholder development can do more than estates in fostering the links between farming, rural capital formation, and the growth of rural services and manufacturing. By creating jobs, developing rural entrepreneurs, and opening new opportunities for investment, it can diversify the countryside.

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Fertility South of the Sahara

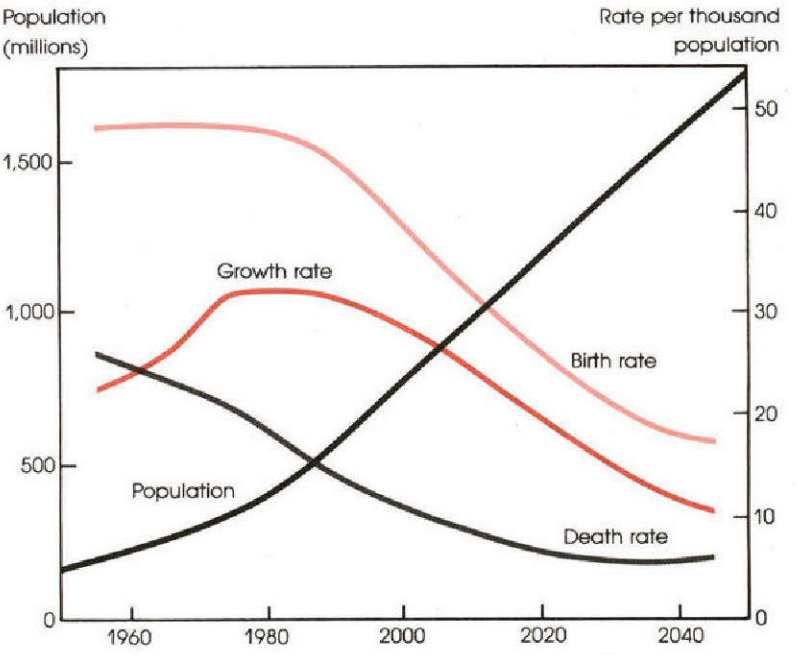
It isn't going to plummet

The rate of population growth in Sub-Saharan Africa is the highest in the world. It's risen from 2.6% in the 1960s to an estimated 3.2% in 1985–90 (see the chart). Bank projections show the rate declining to 3.1% in the 1990s. Even so, the population of the region will rise from 460 million in 1985 to 730 million by 2000.

The average fertility rate in the region—6.6 births per woman—is also the highest in the world. This average cloaks big variations between countries, districts, and individuals. Fertility in Kenya is almost twice that in Gabon. Some women have 14 children, some none. What explains these differences? And do the differences yield clues for reducing excessive fertility?

Three consultants to the Bank studied the factors determining fertility in the region. They examined factors directly affecting reproduction, the most important of which are post-birth sexual abstinence, temporary infertility caused by breast-feeding, permanent infertility caused by disease, and contraception. They also examined socioeconomic factors, such as income, education, and urbanization, which affect fertility indirectly by influencing the direct factors.

People in Sub-Saharan Africa



Source: Standard projection from the data base for *World Development Report 1985.*

The direct factors

Abstinence. Most African communities have a tradition of temporarily abstaining from sex after a child is born. The period ranges from 40 days for some Islamic groups to two years for some tribes in Central and West Africa. Where it exceeds a year, abstinence usually continues until the child is weaned from the breast. This can lead to a spacing of as much as four years between children. Abstinence has thus played an important role in controlling births, but the custom is eroding. In Tanzania in the 1970s, post-birth abstinence rarely exceeded six months. In Kenya, four months was more typical.

Breast-feeding. The biological changes caused by breast-feeding suppress ovulation. This suppression, called lactational amenorrhea, lasts on average from two months for women who do not breast-feed to two years for the most prolonged breast-feeders. The suppression of ovulation often overlaps with post-birth abstinence. The combined effect of the two factors ranges from 13 months in Kenya to 18 months in Lesotho.

Many African women are switching from the breast to the bottle in feeding children. This switch tends to raise fertility.

Disease. Natural sterility is not significant in Sub-Saharan Africa, but disease (especially gonorrhea) is an important cause of sterility. On average, disease reduces fertility by one live birth per woman. The impact is high in Gabon and some regions of Cameroon.

Contraception. Birth control plays a very limited role in the region. Knowledge about contraception is low. Two-thirds of women in Cameroon and one-third in Ghana say they have never heard of any form of contraception.

Better knowledge does not necessarily mean more family planning. The desire for large families is great. Among women exposed to conception, only 12% use contraceptives in Kenya, and fewer than 5% in Senegal. Of these women, a third use inefficient methods.

Other direct factors. If, when, and how often women marry help determine fertility. In Sub-Saharan Africa, mar-

riage is almost universal. Rates of divorce and widowhood are high but are offset by high rates of polygamy and remarriage. Extramarital sex is not uncommon, and 5% to 10% of children are born outside wedlock.

The average age of women when they first marry ranges from 17 to 22, which is higher than in some Asian countries. But sexual activity after the first marriage is greater in Africa because of remarriage, polygamy, and extramarital sex.

The effect on fertility

What is the combined effect of these various direct factors on fertility? And how will this effect change with socioeconomic development? To begin to answer these questions, the researchers developed a model that would estimate the effect of the direct factors on fertility. Based on current evidence of what is typical, they made the following assumptions: proportion of reproductive years that women spend outside sexual union—10% (weighted average); proportion using contraception within union—5%; duration of the "safe" post-birth period—16 months; proportion of women childless at the end of their reproductive span (a measure of disease-induced infertility)—10%.

Under these assumptions, the model shows that the post-birth safe period is by far the greatest inhibitor of fertility. If the safe period falls to zero, fertility will rise by 70%. The elimination of the other inhibiting factors has less impact—fertility will rise 5% if there is no contraception, 11% if women spend no time outside unions, 12% if there is no disease-induced infertility.

If the inhibiting effects of all four factors are removed, the fertility rate in the region would shoot up from 6.6 births per woman to more than 15.

This estimate means it is wrong to think that traditional tribal societies do little or nothing about birth control. The traditional safe period is an extremely powerful way of controlling fertility. The impact of modern contraception, given current use, is far less.

Indirect factors and future fertility

What will be the impact of education, urbanization, and other forces of modernization on fertility? The researchers do not come up with an optimistic picture (but see the box on changing attitudes). Modernization will tend to reduce fertility by raising the age of marriage and popularizing contraception. It will also tend to raise fertility by shortening the period of breast-feeding and post-birth abstinence. Modern medicine will cure diseases that cause sterility.

The net effect will vary from country to country. But Kenya provides a cautionary tale. Its fertility went up from 6.6 per woman in the early 1950s to 8.1 in the late 1970s. The average age of Kenyans at first marriage has risen one and a half years. It has the best family planning performance in the region. It has done well in economic growth and education. Yet its population growth is the highest in Africa.

It appears, then, that flooding the continent with contraceptives is not the answer. Simply, people in Africa don't want them yet, because they want large families. The high fertility rates there are thus a function of the number of children people want—and that number is not going to fall until even more improvements are made in health, income, schooling, and infant mortality. With these improvements, the desire for large families will wane—and the demand for family planning will increase. Meeting that demand is going to require a major effort to muster the needed human and financial resources.

African attitudes are changing

A decade ago, few African governments thought that population growth was a problem. Now, their attitudes are changing fast. In 1984 almost 40 African countries adopted the Kilimanjaro Program of Action on Population. The program calls for family planning services to be made available to all couples—either free or at subsidized prices. It also calls for a series of programs intended to increase the demand for these services.

This demand for family planning services probably is higher than earlier estimates—for four reasons. First, surveys show a substantial unmet demand for spacing children. Second, abortion rates are high and rising. Third, in areas where contraceptives are easily available, their use is relatively high—27% for women in the rural Chogoria project area of Kenya, more than 35% for urban women in Zimbabwe. Fourth, female education is rising fast in Africa. In Kenya the enrollment rate for women in primary school rose from 50% to 95% between 1970 and 1980. This could be one reason why the latest surveys suggest that Kenya's fertility rate has dropped from a peak of 8.1 births per woman to 7.7 births.

For more details, see John Bongaarts, Odile Frank, and Ron Lesthaeghe, "The Proximate Determinants of Fertility in Sub-Saharan Africa," *Population and Development Review*, vol. 3 (September 1984). Research briefs are drawn from the work of individual researchers and do not necessarily represent the views of the World Bank and its affiliates. 7-04.

Indirect Taxes

Measuring their effect on prices and the poor

With world oil prices rising sharply in the 1970s, policymakers in many developing countries cut the tax rates on oil to soften the impact on domestic prices. They feared that keeping the earlier rates would cause too much inflation and worsen the distribution of income. Were these fears warranted?

To assess the impact of indirect taxes, such as those on oil, scholars and government departments often use cost-plus models. Such models assume that all producers can pass on increased costs (like taxes) to consumers through higher prices—an oversimplified assumption that can lead to wrong conclusions. But many policymakers cling to such models because they are easy to handle and are convenient for forecasting revenue and inflation. Sophisticated models can be too complex and require too much data to be of practical use.

Striking some middle ground, Bank consultant Gordon Hughes has developed a new general-pricing model for evaluating the impact of indirect taxes. It gives a more accurate picture than cost-plus models but is still simple enough to be a practical policy tool. It differs from cost-plus models in three ways.

First, the general-pricing model allows for the fact that all producers cannot pass on higher taxes to consumers. For instance, a steel producer cannot pass on fuel taxes to consumers if steel imports determine the local price. Government price controls constrain some other producers. And an exporter can seldom pass on taxes to the world market.

Second, the general-pricing model can take into account changes in income arising from taxes. Exporters, for instance, may suffer a fall in profits.

Third, the model allows for induced increases in the price of some untaxed items. A tax on kerosene will also tend to raise the price of competing cooking fuels like charcoal. A cost-plus model wrongly assumes that there will be no change in the price of goods that compete with taxed items.

The new model thus provides a better depiction of the real world. It is built on knowledge of which economic variables are actually linked—and on data about how much of a change in one variable has been associated with change in another. Simply put: the links in the model make sense, and observations of real events confirm that they are true.

An application to Thailand

The two models were compared in an assessment of various taxes in Thailand, which is typical of many developing countries. It relies on imported oil for most of its commercial energy, and its population of 46 million and per capita income of $600 in 1980 were close to the median value for all developing countries.

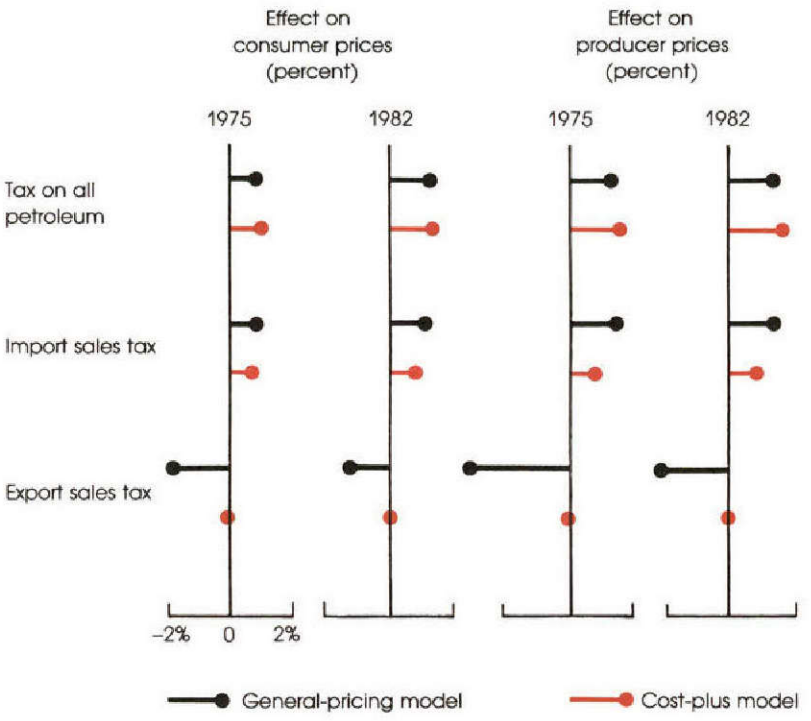
Consider three alternative taxes, each designed to yield 1% of final demand in the Thai economy: 1) a uniform tax on the value of all petroleum products; 2) an import sales tax on the landed price of all imports; and 3) a tax on the f.o.b. value of all exports.

The new model suggests that the fears of policymakers about petroleum taxes are not well grounded.

The impact on prices

The cost-plus model suggests that the petroleum tax would have been the

Two models, two tales



most inflationary of the three in 1975, raising consumer prices by 0.9% (see the chart). The import sales tax would have been less inflationary, raising consumer prices by 0.7% percent. The export tax would have had a negligible effect on prices.

The general-pricing model tells a very different story. It suggests that the petroleum tax and import sales tax would have had much the same effect, both raising consumer prices by 0.9%. The export tax would have caused a substantial fall of 1.8% in prices.

Why such divergent results? The cost-plus model exaggerated the impact of the petroleum tax, for it assumed that all producers could pass on the levy to consumers. It also understated the impact of an import sales tax, for it failed to allow for an increase in the price of domestic goods that competed with imports. This led it to predict that the petroleum tax would be more inflationary than the import sales tax. The new model avoided these pitfalls.

The cost-plus model also assumed that an export tax would be passed on to foreign buyers, and hence have a negligible effect on domestic prices. The new model allowed for the fact that exporters would have to absorb an export tax. This meant that exports would decline, particularly of rice, tapioca, sugar, fish, and nonferrous metals. The availability of these items in the local market would increase and lower consumer prices.

The general-pricing model was also used to calculate the effect of a fourth tax—a uniform consumption tax designed to raise the same revenue. This tax would have raised consumer prices by 1.7%, almost twice the impact of the petroleum tax. So, policymakers should not fear that taxes on oil are excessively inflationary.

The impact on the poor

What about the effect of the three taxes on the poor? To measure this, it is necessary to look first at the impact of the taxes on spending by different sections of the population. Then it is necessary to take into account changes in the income of producers who had to absorb the taxes—and the impact of substitution effects (like the replacement of machines by labor if the former were taxed).

The petroleum tax and import sales tax would help the poor marginally, an improvement too small to form a basis for policy. So, policymakers should not expect that a petroleum tax will improve the income distribution very much. Nor should they shy away from such a tax on the mistaken ground that it will bear excessively on the poor.

An export tax would be regressive. It would reduce the income of farmers who export items like rice and tapioca. It would also reduce the price of these items, something that would tend to help farmers. But the first effect would be stronger than the second.

Lessons for policy

Results from the two models have divergent implications for policy. Unlike the cost-plus model, the general-pricing model shows that the petroleum tax has only a modest effect on prices, much less than some other taxes. Such a tax does not have significant effects on income distribution. So, it is a good tax for raising revenue. And there is a strong case for setting petroleum taxes at levels that will promote the efficient use of resources.

For instance, the Thai government could choose to maintain domestic oil prices at last year's level despite this year's fall in world prices, mopping up the difference through a petroleum tax hike. At the same time, it could cut import duties so that there is no net change in revenue. This would promote efficiency by reducing the effective level of protection and discrimination against export-oriented sectors. Workers in highly protected industries might lose their jobs. But in a period of falling oil prices, it's easier to move away from protectionism.

The focus here has been on using a general-pricing model to examine the effects of a petroleum tax in Thailand. Since the model is easy to handle, policymakers can use it equally well to analyze the effects of any other indirect tax in any country. They can also, where data are available, use it to study the impact of taxes on specific regions or sections of the population. The new model thus has wide applicability as a practical tool.

Should governments subsidize kerosene?

Poor people in many developing countries use kerosene for cooking. Some policymakers want to subsidize it to improve equity.

The general-pricing model disentangles the impact of separate taxes on gasoline, kerosene, and diesel, each designed here to yield revenue equal to 0.25% of final demand in the economy.

Such taxes on gasoline and diesel would increase prices modestly. But a tax on kerosene would be nearly four times more inflationary than a tax on gasoline, since the kerosene tax would also raise the price of competing cooking fuels (charcoal and firewood). A tax on kerosene alone would be regressive. But a general tax on all petroleum products would improve equity slightly.

Wanting to protect poor householders, the Thai government raised the price of kerosene much less than it raised the price of other petroleum products between 1975 and 1982. But many commercial users switched from diesel to kerosene to take advantage of kerosene's low price. This weakened the impact on equity and distorted the use of petroleum products.

One possible way of avoiding this kind of substitution would be to subsidize both kerosene and diesel. But more than 90% of the subsidy would go to diesel, defeating the attempt to help the poorest. Besides, consumers of gasoline would switch to diesel.

So, the case for a kerosene subsidy is not strong.

For more details, see Gordon A. Hughes, "A New Method for Estimating the Effects of Fuel Taxes: An Application to Thailand," *The World Bank Economic Review*, vol. 1, no. 1 (September 1986).
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Can pick up.

The Oil Windfall

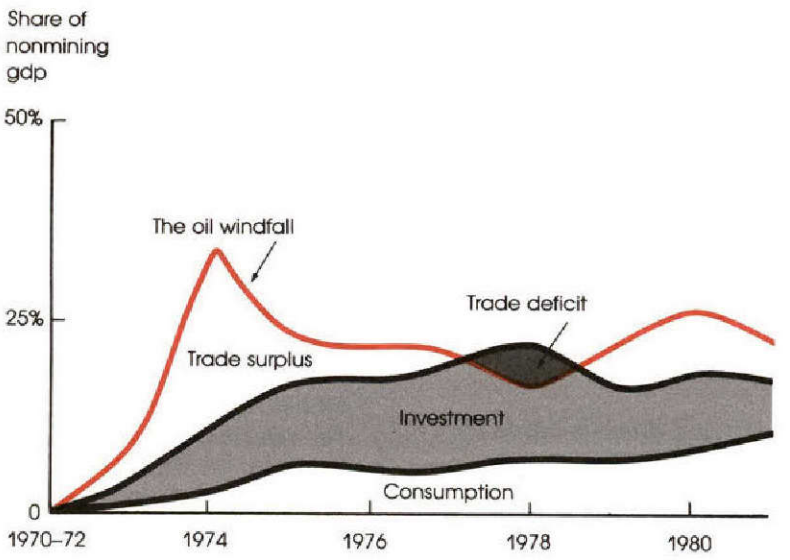
It also brought uncertainty

The oil price hikes of 1973–74 and 1979–80 each transferred $300 million a day from oil-importing to oil-exporting countries. The exporters greeted these windfalls with euphoria, as a means to transform their economies. They had three common objectives—diversification away from oil, faster growth and modernization, and greater national control over their economies.

But concern soon arose that some of the oil exporters were frittering away their windfalls with poor investments and unsustainable consumption. Some experts predicted that the exporters would contract the Dutch disease—a decline in the production of tradable goods other than oil, associated with an appreciation of the real exchange rate. And when the oil market swung abruptly and unexpectedly downwards after 1982, many exporters floundered in fiscal and balance of payments crises. Oil could be a curse as well as a blessing.

Bank researcher Alan Gelb analyzed how oil exporters used their windfalls in the decade after 1974, and with what results. He focused on six countries that reaped large windfalls but had oil reserves enough to finance only two decades or so of development: Algeria, Ecuador, Indonesia, Nigeria, Trinidad and Tobago, and Venezuela. His study excluded capital-surplus oil exporters.

What the windfalls went for



Unweighted average for Algeria, Ecuador, Indonesia, Nigeria, Trinidad and Tobago, and Venezuela

The windfall and its uses

The annual windfall to the six countries during 1974–78 averaged 22% of their nonmining gdp. The second oil boom raised the windfall to 27% (see the chart), but slumping prices and sales halved it in the downturn of 1982–85.

The countries had several options. They could have saved abroad, invested at home, or consumed their oil incomes. They opted mainly for domestic investment, overwhelmingly in the public sector. Four-fifths of the windfall accrued to governments, which passed on only a small part to taxpayers through tax cuts.

During 1974–78 the six countries together used a quarter of the windfall to reduce current account deficits, consumed a quarter, and invested the rest in the public sector. The oil income enabled them to go on an investment spree, and some borrowed abroad to expand public investment even faster. Algeria's investment rate in 1977 reached a remarkable 73% of nonmining gdp.

The pattern changed somewhat in 1979–81, with the share of consumption going up at the expense of investment, partly because of the growth of subsidies. For the whole period, the proportion of the windfall consumed was not excessive. It was consistent with reasonable (though speculative) estimates of permanent income flowing from the oil boom, after allowing for the depletion of oil reserves.

The pattern of investment

As much as two-thirds of public investment went for infrastructure and social services. Most of the rest went for heavy industry, often based on oil and gas.

The pattern varied greatly from country to country. Ecuador focused on infrastructure. Algeria developed gas reserves for export. Venezuela went for steel and aluminum plants. Trinidad invested in steel, chemicals, and gas-based fertilizers. Nigeria initially concentrated on education and roads, and later invested in steel and a new federal capital. Indonesia was the only one to stress smallholder agriculture, and its balanced strategy included education, infrastructure, and heavy industry.

Public investment often meant ambitious macroprojects. Venezuela launched 27 such projects costing an average of $1,015 million each, Indonesia 44 such projects costing an average of $327 million each. By 1980, a third of the largest projects had cost overruns averaging 109%. Many were delayed by several years, and some may never be completed.

Four problems plagued these projects. First, project backers often rushed them through without proper assessment and preparation. Second, many projects involved complex technology and organization, and local managers lacked the skills to manage them efficiently. Third, construction costs rose rapidly and persistently. Fourth, the oil exporters committed themselves to large, sector-specific investments in a period of increasing global economic uncertainty. The global recession of the early 1980s shrank the markets for many heavy industries and dropped long-term prices for steel, aluminum, and gas-based chemicals by 25%.

Growth and diversification

The oil exporters had expected that their windfall would help them speed growth and diversify their economies. By and large, they did not succeed in doing so. Compared with the trend before the oil boom, the average annual growth of their nonmining gdp went up by only 0.5% in 1974–78, and then fell by 4% in 1979–81.

Large investments in infrastructure and social services failed to spur the production of nonoil goods. And industrial investments were often failures, partly because they had been made on the basis of highly optimistic projections of past trends. Subsidies propped up inefficient units. In Venezuela, the value added in public manufacturing did not even cover the wage bill. In Trinidad and Tobago, one sugar plant had a production cost five times that of efficient global producers despite paying lower wages.

Diversification was to some degree hindered by the tendency of an oil boom to drive up the real exchange rate and shift investments to nontraded sectors (construction and services). Such a shift helps the absorption of windfall gains but poses the danger that living standards will decline sharply if oil revenue falls, especially if it proves difficult to reverse the shift in investments.

Price controls and liberalized imports helped Algeria and Venezuela to escape much currency appreciation until the end of the 1970s. Indonesia devalued its currency, and so did Venezuela and Ecuador at a later stage.

But Nigeria had appreciated its currency by 187% by 1984, Trinidad and Tobago by 70%. It is not surprising that these two countries showed pronounced symptoms of the Dutch disease.

One index for measuring the disease is the shortfall in the share of agriculture and manufacturing in nonmining gdp relative to normal levels derived from cross-country regressions. This index rose in most countries, with agriculture suffering most, but Indonesia improved its agriculture significantly, the only country in the sample to do so. Nonoil traded sectors can thus hold their own if policies are appropriate.

The volume of nonoil exports fell in four of the six countries despite the avowed aim of diversifying exports. Overall, the volume of nonoil exports slipped 2% a year between 1974 and 1981.

From boom to bust

After 1982 both the price and volume of oil exports slumped. Imports continued to rise with the result that the countries had a combined current account deficit of $20 billion in 1982. Capital flight and high interest rates abroad compounded their woes. They had to cut imports, investment, and subsidies sharply. As with oil importers in earlier years, a combination of supply shocks and falling demand propelled them into stagflation.

If the large investments of past years had been productive ones, they could have ameliorated the situation. In Venezuela, new investments should have generated nonoil growth of at least 4% a year (assuming constant total factor productivity). But its nonoil economy stalled after 1978.

Adjustment to the downturn in oil meant moving capital and labor back to agriculture and export industry from construction, services, and heavily protected industry. It also required a swift, substantial realignment of exchange rates, wages, and prices. But most of the countries could not adjust fast enough, leaving them huge debts and unused capacity in the industrial and nontraded sectors.

The stop-go effect of revenue fluctuations proved costly. A separate study of Gelb's used a multisectoral model to analyze the impact of a stop-go cycle on an Indonesia-like economy. The study suggested that the cost of spending sequences based on overly optimistic predictions of income could be higher than the potential benefits of the windfall itself.

Conclusions

On the whole, the oil exporters made poor use of their windfall. They did not consume an excessive part of it. But they invested it badly.

Of the three aims they had in common, they achieved only one—substantial national control over sectors (like oil) earlier dominated by multinational companies. They failed to diversify their economies to the extent expected, and some even increased their dependence on oil. They failed to accelerate growth, largely because they conceived and executed major investments poorly.

Diversification and faster growth required more than just investment. They required major structural reforms of administration and the organization of production. But the oil windfall reduced the urgency of such basic and politically difficult reforms and underwrote wasteful practices. So, the benefits of the windfall were small and in many countries transient.

In the end the two oil booms did not simply transfer income from importing countries to exporters. They hit the former without giving commensurate benefits to the latter. The booms thus involved the world in a large negative-sum game.

For more details, see Alan H. Gelb, "Adjustment to Windfall Gains: A Comparative Analysis of Oil Exporting Countries," in Peter Neary and Sweder van Wijnbergen (eds.) *Natural Resources and the Macroeconomy*, (London: Center for Economic Policy Research, 1986). Also see Gelb, "The Oil Syndrome: Adjustment to Windfall Gains in Oil-Exporting Countries," in Deepak Lal and Martin Wolf (eds.), *Stagflation, Savings and the State* (New York: Oxford University Press, 1986). Research briefs are drawn from the work of individual researchers and do not necessarily represent the views of the World Bank and its affiliates. 7-01.

9r costs $34.50. Staff member gets 25% discount

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starting with the era before independence—and to identify the main actors and groups. The idea is to provide a perspective for the other parts of the study by exploring how political interests have evolved and how they explain (or do not explain) the content of agricultural policy.

The effect of domestic policy

The second part of the study assesses agricultural performance and the way domestic policies have affected it—the policies for price incentives, infrastructure investments, research and technology, institutional and manpower development, and so on.

In essence: Did the country systematically pursue a strategy for agriculture? What was the focus of that strategy? How did that focus change? Did the strategy work? And why?

In detail are such related questions as those of regional balances or imbalances, short-term or long-term gains, leanings toward food crops or export crops, and extracting surpluses for use elsewhere in farming or the economy.

Such questions are not easy to answer, because data on African agriculture are generally poor and those on food crops are far less reliable than those on export crops. For example, estimates of food production from the FAO, USDA, and government ministries may differ by a factor of 4. Nor is information on policies and strategies easily extracted from the files of governments.

So, an important part of the study is to glean information on agricultural policies and to compile a systematic data base for the performance of agriculture in the six countries since their independence.

With those building blocks—and with a better fix on the obvious gaps in information—the researchers will test hypotheses about how domestic and external factors have affected agriculture's performance (see the boxes on page 2). Some of these hypotheses will deal with such quantitative aspects as price incentives, others with such qualitative aspects as the consistency of policies.

The effect of aid

Because aid figures heavily in the budgets of most African countries, donors have been important in determining patterns of public spending. Donors have also done much in providing policy advice and in developing human and institutional capabilities.

With many donors in evidence, however, the recipients of aid have often had trouble reconciling the different views of an amorphous donor community. Indeed, by the late 1970s, Africa's poor economic performance was not just the result of poor economic policies and unexpected shocks from outside. Taxing the abilities of countries to absorb aid in their development programs was a profusion of donor-financed projects in and outside agriculture (see the chart).

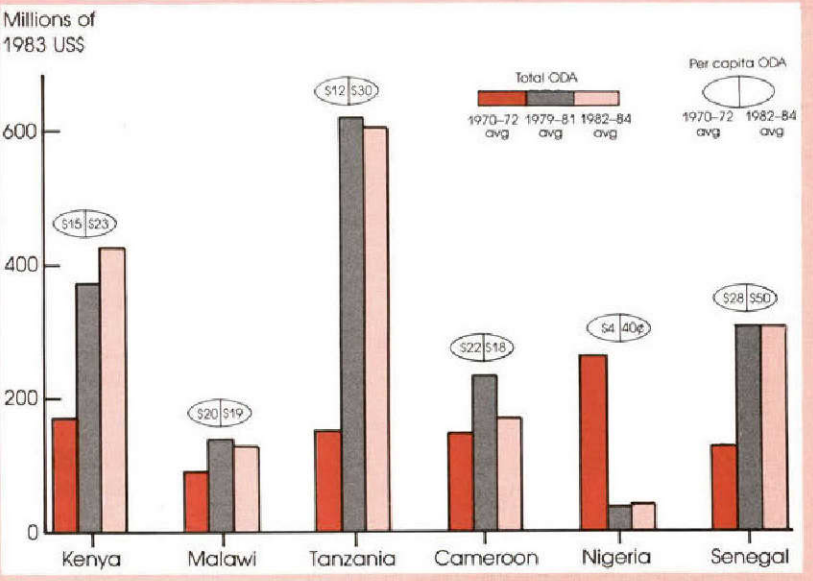
What has been aid's effect on agriculture and rural development? Rosy reports and selective recollections have clouded many such assessments in the past. This time, however, many of the major donors to Africa have joined the Bank in a broad inquiry that strives for candor and credibility.

The participating donors are the U.S. Agency for International Development (AID), the Swedish International Development Agency (SIDA), the Danish International Development Agency (DANIDA), the British Overseas Development Administration, the German Ministry of Economic Cooperation, the French Ministry of Cooperation, and the European Economic Community.

The donors have opened their doors to teams of researchers who know about Africa's economic problems and about the policies and internal workings of the aid agencies. A team of Americans is looking at USAID, a team of Britons at the U.K.'s ODA, and so on. The teams are poring over project evaluations, interviewing key people to fill out the stories, and discussing their findings with African policymakers for refutation or confirmation.

The next milestone for this part of the project will be a conference of researchers, donors, and African policymakers in the Spring of 1987 in Washington, D.C. Each team will present its findings to the others, with the interaction of teams providing ideas for incorporation in the volumes that distill the lessons. The focus will be on the way politics, economics, and foreign aid interact to affect the prospects for African agriculture.

Official development assistance



What these aggregate figures mask, and what the study is beginning to turn up, are some interesting patterns in the effectiveness of aid to the six countries. Reflecting historical ties and ideological attractions, these patterns relate to whether the design of programs responds to the needs of countries or to the preferences of donors. They also relate to whether there is a lead donor to help coordinate the various aid programs and whether there is continuing support for those programs.

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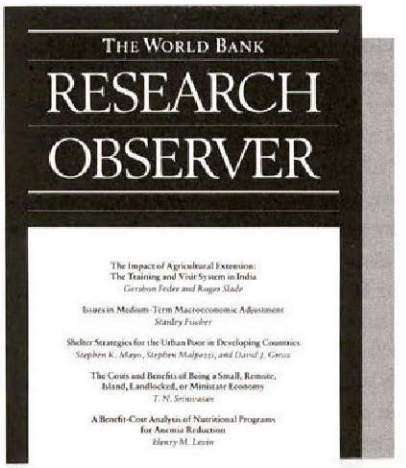
The Impact of Agricultural Extension: The Training and Visit System in India *Gershon Feder and Roger Slade*

Issues in Medium-Term Macroeconomic Adjustment *Stanley Fischer*

Shelter Strategies for the Urban Poor in Developing Countries *Stephen K. Mayo, Stephen Malpezzi, and David J. Gross*

The Costs and Benefits of Being a Small, Remote, Island, Landlocked, or Ministate Economy *T. N. Srinivasan*

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THE FINANCIAL EXPRESS, India

T & V system : Daniel Benor looks back

By Maithily Jagannathan

SINCE the mid-seventies, the Training and Visit System of Agricultural Extension has gradually replaced the earlier system of multi-purpose field workers. Pilot projects introducing T and V in Chambal area of Madhya Pradesh, Rajasthan, and Rajasthan Canal Project were started at the end of 1973 and early 1974 followed by Nagarjunasagar Command area of Andhra Pradesh.

The T & V system is organised hierachically from the Deptt. of Agriculture down to village level. It is a time-bound system for delivering selected and reasible technology to farmers in a regular manner.

The relevant technology is formulated in terms of a set of impact points or messages, which extension agents convey to contact farmers (about ten per cent of farmers), and others who may attend fortnightly visits of village level workers, or approach him on their own. The system emphasises fortnightly and monthly training of extension staff, and exclusive attention to extension work.

Daniel Benor, the originator of the system in many developing countries, visited India this winter, and toured a few states where T & V system is working.

Halting in Delhi, on his way to Europe, he spoke in relaxed way about a decade of T & V extension system in the world.

What is the real achievement of T & V system?

Is it making extension quantifiable, in terms of loans, subsidies, HYV Coverage, sale of fertilizers and certified seeds, new crop rotations, or greater cropping intensity?

"None of these. Development is not dumping fertilisers and subsidies on farmers. It is for farmers to demand goods, and services and for government to respond.

"The real achievement is the change in attitude which I have observed in India and other countries. I have seen that if the atmosphere is right, there can be a drastic change in attitude.

"Let us take the example of VEWs. Earlier the VEW was assessed by his political associations. His status depended on the help and support he gave to vested interests. Now, under a a single line extension system, he not only gets training in fortnightly, workshops, but he can tell scientists at the monthly workshop: 'no, my farmers cannot afford your recommendations. By applying 20 kg of fertilizer, the return per rupee is higher than if they used 100 kg fertiliser.' Now he is not a hanger-on of theirs, but is respected as a professional. I have noticed change in the attitude of the same subject-matter specialists.

"The extension workers may not solve all problems. But because of regular visits, he has become an important link a communication channel for others, like input suppliers, irrigation departments banks and so on.

"Then look at the attitude of research workers to development work. Earlier, in research stations, the main work was breeding of new and improved varieties. Now there are few centres where work is n going in improving cultural practices, optimising seed rates, sowing and cropping schedules, intercropping and so on.

"Only yesterday I was in Hoshangabad district of Madhya Pradesh. There the soil is very good, but there is rain only for three months in a year. Because of the pressure put on the research system by extension, they have come up with a good idea for double cropping. First plant short-duration Soyabean, which is harvested in end of September. On residual moisture, then plant Bengalgram or safflower. This has been tried out successfully in thousands of fields. I was happy to find that the head of the Research Station was talking about work done in farmers fields, and not only in laboratories. Is it not a change that researchers are proud not of academic recognition, but of farmers following them?"

The aspect of communicating research to farmers, on taking farmers' problems to research stations, would come up only when there is a sound research base. Studies in research extension linkage taken up in some states have shown that research priorities are not determined according to farmers' needs and resources, and there is a gap in generation of appropriate technology, particularly for rainfed agriculture. How did he think the Research base could be strengthened.

"I do not agree that extension is useful only in, say, irrigated areas where research is developed. There is some useful technology for every place. If nothing, yield can be raised by 50 per cent by improving plant population. If we sit back, it may take hundreds of years for research to develop the technology for a particular area on for some farmers. Can we afford to wait that long? There may be no swimming pools. But if many people know swimming, then pools will be built. Don't you agree? It is day to day pressure from farmers and extension workers that can produce required recommendations.

"I do not agree that there is nothing more to be done in developed areas. Suppose you take a place, say Mehsana district in Gujarat. Production is high and general recommendations are not useful. But by testing the soil of individual farmers, and making recommendations according to his resources, we may raise yield from 4 tonnes per h.a. to 5 tonnes per h.a. We may tell him with confidence to use say 50 kg, 20 kg, or even no nitrogen.

"Before extension was organized in this way, we could not suggest anything except optimum recommendations."

The Seventh Plan Working Group had described some of the weaknesses of extension system, as poor infrastructure for workshops, training, and weak research extension link. Other aspects have been the high administrative costs of reorganising agricultural agencies. Some of these problems, such as transfer of staff, may be transitional. What in his view were the real obstacles in developing agricultural development?

"There are none. In the beginning a few political or vested interests may have objected. That's all. As we progress, problems arise. Farmers' needs are more, more agencies are required. Production rises, so outside markets must be found. Prices must be stabilized.

"The initial change, which I think is

AGC 18

48


18

2/14/85

AFRICA Institute

RWS – presentation

Reactions & Conclusions

Methodology interesting and constructive

1. Average wages or income irrelevant to the greatest majority of Rural Population. (SOG-Sahara – 85-90%. Cash availability is the issue because of the disincentive Costs. policies (WB fault !?)
2. Available cash is used for high priority (Male dominated issues) Seeds tools Batteries Radio Bycycle ~~etc~~ clothing's ltc etc.
3. Shadow ~~price~~ Cost & time extra time for water 1-2 h a day 0 – 5 #/H. Children and "extra time" of wives, older group and others residing.
4. Centralised Maintenance work / work – Only privatisation of Village level maintenance

(Ross - Cont)

(5) Do not believe in sub Regional systems as neglegence ↑ O&M will prefer one village or the other create "wars" B will not pay if A is upstream.

(6) Diesel fuel does not reach the pumping stations. Sold on the way to truck and taxi drivers. Water is fed into tankers.

(7) Large systems are the Economic grave yard of Africa. AGRIC etc point source supply is the only hope.

(8) Electrification of Rural a dream for the 22nd Century

(9) The WB role to promote projects for those that otherwise the fats don't give a damn. the less densely populated areas.

(1) WB – Vice presidents

(2) Ground water neglegance on one side or overdrafting. The Dried Engine Syndrome – all control of purpose.

(R) WB

(4) Computers Remote sensing etc could be like the Vehicle revolution — essential for modern life however kills people and a tremendous burden to the economies (Gasoline, Roads, Garages, foreign currency etc etc)

(1) DP — Spare parts for example – competitive bidding of not standardized equipment.

(2) Conjecture use of computer alternatives analysis for planning of policy makers

(5) the Danger of feeding into GIGO which later perceived as calibrated precise data ⟶ mistakes

Summary Africa Workshop Panel

(1) Essential to develop ground water data base as tremendous volume of data exists in the offices of consulting firms, Govts. agencies, universities and to day the planners and strategists cannot locate.
IBM was called to contribute funds to initiate such Data base in collaboration with the World Bank, the FAC, ODA etc.

(2) The use of developed or existing simulation and optimization models for PC should be encouraged and exposed to the use by many.

(3) Conjuctive use or integration of surface-treated (or such) in the extension of urban systems - specific artificial recharge at the integration of pumped storage step by step from the edges.

(4) Engineering and Economic disciplines must be strongly integrated into the planning process to cope with insufficient, unreliable data however concerns is that, for extension in low discharge rural - there is no appropriate data ground.

(1) Initiation of good projects

(2) → Convincing power
preparation, good data, design
of feasible alternatives

(3) the Economic issue
How to justify the investment
in relation to a variety of others

(4) the Rule good project doc
→ funding → higher probability
of success

(5) Preparation of multi purpose projects
low cost - point source. Rural

(6) Integration of Ground Water solutions
into the extension of urban systems

With Tony + Mike + G.T + CT

RWS lecture

2/14 remarks

(1) Amazement at WB position in 1985 on good water & health. They claim all Lead & "reverse-proof"

(2) Graph should be drawn on cash availability (average per region, project site) VERS. Distance/demand. They agreed that total average cash availability could be taken although misleading assumption as top priority cash would not go for water as in most cases shadow pricing women at children time is zero.

(3) Fully agree with presentation Should not favours



Continents but regional conditions

(4) Electrification out of the question (Power availability Length of High Voltage lines, Transformer stations, low voltage lines.

(5) Diesel fuel Supply does not reach pumping stations sold on official way to Truck drivers, shared by driver, pumping station foreman and even village chiefs. Proposal to use (?) special engines for water and "contaminate" the fuel deliberately to be used only for pumping.

(6) Piping systems - non standardized equipment lead to severe Special problems as Inner villages get water at the stars do not water Technicians must have cars to run around every day to shut off Valves - afraid to be killed or stoned by women.

(7) VLOM must be proved in a number of demo. projects before it can start spreading.

(8) Silence when asked on the contradiction between para. 2 and the economic importance of RWS.

(9)

11 Summary of (Africa last)

5 Rehabilitation Maintenance schedules training of technicians on Water mgmt and last but not least prevention of wastage could delay large scale investments (Unnecessary) for ~~a~~ quite some time. Participants voiced loudly their reservations from the ~~Dec~~ project Decision makers process of looking for the fast easy way of taking off the shelve ready made ~~S~~ Surface - Treatment - transfer pumping projects which burden the national - municipal economy sometimes to a prohibitive level's while other much cheaper alternatives are not "brought into the ~~S~~ surface" as a result of the "consulting firms cartel" of conventional supply"

6

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2 Egyptian - Scientific center, Cairo.

P

Part B

Weaknesses of separate computer Database related points

(1) Use of Computers must be enhanced the PC revolution must be integrated into the schooling Universities of Africa as this tool could help Africa more than the Industrial world because of lack of data and skilled man power for strategic and policy planning.

(2) In cases a lot of data has been collected for years accumulating in ~~el~~ variety of offices and not analysed or brought to the knowledge of policy makers and planners.

(3) ~~for~~ sustainability and reliability Computer Centers should be established run by highly Trained experts and to give service to Govt. units and others. To become Country data centers Data bases. However experts warned that such centers could be clogged with data or the tendency to over input (being scared that data is lost) one then

GW / Surf integration for DAKAR

Largest need 10 - 15 MGD

$$\sim \frac{15\ \text{MGD} \times 4000\ m^3}{15\ \text{hours}} = \sim 4000\ m^3/H$$

Borehole @ 200 m^3/H = 20 points

$$20 \times (\underset{\text{chlorination}}{\text{drilling}} + \text{pump} + \text{power} + \text{Bldg. etc})$$

$$20 \times (20{,}000 + 10{,}000 + 10{,}000)$$

$$= 20 \times 40{,}000 = \$800{,}000$$

additional population served

$15 \times 4000 = 60{,}000\ m^3/d$

$$\frac{60{,}000}{0.3\ m^3/c/d} = 200{,}000 - 300{,}000$$

Investment per capita $\frac{\$800{,}000}{200{,}000} = \$4$/c

Recurrent Costs Each m^3 = 400 watt h/m^3

$\sim$ 10-15 c/m^3 total

$\sim 10 \times$ 1/3 $m^3/c/d \times 250$ days $= \frac{3}{100} \times 250 \times 6$

20 = 40 $/HH/Y (6)

you overload the Comp. cycle it is never used, retrieved or analysed.

(10) those involved should be alarmed to false or incorrect data collected by a variety of agencies, units etc and fed into Data Banks later perceived as "Bible-instructions" Without appropriate checking sources or methodology. Serious problems of planning emerge out of it.

(11) Spare parts stocking, dist. & control programme essential to Africa because of the great variety of equipment & the non standardized components as a result of donor agencies & World Bank Competitive Bidding Blind attitude. like local Manufacturing — policy to induce standardization should also receive preference in the bidding process at least for the crucial — essential elements in the system where less skilled manpower is involved. (Govt. staff in treatment plants or pumping stations vers. privatized units like Garages or Service organisations)

V

(12) A lot of criticism of WB policies — Programs dictate priorities. (If you disagree with them you find that pre appraisal is delayed. Projects are receiving transmissions contrary to the agreement.)

Projects dictate their philosophy engineering and economic views — narrow mindedness, non Modern attitudes the fast way of project preparation to get it to the disbursement cycle regardless to the burden it inflicts on the country economies.

WB staff initiate, assist in planning appraise themselves, and then supervise "their" projects and hide the mistakes which are associated with the planning-appraisal process while amplifying the problems associated with the operation or maintenance and the institutional issues which in many cases are their faults

VI

(13) "When you read the press the young generation in Africa are taught that the WB + IMF are the modern Colonizers —

disregarding the real problems of African countries leading us into the "dead end alley" By using the long range concepts. We shall be dead by that time — not only we but also our children, al grand children will have an ~~eeee~~ eternal debt, economic burdens and to pay for our mistakes being too soft to listen and docile to Donor agencies al multilateral so called support.

The positive response from Decision makers in may cases is "corruptive" and wrong influenced by Dikkers ad lenders in X or Washington. (3.1.0)

Look at the Empty Dams

VII

of Africa or the full ones
wanted to understand better
just as indicators of the
magnitude of the problems."
Participants praised the way
and the scope of PRC aid to
African countries.

GT

(to Buy Symphonie
replacing Lotus 1,2,3

'Sub-Saharan Africa and The World Bank'



Timothy T. Thahane

Writing in the September issue of the New York-based *Africa Report*, Timothy T. Thahane, Vice President and Secretary, discussed "Sub-Saharan Africa and The World Bank."

Here are excerpts from that article:

"Although during the past two decades there have been concerns in the donor community about the development, the constraints, and the needs of Sub-Saharan African countries, the fact is that today the economies of most of them are still basically underdeveloped.

"As a whole, the economic condition in Sub-Saharan Africa is grim, and the outlook is bleak. Unless we view the current economic condition of the region in its historical perspective, we will not be able to understand and appreciate the depth of the crisis.

"One of the major problems faced by many African countries at their independence was institutional fragility in political, social, economic and financial sectors."

Building More Schools, Hospitals

"The World Bank and other donor agencies did not directly tackle the issue of institutional development, which requires long-term and sustained commitment of funds and other resources, nor did governments of the region give institutional development top priority. Instead, they jointly focused on expanding economic production, physical infrastructure, and building more schools and hospitals to make their services available to a large number of the population.

"With political and social turbulence that occurred in the two decades following independence, institutional performance was strained. Many government ministries revealed a lack of capacity to determine and evaluate appropriate policies for investment selection, stimulation of private sector development, including the fragile cooperative movement, and for designing appropriate tax structures that could stimulate production and ensure long-term sustainable growth.

"Therefore, a meaningful development strategy for Sub-Saharan Africa must include as a central component institutional and policy reform. This is a major challenge whose solution is slow and long term. The Bank and other donors cannot avoid it if they are to be credible partners.

"Another major problem is agricultural development which has been characterized by falling output per head since the mid-'60s, and a growing dependence on food imports. Since 1961 food imports have increased from about 8% to about 23% in 1983 of all cereal requirements. This food dependence reflects both the low output of agriculture and the increase in population which is among the highest in the world. Compounding this is the recent drought and large refugee populations numbering over 400,000, mostly a result of internal political instability. Therefore, no strategy by African governments and international agencies can reverse the situation without dealing head-on with the problems of agricultural development, population, growth and dependence on rising food imports.

"Another challenge relates to the overdependence of several African countries on a few primary commodities whose long-term prices are likely to remain substantially lower than they were in the '60s. A strategy for economic and trade diversification must therefore be included among the tools to get Africa out of its present situation."

To Adjust and Reform

"There is also a challenge and need to adjust and reform management practices in public, personnel and sector management, in employment policies, school curricula and training. The scope and nature of this adjustment and reform require time and long-term commitment by the government.

"Finally, a problem that is often referred to but never fully analyzed is the private sector and the development of indigenous entrepreneurship. Many governments, after independence, introduced legislation granting various kinds of incentives to foreign entrepreneurs, a few with investments directed at the mineral or other extractive industries. Taken as a whole, foreign private investment with its

management, financial and marketing expertise has never played a meaningful role in Africa outside mining and plantation agriculture. But the policy environment and specific rules of licensing, site allocation, and import permits were cumbersome and not very encouraging. Furthermore, no policies to encourage development of domestic entrepreneurship beyond those geared to commercial and real estate dealers existed.

"While impressive progress in different countries was made in building roads, railways, ports, power systems, schools and hospitals after independence, little attention was paid to creating an effective operation and maintenance capability. Consequently, the quality and frequency of these services in most Sub-Saharan countries are irregular. As the economic crisis deepened, a number of governments responded by reducing funds for maintenance of many of these services. In some cases, roads deteriorated because of lack of maintenance funds, schools lacked essential books, health clinics had insufficient drugs and dressings, and funds to pay staff became scarcer. Thus, to reverse these conditions, the donor community must be willing as a strategy to provide recurrent funds for maintenance of these services."

Debt Rescheduling Is Not Enough

"Africa responded to the balance of payment crises of the late 1970s—especially the increase in the prices of oil and cereal imports—by using its reserves and borrowing from commercial banks where feasible and from the International Monetary Fund. This has resulted in an increased debt service burden for many countries. For Sub-Saharan Africa, average annual amortization payments will rise from an average of $2.3 billion in 1980-82 to about $8 billion in 1985-87, exclusive of IMF obligations of about $1.6 billion falling due in the next few years. Clearly, something has to be done. Debt rescheduling alone is not enough, but must be supplemented by measures to make available external financial resources in a timely fashion and suitable form and by government policies to ensure the efficient use of these external and domestic resources to increase output and incomes.

"The World Bank's development partnership with Sub-Saharan Africa dates as far back as the early 1950s when the first loan was granted to Ethiopia. Since then, the Bank and its affiliates (IDA and IFC) have committed over $19 billion for priority development projects and programs in the region.

"In the '60s and '70s, the Bank expanded its support to Africa for agriculture and rural development and focused explicitly on techniques of achieving growth with equity, poverty alleviation, and increasing the quality of life for many of the poor and disadvantaged people living in rural areas.

"The agricultural projects (164) financed by The World Bank in the last five years have benefited about 33 million people, and over 85% of them realized an average rate of return of 20% to 23%. Fifty-three of them increased food grains by 12.5 million tons of additional grains. But these projects included other objectives where results were moderate and mixed.

"The second priority sector relates to energy development. In response to the dramatic oil price increases of 1973 and 1978, and the persistent balance of payments deficits of oil-importing developing countries that emerged, the Bank increased its lending for energy from 15% to 22.8% in 1984.

"Another area of Bank lending which has attracted attention is structural adjustment lending (SAL) which provides short-term balance of payment assistance through a series of operations over a three- to five-year period to help the country restructure its investment portfolio and to reduce its current account deficit to a sustainable level in the medium and long term."

Poor Quality and Credibility

"Within Sub-Saharan Africa structural adjustment lending varies by country according to unique economic situations. In several countries, some progress has been made toward financial stabilization through policy changes which have helped to reduce budget deficits and moderate inflation. In other countries, progress has also been made in restructuring the incentive system through adjusting exchange rates and pricing policies, and some steps have been taken to improve public resource management or restructure external debt. It is evident that a far greater number of countries continue to face the kinds of problems that structural adjustment loans were designed to address. However, participation remains limited because of the poor quality and credibility of the programs with which governments propose to address their structural adjustment problems, despite analytical and technical advice from the Bank.

"Collaboration of the Bank and the IMF is essential for achievement of the broad objectives of adjustment programs. IMF balance of payment assistance has played an important role in Sub-Saharan Africa in restoring short-term financial viability and creating macroeconomic conditions in which longer term structural adjustment can begin to take place effectively. The Bank's work, drawing on its continuing analysis of general developmental and sector issues, views financial questions in relation to the policy and institutional changes necessary for sustained development.

"In conclusion, it is difficult to build a recovery plan for Sub-Saharan Africa because the conditions within each country vary according to problems, potential, requirements for external assistance, and resumption of growth. However, The World Bank believes that a general strategy among donors to support government-sponsored reforms is necessary to avoid a discordant development effort.

"The economic potential as well as the challenges of development in Sub-Saharan Africa are enormous. Undoubtedly, the time for action is now, and the Bank is firmly committed to making a contribution in the effort to improve the human condition in its member countries in the region." ■

WATER SUPPLY AFRICA

FEB 2 6 1984

Order for Saudi irrigation programme

Six Failing water well drilling rigs have been ordered for use in the agriculturally-rich Buraydah/Qaseem region of Saudi Arabia to exploit natural ground water reserves for wheat crop sustenance.

The first rig was supplied in July, the second in August, a further is en route and the remaining three are due for delivery by the end of 1983: the order for these Failing rigs is valued at approxmately $3,3000,000.00.

The rigs in question are the Model 3000, which is capable of drilling to a depth of 3,000ft using 4-1/2″ drill pipe and to greater depths using lighterweight pipe. This capacity will provide the necessary means of extracting potable water which, due to demand, is now only available from the water bearing strata at increasing depths.

Supplies for Cameroon

Sixteen towns in southwest Cameroon are soon to have water supplies. A $25.2 million project is being undertaken by Belgium's Six Construct International and the local firm Six International with financial backing from the World Bank and the government. The project should be completed by February 1985.

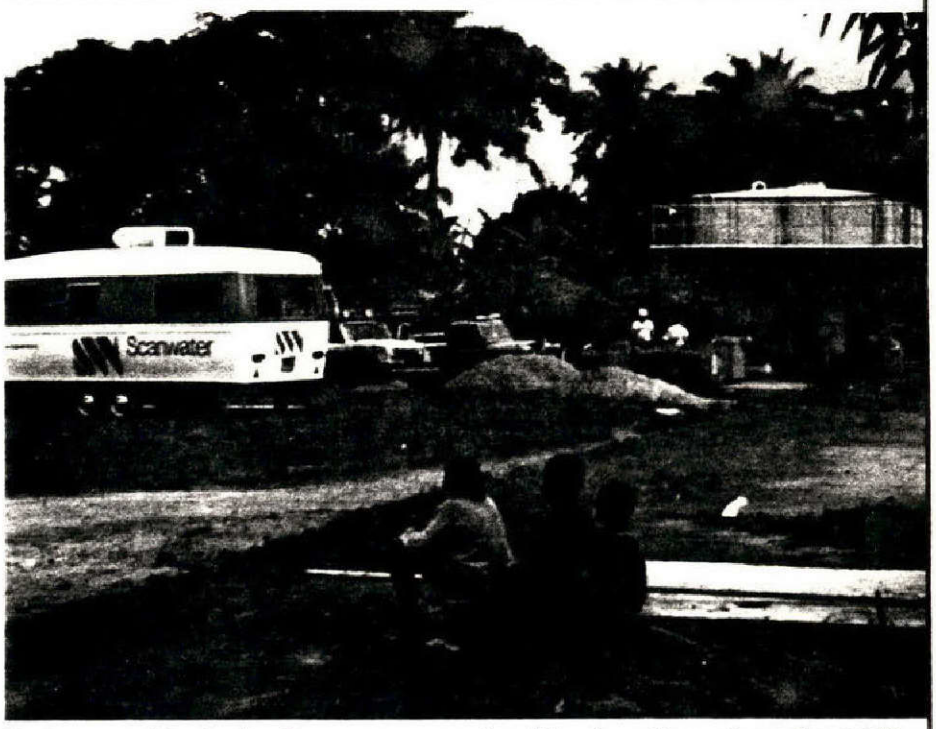
In Massoumbou a new waterworks is being constructed by 12 firms who are aiming to complete the project on schedule this month. Douala's water supply will be boosted by 120,000 cubic metres a day from 10 wells.

Turnkey water supply system

By the end of 1983, about 50 water supply systems based on Scanwater's pre-fabricated package waterworks will be yielding reliable supplies of drinking water to rural communities in Cameroon. By September 1984, the number will have increased to 80.

Since 1974, the Danish engineering company Scanwater, has provided turnkey water supply systems to Africa, either as individually designed plants of capacities up to 450m³ per hour, or as standardised waterworks with capacities ranging from 5 to 40m³ per hour.

The engineering services provided by Scanwater depend of course on the project assigned, but may include any or all of the following: preliminary surveys of the project area, hydrogeological investigations, – the most advanced techniques for locating groundwater potentials, can be applied by Scanwater's own professional staff, – and well drilling. Planning and management of the project through all its phases. Detailed design of all civil, mechanical and electrical works including remote control and monitoring equipment, distribution networks and water storage tanks. Procurement, construction, erection, and commissioning services. In several cases, Scanwater has been assigned the organisation and management of the technical facilities, including training of local operative staff, – and has further been acting as middleman of financial backing of the projects assigned.



Rural communities in the Cameroon are now benefiting from Scanwaters water supply systems.

The range of standardised plants supplied to Cameroon treat the water fully up to WHO standards, and have proven a high degree of reliability and ease of operation. The plants are self-supplied with electricity by diesel powered generating sets.

Another benefit of this range is the modularised construction facilitating the transporting of a complete waterworks in one 20 feet standard freight container from the port of embarkation, on a specially built truck directly to the site of erection in rural villages and small towns in Cameroon.

A long term solution to the problems of organising the operating and maintenance of and spare part distribution to the 80 water supply systems has been secured by a specially designed training programme.

Cavity pump range

A new range of pumps, The Merlin, has been launched by **Mono Pumps** of the UK. The Mono Merlin pump has been designed and produced to fulfil today's market needs, and to be able to meet all of the forseeable future challenges. The most fundamental concept of the Mono Merlin pump is to retain the basic progressive cavity rotor/stator element and to apply value engineering and design principles to the rest of the pump, from the drive end to delivery.

The Mono Merlin Pump, in its first launch phase, covers the heart of Mono Pumps industrial business, the D (cast iron) and H (stainless steel) pump models, up to 25 m3/hr. The Mono Merlin components – bearing housings, bodies, suction chamber, pumping element etc. are designed to "bolt together" in a modular manner, to give maximum flexibility in meeting a customer's exact requirements. The bolt together build ensures easier maintenance, easier and cheaper replacement, and easy change of parts to suit changing needs. In addition, nearly 90 per cent of Mono Merlin components are interchangeable with the equivalent D & H pumps already in the field, minimising spares holdings, and minimising obsolescence. Of course, any obsolete

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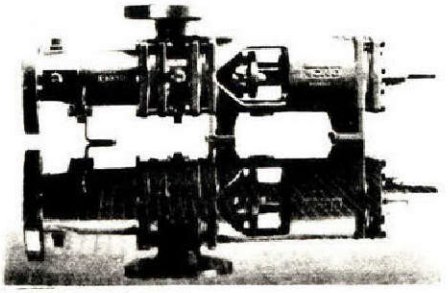
FEB 29 1984

continued from page 85

spares will be maintained for at least ten years for old models.

New features of the Mono Merlin pump body include: long life heavy duty adjustable taper roller bearings, tested to 40,000 hours. Shaft sealing with a new detachable interchangeable section which allows the fitting of either mechanical seals or packed glands in the same body. A suction chamber tapped for pressure gauges that can be turned through 180 degrees to facilitate installation. The pump barrel and end cover are available as a once piece construction – for maximum economy, separate bolt together construction, with straight-through or 90 degree bend end cover, or a moulded-to-metal stator with separate straight-through or 90 degree end cover.

The rotating parts of the pump have a hollow drive shaft of one piece construction for maximum economy, or three piece bolt together construction to allow flushing of hollow shaft during maintenance, or easy extraction, without dismantling the pump assembly. The shaft may be chrome or ceramic coated for even better abrasion resistance under the packed gland. With Mono Merlin Pump a greater range of stator materials is offered in synthetic and natural rubbers, other elastomeric materials, and solid materials for an increased range of applications, especially those resistant to solvents and corrosive chemicals.



The Mono Merlin Pump.

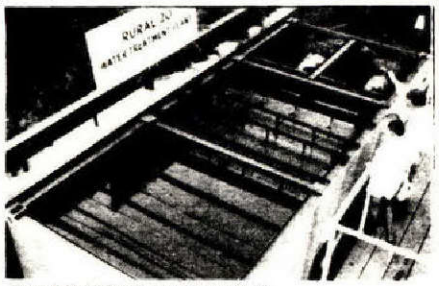
Value engineering concepts have been applied to every aspect of the design, to reduce unnecessary material weight (without sacrificing strength) to reduce tooling and machining costs, and to take full advantage of modern machining techniques. As a result, Mono Merlin Pumps are lower priced than the 1983 prices of the D & H range pumps they are replacing, and will remain so until the end of 1984. *Circle No. 33*

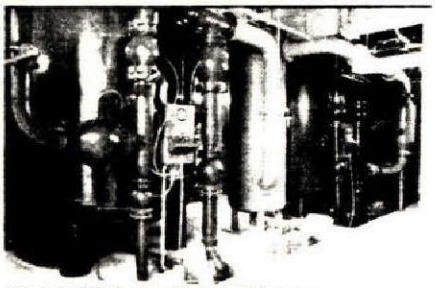
1,000 boreholes for Kano

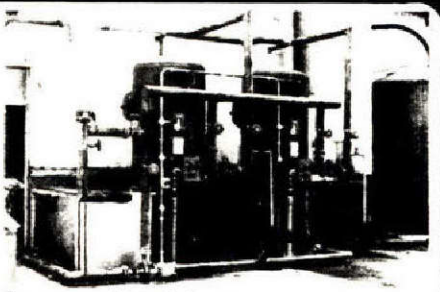
The rainy season is short in Kano and during the prolonged dry season the domestic water supply in rural villages can be erratic. It is thus important to ensure a supply of good water is available to all villages. As part of its overall programme to improve agricultural productivity and increase the standard of living of rural families, KNARDA has implemented an extensive Rural Water Supply Project. The project includes the drilling of over 1,000 successful boreholes each fitted with a handpump. An additional 1,000 handpumps will be fitted to rehabilitated hand-dug-wells. The boreholes will go deeper than open wells and will provide a more reliable supply of water. The newly installed modern handpumps will enable water to be brought to the surface more easily and, more importantly, free of pollution. The drilling contract was awarded on 5 May, 1983, and the first well drilled on 25 May. This project will bring improved supplies of potable water to 1,000 rural villages – benefiting in excess of one million people.

The KNARDA project is aimed at the smaller communities (2,000 people or less) since the larger towns will be more suitably served by the motorised pumps and standpipes currently being installed through another agency, WRECA. In order to ensure that the benefits of the programme are spread evenly through the State, the boreholes and pumps are being divided among KNARDA's four administration zones. Zones 1, 2 and 3 will receive 200 each while Zone 4 will receive 400. It should be stressed however that Zones 1, 2 and 3 are also benefiting from increased supplies of potable water through the washbore programme whilst Zone 4 is not geologically suitable for extensive washbore development.

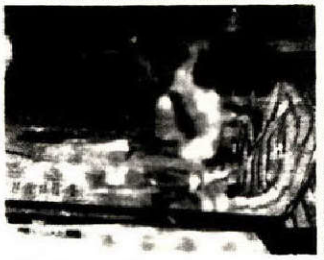
It is anticipated that by 1985 the borehole drilling programme will be complete throughout the State.

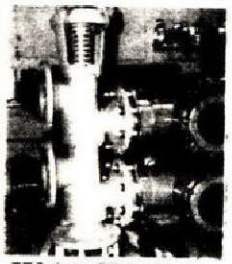

Rural 20 Village package plant

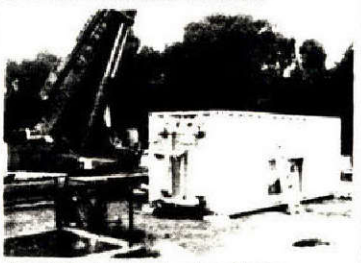

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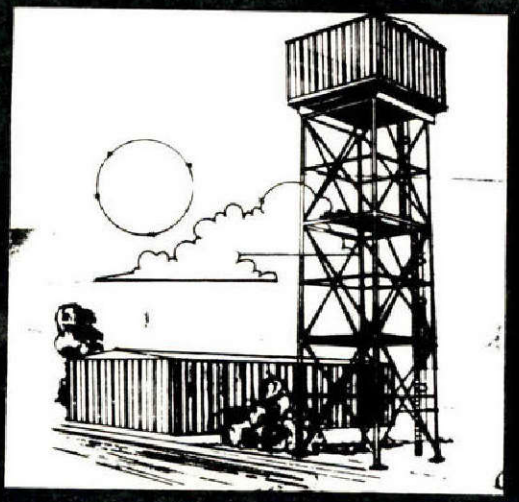
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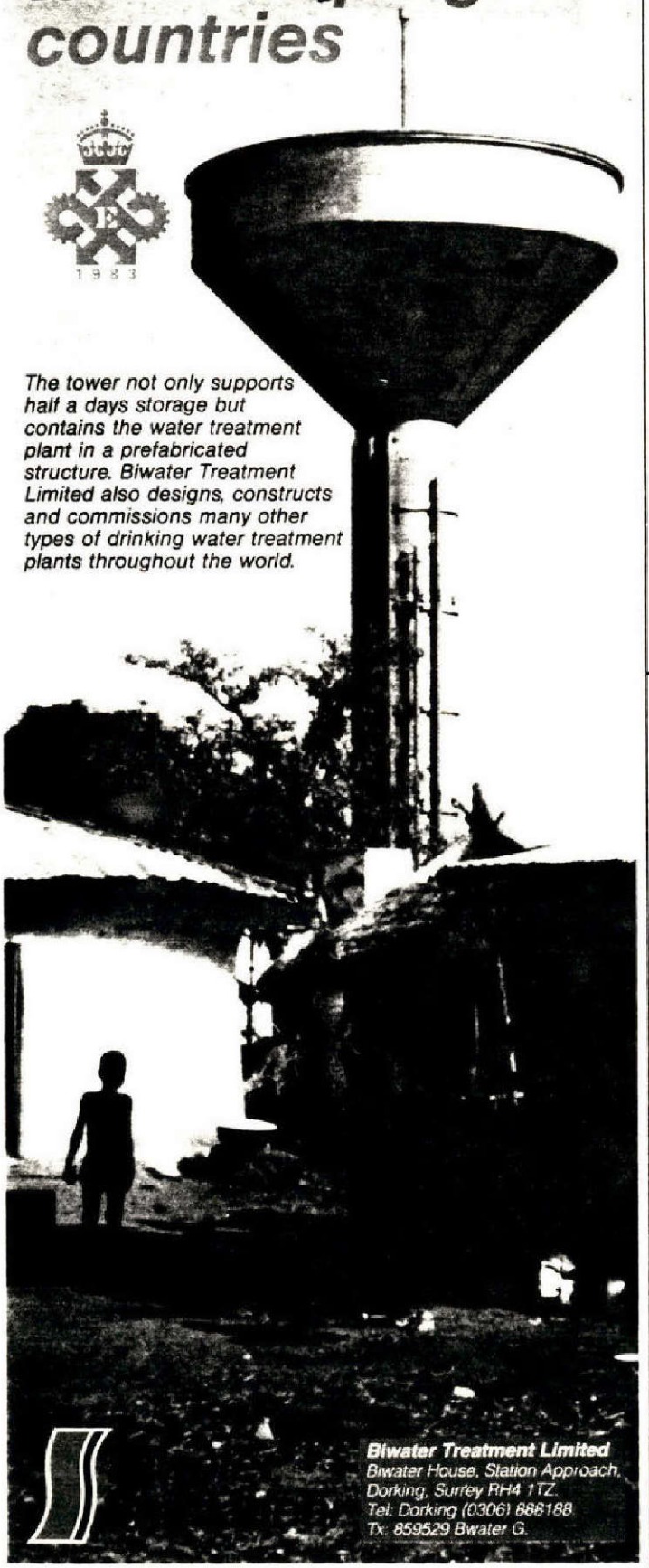
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Know the code

Clean water is fundamental to life. Where there are no satisfactory surface supplies it is normal to drill in a promising area for water. But even if you then strike water there remain problems, particularly in judging the reliability of the supply, Dr. Israel Berkovitch emphasises.

TESTS ARE NEEDED to obtain information on which to base policy. To determine the usefulness of the well as a source of water, the water engineer needs to be able to:

(1) assess its performance under different pumping regimes, select the most suitable pumping plant for long term use and give some estimate of pumping costs;
(2) determine the properties of the aquifer (the water-bearing layers of rock) how it transmits and stores water, and the hydraulic boundaries;
(3) determine the effects of pumping upon neighbouring wells or streams;
(4) obtain information on the water quality and on whether it varies with discharge rate and time.

When water is pumped from a well, the head of water in the well is lowered points out a new Code of Practice (BS 6316: 1983). This sets up a localised hydraulic gradient that causes water to flow to the well from the surrounding aquifer. In turn this produces a cone pointing downwards, of the water surface within the ground around the well.

Observation wells can be sunk nearby. By monitoring the water levels in these, it is possible to see how this surface is affected by the pumping rate and how long it is continued. There can be complications due to aquifers at different levels within the ground. In that case, drilling boreholes tends to disturb the conditions of the water (the hydraulic regime). However, it is possible to separate the effects of the different layers by introducing water-tight packs into the drilled hole around the pipework, and thus restore the original isolation of the aquifers at different depths. The Code does not deal with the action to be taken as a result of the test results but does give reference to texts that deal with this further practical stage. In effect, this Code is like a summarised text book on test pumping. The overall procedure recommended is shown in Fig. 1. Here it is possible to discuss only a few aspects of this recommended procedure.

Important objectives are to define the quantitative properties of the aquifer. They are permeability – how fast water can flow through it under a difference of pressure – and storage, which is the volume of water within it. If the aquifer is 'confined', with neighbouring impermeable beds, its storage coefficient is very much reduced. This coefficient is the volume of water it releases from, or takes into, storage per unit of surface area and unit change in head of water. The confining bed of impermeable material of course restricts the natural flow of water to or from the aquifer.

Pre-test planning includes discussing plans for test pumping with any relevant public authorities to avoid breaking any relevant regulations, or upsetting any nearby community. And good site facilities should be ensured before starting drilling. Depending on the equipment used, and the local facilities, this may include organising utility supplies, communications, organising disposal of waste, disposing of pumped water without causing nuisance, maintaining and storing equipment.

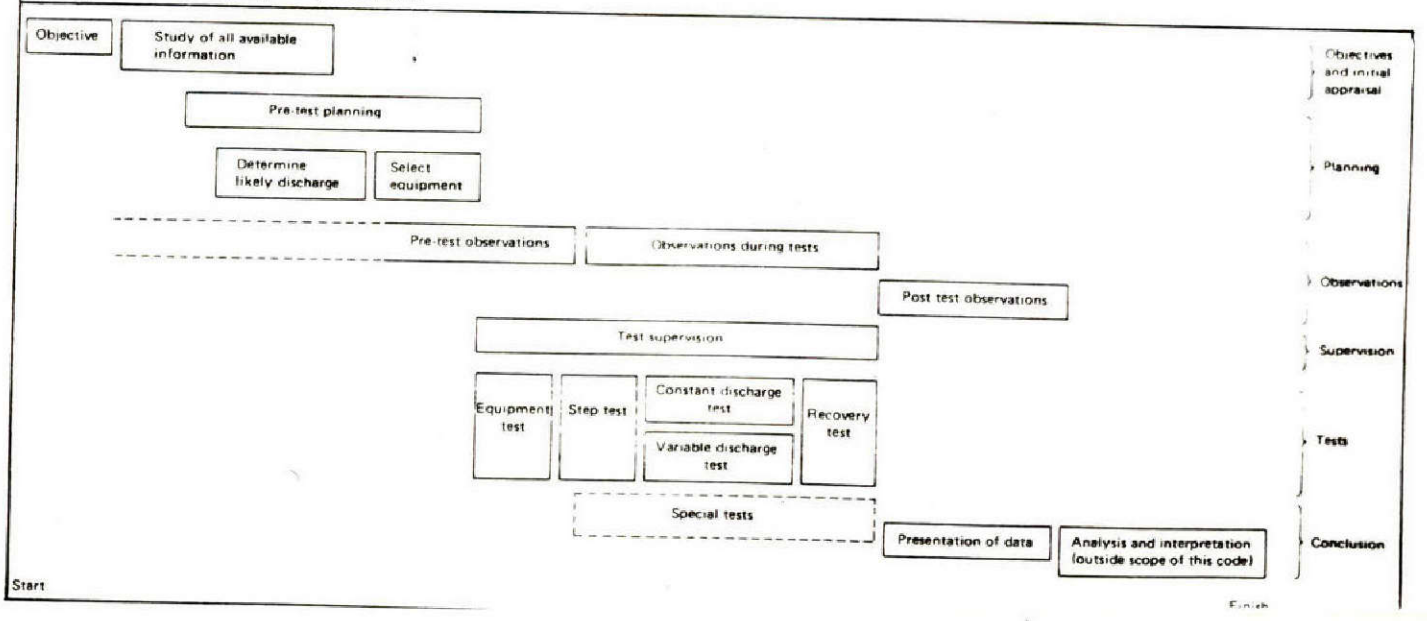
First, it is necessary to test the equipment itself. This means checking over the pumps and associated gear, devices for measuring discharge, instruments for measuring water level, and all safety devices. If these are all in order, there are then four tests directly connected with pumping. They are:

- Step test: this means pumping the well in a series of steps of increasing discharge rate. A useful tip is to run each step for 100 minutes. This is a sensible time for the test and is also convenient for plotting graphs and for calculating. The highest step should be close to the maximum for the test well. Groundwater level measurements should be taken in the pumping well and in the observation wells discussed below;
- Constant discharge test: running a test at constant discharge indicates the characteristics of the aquifer within the radius of influence of the pumped well. Recommended duration for such tests is shown in Table 1.

These tests are combined with measurements in the observation wells and can also

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Figure 1. Typical pumping test procedure.



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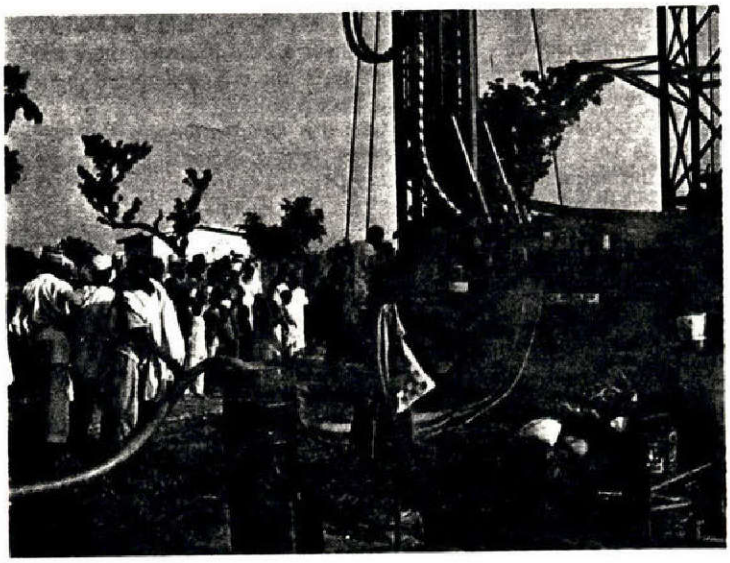
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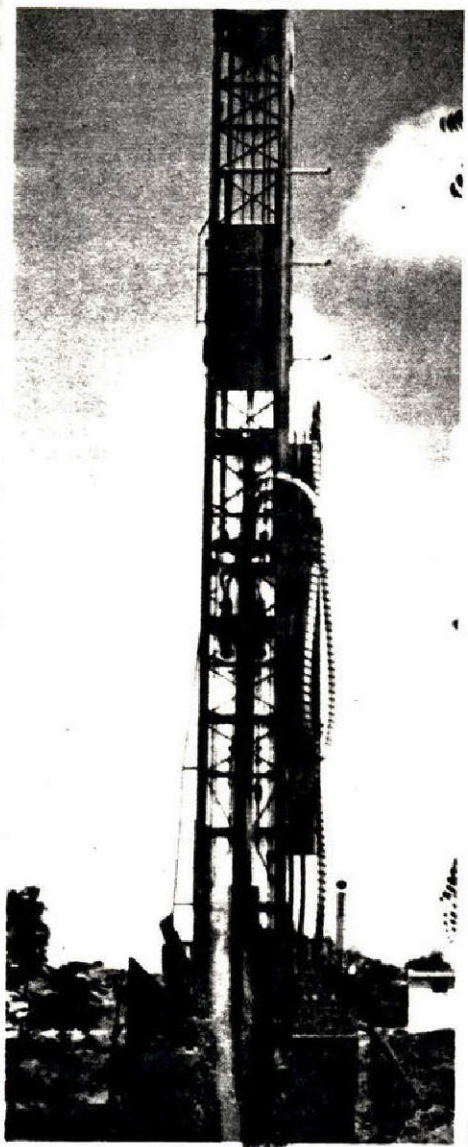
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give the specific capacity of the pumped well (rate of discharge divided by reduction in head of water within the aquifer);

- Variable discharge test: again the aim is to examine the characteristics of the aquifer but this time under conditions that keep the head constant. So it is a test that is best carried out with a pump that can be controlled to give a variable discharge rate. Table 1 also applies here in defining the duration of test.
- Recovery test: after either a constant or a variable discharge test, the water level data are recorded in the observation wells and in the pumped well if it has a foot valve (if it has no foot valve, water from above may flow back into the weel).

In addition, if there are any streams in the neighbourhood, stream flow should be measured to check if there are any effects on the normal natural flow on the surface and if there is any serious depletion.

Where do you sink the observation wells? The Code sets out to be as general as possible, often emphasising that conditions vary so much that only broad principles can be proposed and not strict procedures as in the more usual Test Standard Methods. Nevertheless in respect of observation wells it does give a table of recommended spacings. They are shown as Table 2.

Water level can be measured by automatic devices but it is quite adequate to use simple floats. An intermediate device is a dipper instrument that relies on making an electrical circuit when a slim electrode makes contact with water. This kind of instrument is powered by battery and gives a signal by light, instrument needle or a buzzer. The supporting cable is marked at one metre intervals.

In the test itself the four basic objectives are these:

to ensure satisfactory operation of the pumping equipment
to collect data about the well
to measure the pumped discharge.

Fig 2 shows a typical arrangement of equipment to meet these objectives in a well that is part-lined (to prevent collapse of the hole and to prevent particles from falling in and obstructing the flow); since the lower part is unlined, it is called 'unscreened'.

As would be expected the Code itself goes into detail on all aspects of the procedures sketched out above including choosing pumps, geophysical logging, methods of measuring flow. Engineers working on supplying water on any appreciable scale from wells would be well advised to obtain the Code and follow up its further references on groundwater hydrology, particularly those on evaluating pumping test data. □

BS 6316: 1983. British Standards Institution. £19.50 (£9.75 to members).

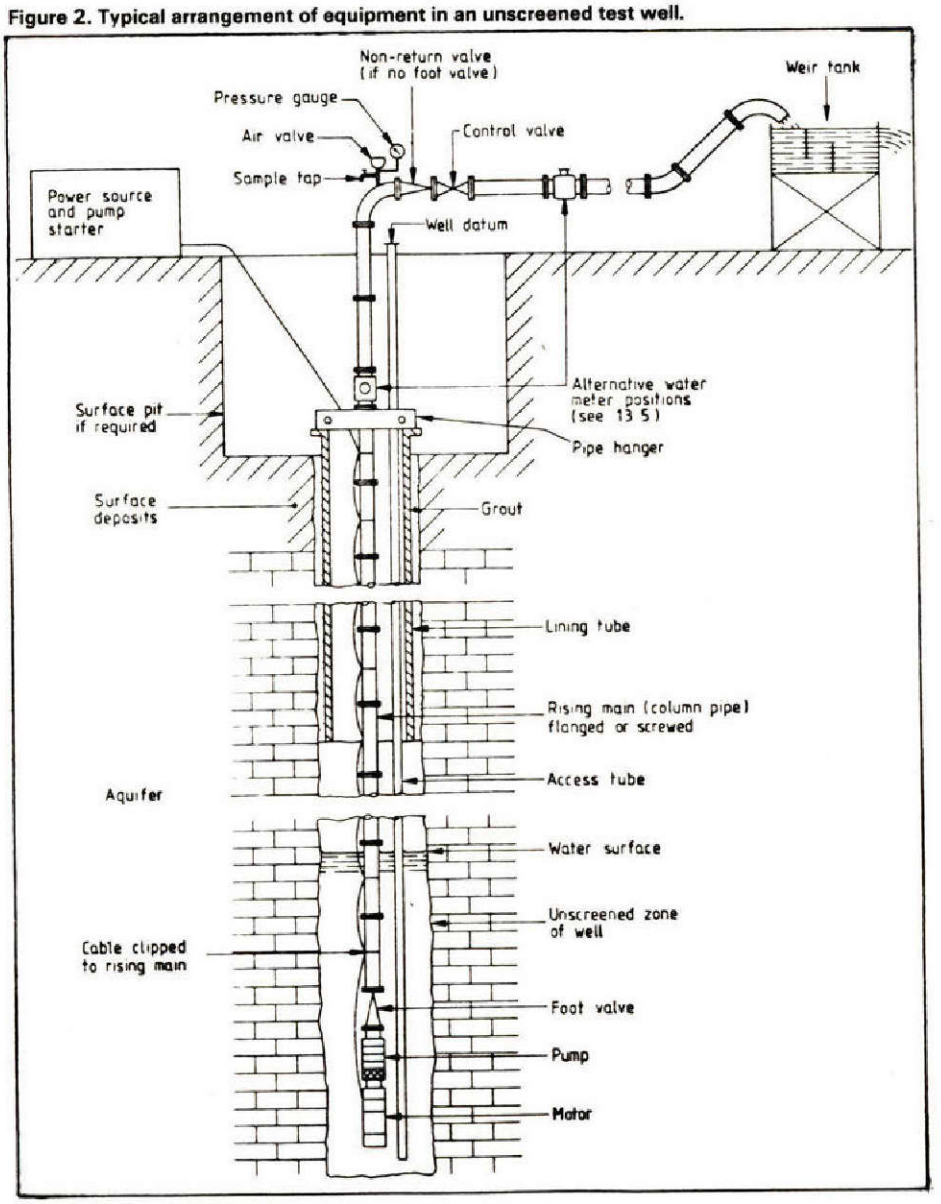
Table 1. Minimum duration of constant discharge tests

Discharge rate in cu m/day	Duration in 24 hr periods of constant discharge
up to 500	1
500 to 1000	2
1000 to 3000	4
3000 to 5000	7
over 5000	10

Table 2. Location of observation wells

Aquifer state	Transmissivity	Measurable response	Typical lithology	Spacing from test well
	m^2/day			m
Unconfined	50 to 500	slow	unfissured sandstone	25 to 35
Unconfined	over 500	fast	fissured limestone	45 to 60
Confined	50 to 500	slow	unfissured sandstone	60 to 100
Confined	over 500	fast	fissured limestone	100 to 200

Figure 2. Typical arrangement of equipment in an unscreened test well.



The technology of rural water supply

The importance of improving water supply and water disposal has been repeatedly stressed by various national governments and international agencies. Here we reprint a paper delivered at World Water '83 by S. Arlosoroff, of The World Bank, Washington.

THE UNDP/WORLD Bank Rural Water Supply Project for the Testing and Technological Development of Handpumps (INT/81/026) is part of the UN effort to achieve the goals of the International Water Supply and Sanitation Decade. These goals call the provision of adequate drinking water for all people in developing countries by the year 1990. Handpumps installed in wells, where groundwater of appropriate quality is readily available, provide one of the simplest and least costly means of supplying drinking water to rural areas. The project consists of three phases: laboratory testing, field trials in about 15 developing countries, and the promotion of the technological development of new types of handpumps that could be maintained at the village level and manufactured in developing countries.

The World Bank and other international organisations have estimated that less than 25 percent of the over 2 billion people in the developing countries have access to adequate supplies of safe water and adequate sanitation facilities. The 1.5 billion people who lack these basic services include about 1.1 – 1.2 billion rural inhabitants, while the remaining 300 to 400 million live in urban areas.

The mandate for a concentrated effort to provide the above basic needs is the United Nations resolution declaring the 1980s as the Drinking Water Supply and Sanitation Decade. The basic goal is to provide the most fundamental of human needs – safe water supply and adquate sanitation.

Full achievement of the Decade Goals would mean providing water and sanitation services to over 2 billion people in the developing countries by the year 1990. In addition, there is a need for rehabilitation and expansion of services to those perhaps 200 – 300 million who have access only to systems that do not function properly.

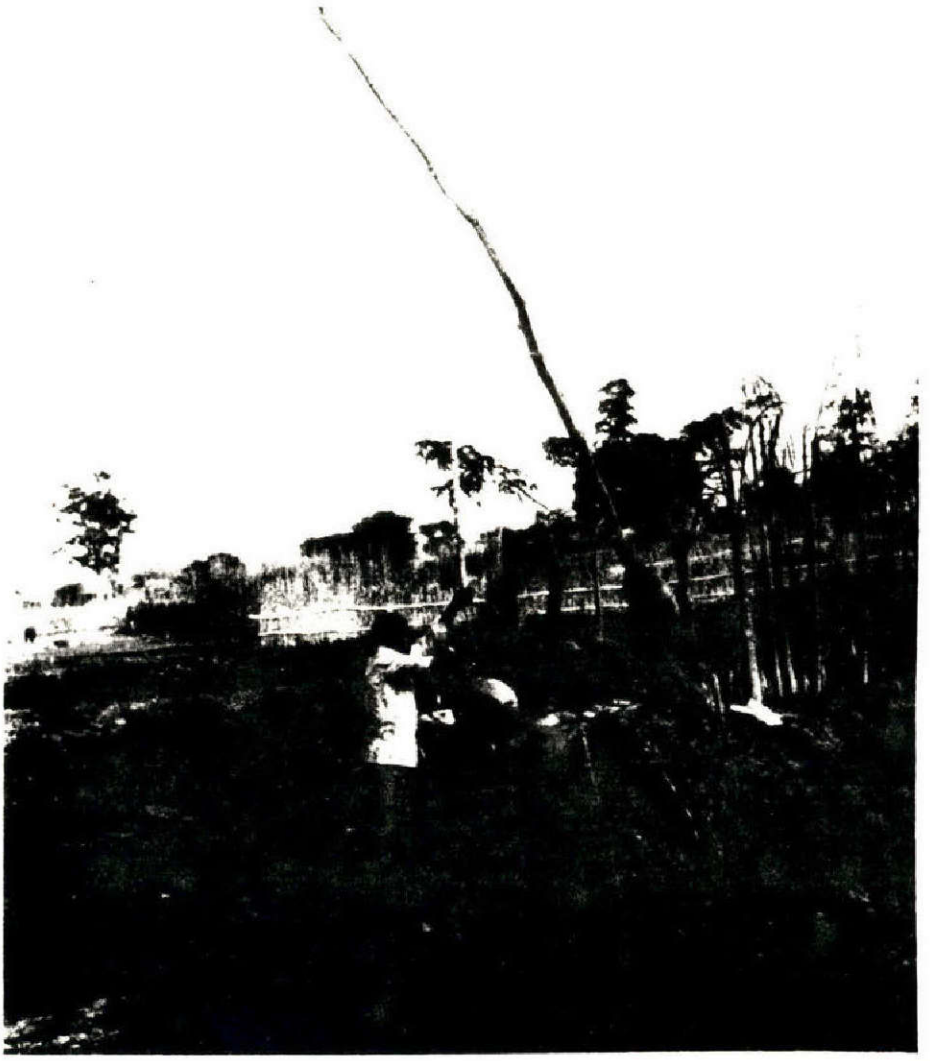
Rural water supply programmes will undoubtedly include the untilisation of ground water resources since this resource, where available, requires little or no treatment. Although ground water abstraction by motorised pumps (gasoline or diesel engines, electrical motors, etc.) will be employed in some rural water supply projects, handpumps are expected to play a major role in these areas. Massive investments in handpumps are anticipated in the coming decade, the rest of the century, and beyond.

There are some serious technological problems that contribute to poor performance and short working life of handpumps. Data on evaluating and improving handpump performance are sparse and often inconclusive. Likewise, there is a lack of reliable data on the comparative performance of various handpumps.

In response to the above problems, the UNDP has initiated, and the World Bank has agreed to act as executing agency for, a project on laboratory and field testing or handpumps. The output of this project will enable governments and international agencies to obtain maximum benefits from funds available for rural water supplies. The project will also provide the necessary data for the development of simple, reliable handpumps which can be installed, maintained and repaired by technicians from the users' community with little or no outside help.

continued on page 90

Less than 25 per cent of the over 2 billion people in the developing countries have access to adequate supplies of safe water and sanitation facilities.



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Background

Groundwater supply in rural and urban fringe areas can be provided by:

(1) Small distribution systems consisting of a motorised pump, storage tank, distribution network, and stand pipe or individual connections.
(2) Larger distribution systems consisting of a few villages, i.e. an expansion of (1).
(3) Open or covered dug wells and/or drilled wells equipped with handpumps.
(4) Dug wells without pumps.

Small distribution systems rely on fuel or electricity as power sources for the pump. Fuel costs are increasing in real terms and shortages are common in many rural areas. Spare parts often are difficult to obtain, and maintenance and repair are serious problems. Breakdown of small engines are common, leaving villages without suitable water supply until the pump/engine is repaired or the fuel supply is resumed.

Electricity is not widely available in rural communities and the supply, where available, is often unreliable. The costs of rural electrification, including generation and distribution, are very high. Other motorised pumps powered by wind and solar energy, etc. are either not yet well developed, expensive, or suitable in only certain specific locations.

In view of the need to supply permanent safe water sources to rural communities, and because of serious budget constraints, many rural water supply programmes will have to rely on handpump installations as the only economical feasible alternative.

Regrettably, the basic design of handpumps has changed little in the last 50 years; the common handpumps were designed for use on single-family farms in rural areas of industrial countries. These pumps were fabricated from cast iron and other metals, functioned well under light use, and required an average level of technological knowledge for routine maintenance and repair.

The introduction and use of such pumps in rural handpump programmes have produced some major complex problems on a worldwide scale. Several of these problems have their roots either in sociological and cultural attitudes of the pump user or in the organisation (or lack of it) of the handpump installation and maintenance programme. Other major problems are associated with design, selection, and quality of manufacture. Review of a number of handpump projects indicate that handpump failure may be attributed to one or more of the following:

(a) Lack of proper maintenance, spare parts, and trained repair personnel.
(b) Use of cheap and inferior pumps in an effort to provide water to the greatest number of people within the scope of a limited budget.
(c) Intensive use of a pump in a village water supply scheme, which may require it to be in almost continuous operation for perhaps 10 – 16 hours per day.
(d) Lack of unbiased and reliable test data from which cost effective decisions can be made as to which pump should be selected for a given project.

At the present time, there is no reliable field data on the performance of various handpumps, and therefore, no meaningful comparison between pumps can be made. Over the last ten years, a number of field testing programmes have been conducted. The objective of most of these programmes – UNICEF (Bangladesh), WHO/UNICEF (India), USAID/GEORGIA TECH (Central America) – was the development and testing of a particular pump rather than comparison testing. Field testing programmes that included various types of pumps, e.g. CIEH (Upper Volta), CIDA and IDC (Ghana), and others, provided insufficient results. The Consumer Association (CA) of the U.K. has conducted a full-scale comparative testing. This laboratory test project, sponsored by the British Overseas Development Administration (ODA), has tested 12 different types of pumps under simulated field conditions. The long-term test (4000 hours of operation) provided results on performance, durability, user comfort, and other engineering data. The present UNDP/World Bank project continued under Phase 1 (UNDP Project GLO/79/010), which began in 1981, to test handpumps in cooperation with CA.

The test programme, which recently concluded, was extensive, and took about 20 months to complete. It included detailed inspection of the pumps as received, including their packaging, engineering assessments with suggestions for design improvements, and user trials. Tests carried out included endurance, performance before and after edurance, impact and handle shock where applicable. Assessments of ease of installation, maintenance and repair were also made.

General observations from tests

Literature: all pumps should be supplied with instructions for installation, maintenance, and use. Clear illustrations are of particular value in overcoming language and literacy problems.

Skills required: all the pumps require basic mechanical skills for installation and maintenance, and some need considerable expertise.

Installation: many pumps require lifting tackle for installation and maintenance because a galvanised iron rising main is

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Handpumps are expected to play a major role in rural water supply projects.



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used. If uPVC or other plastic pipe were used, the below-ground assembly could be installed or removed without lifting tackle.

Baseplate sealing: with some pumps, extra care is needed during the preparation of the base and subsequent installation to ensure an adequate sanitary seal.

Mounting height: many manufacturers give no indication of the correct height to which the pumps should be installed. The best pump designs are those which do not require a special pedestal built up on a wellhead. Pumps should have an inbuilt design feature which ensures that they are mounted at the correct height.

Spares: all the pumps may in time need manufacturer's spares, some of which can be costly. However, the cost per unit of a stock of spares will fall the more pumps are installed in the field. Emphasis should be placed on development of the VLOM concept with regionally produced spare parts if possible.

Two-person Operated Pumps: rotary pumps operated by two people may have certain advantages. It may be necessary to investigate local cultural/sociological factors to assess the likely problems of this in practice.

Design features

Safety: some manufacturers do not pay sufficient attention to avoiding safety hazards, even where this involves only a simple design change, i.e. long bolts with ragged ends, finger traps, tails of split pins.

Handle: from observation of users operating reciprocating pumps, a potential cause of wear in the handle pivot could be eliminated by adding a "T" at the end of the handle where applicable. Cast iron is prone to breakage and difficult to repair. Handles should be of resilient material, steel bar or tube, or wood where available.

Valves: some manufacturers give insufficient attention to the amount of valve lift. It is often excessive thereby lowering efficiency and introducing risk of valves jamming open.

Pump rod constraint: the test results suggest that where the design attempts to constrain the motion of the pump rod into a straight line, bending forces are generated causing failure at the pump rod joints.

Glands: these are not an ideal method of sealing the pump where it passes through the pumpstand, particularly if also used as rod guide. Wear is inevitable and the subsequent leakage, apart from the loss of sanitary seal, could produce difficulties if tank filling is needed.

Faecal contamination: manufacturers should, where necessary, look at the designs of the outlet spout to ensure that users cannot seal off the outlet with their left hand after defecating, while pumping with their right hand.

Fixings: few manufacturers have considered rationalising the variety of fixings used on the pump. These could often be all one size of type; therefore, requiring only one tool.

Discharge valve: in view of the few applications where a tank filling facility is needed, the complication in pumpstand design that this introduces is unnecessary and often creates points of weakness.

Quality control: all designs require a measure of quality control, but some of the more complicated pumps need very strict quality control in manufacture, particularly in developing countries. Use of simple jigs and fixtures can greatly help the quality control problem and ensure both correct original construction and interchangeable replacement spares.

VLOM: preliminary findings and reports from the laboratory and field have begun to confirm the need for the development, testing, and promotion of VLOM (Village Level Operation and Maintenance) pumps, i.e. pumps that can be pulled out of the well and repaired by trained village operators. These pumps should be simple in design and construction and light in weight. The first VLOM pumps have already begun to appear on the market; however, these versions still require modifications. This newly developed generation of VLOM pumps were included in the final batch of pumps to be subjected to Phase 1 laboratory tests. Although some of the pumps come close to satisfying all the requirements for VLOM, none do so completely. Attention to the above observations would go a long way towards meeting the VLOM concept.

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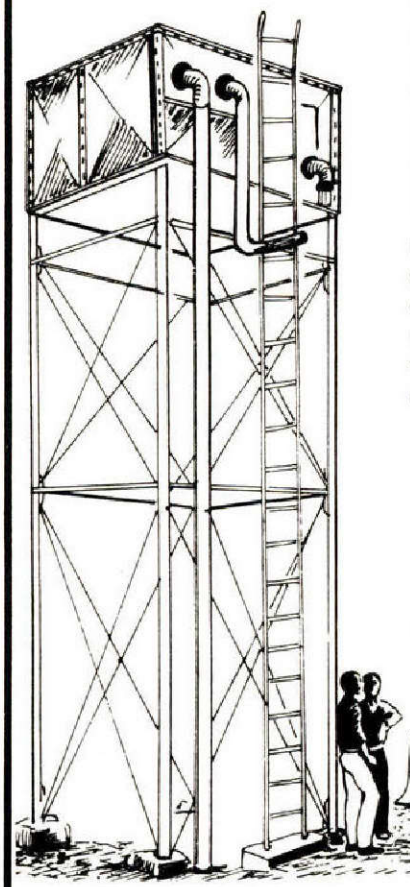
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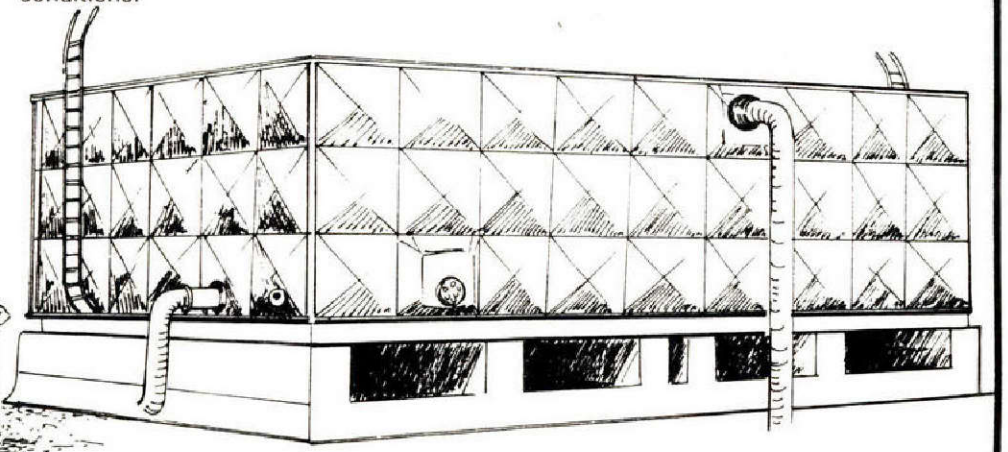


Bridgestone Panel Type Water Tanks are made from G.R.P. (Glassfibre Reinforced Plastic) a material which is increasingly replacing iron and steel because of its more advantageous features. The outstanding features of Glassfibre Reinforced Plastic are:

1. It is lightweight (it is even 40% lighter than aluminium)
2. It is durable
3. It is anticorrosive
4. It is easily moulded

Bridgestone Panel Type Water Tanks keep water clean which makes them ideal for storing drinking water because they are free from rust, free from growth of bacteria and free from accumulation of algae.

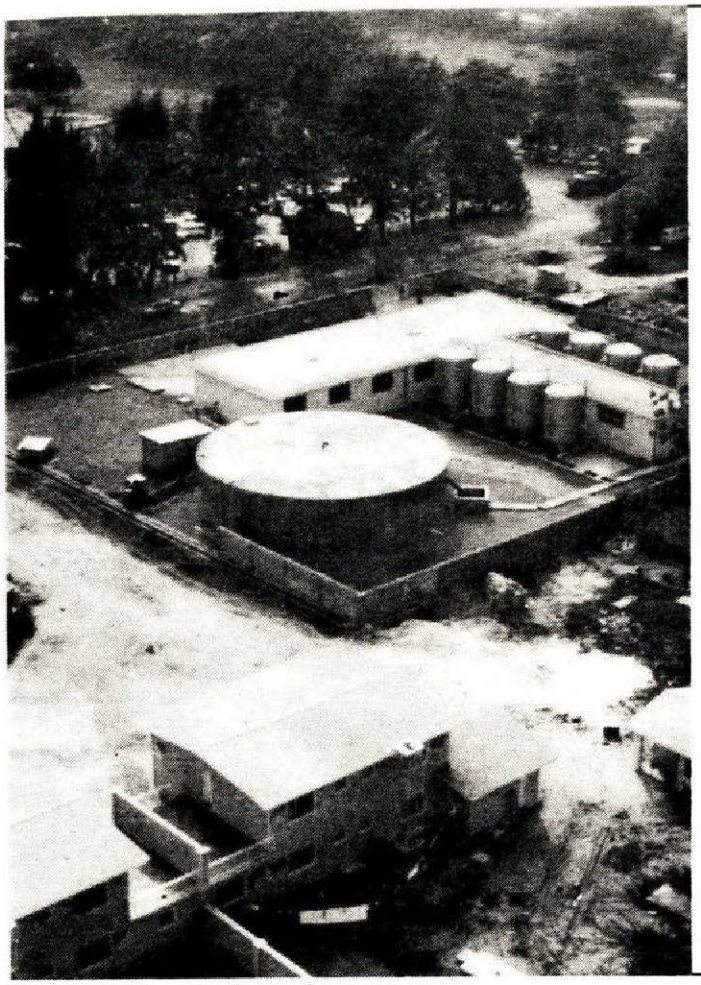
Bridgestone tanks are easy to assemble and have won a good reputation for themselves all over the world, having proved themselves in all kinds of weather and conditions.



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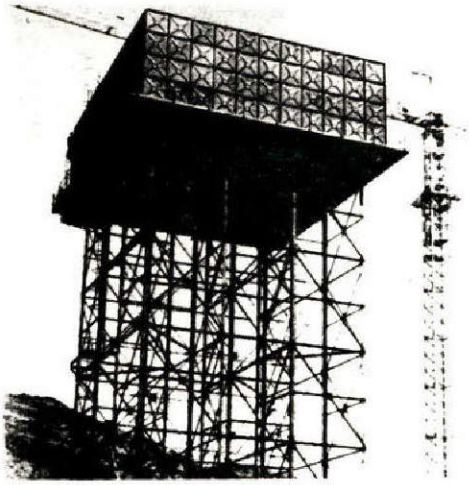


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Digital pH meter

LaMotte Chemical's new digital pH meter offers laboratory precision in a rugged, compact field instrument. The Model DHA-2 measures pH 0 – 14 with an accuracy of ± 0.01 pH and also reads ± 1999 millivolts with an accuracy of 1 mv. The instrument is powered by a single 9V DC battery, and an optional AC adaptor is available. Furnished in a foam-lined carrying case with Ph electrode, electrode stand, and buffer solutions, the Model DHA-2 is designed to provide years of reliable performance for onsite pH measurement in natural waters, process waters, and wastewaters.

Test results are read on a bold ½" tall LCD. Control panel features include a battery-capacity test circuit, a voltage potential control for full scale adjustment, and manual temperature compensation from 0 – 100°C. An external slope adjustment permits the meter to be calibrated for use with a variety of ion selective electrodes.

The Model DHA-2 is furnished with a gel-filled combination electrode. This rugged, maintenance-free electrode has a 3' lead with a BNC connector. A convenient stand swings out from the carrying case to support the electrode during testing. Three standard buffer solutions are included.

Circle No. 13

Treatment systems company

A new company, **Fluid Dynamics International Limited**, has been formed within the Fluid Dynamics Group to handle the UK and overseas marketing of smaller, package-type water and effluent treatment systems, with particular emphasis on the developing countries.

The Fluid Dynamics Group specialises in municipal and industrial filtration, sewage and effluent treatment systems as well as domestic and industrial water softeners. Fluid Dynamics Ltd, the Eire-based company, manufactures the Colloid-A-Tron non chemical treatment system for the prevention of scale caused by hard water.

Circle No. 14

UV plants

Katadyn Products Ltd of Switzerland are water sterilisation specialists with a comprehensive product range: Katadyn filters, Electro Katadyn sets, Micropur powder and tablets, Multus-UV plants.

In the Multus ultraviolet plants UV-C radiation destroys germs. The Multus principle has the ultraviolet lamp with its quartz protecting tube arranged axially inside the irradiation chamber. Turbulence vanes and a homogeneous distribution of the UV light ensure optimal exploitation of the radiation as the water passes through. The basic Multus plant is extensible at will on the modular principle. The UV permeability is monitored continuously. Multus can be employed for any performance rate. For very large treatment capacities the Multus compact plant with several UV lamps in one chamber is also recommended.

Circle No. 15

Sterilisation systems

Hanovia has launched a new range of packaged water disinfection systems, with full automatic monitoring and control, based on the latest developments in ultraviolet photoreactor technology.

The new sterilisers can kill all types of waterborne microorganisms, including the smallest virus, with a kill factor greater than 99.99 per cent. Applications include drinking water treatment, especially for rural borehole supplies, effluent treatment and industrial process and product water supplies where the effectiveness of normal does levels against viruses is an important feature.

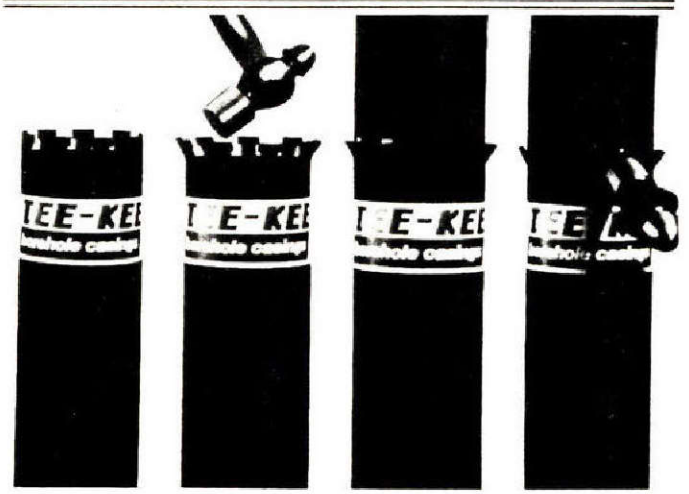
Four systems are currently available with treatment capacities of up to 1.4, 12,34 and 90m³/h, though higher flow rates can easily be treated by using several units in parallel. Power consumption is modest, ranging from 150W for the smallest unit to 2.5kW for the high capacity model.

In its most comprehensive form, each system consists of a UV photoreactor module, power supply, automatic controls, UV sensor, water pressure sensor and electrically actuated valve. All components are mounted on a steel frame and cabinet which can be floor or wall mounted. Supplied as a ready to install package, installation simply requires two plumbing connections and electrical power wiring.



In the event of electrical failure, reduction of UV lamp intensity or drop in water pressure, the system automatically switches to a standby unit or shuts down completely and gives a visual and audible warning. These features positively prevent unsterilised water passing through the system untreated.

Circle No. 16



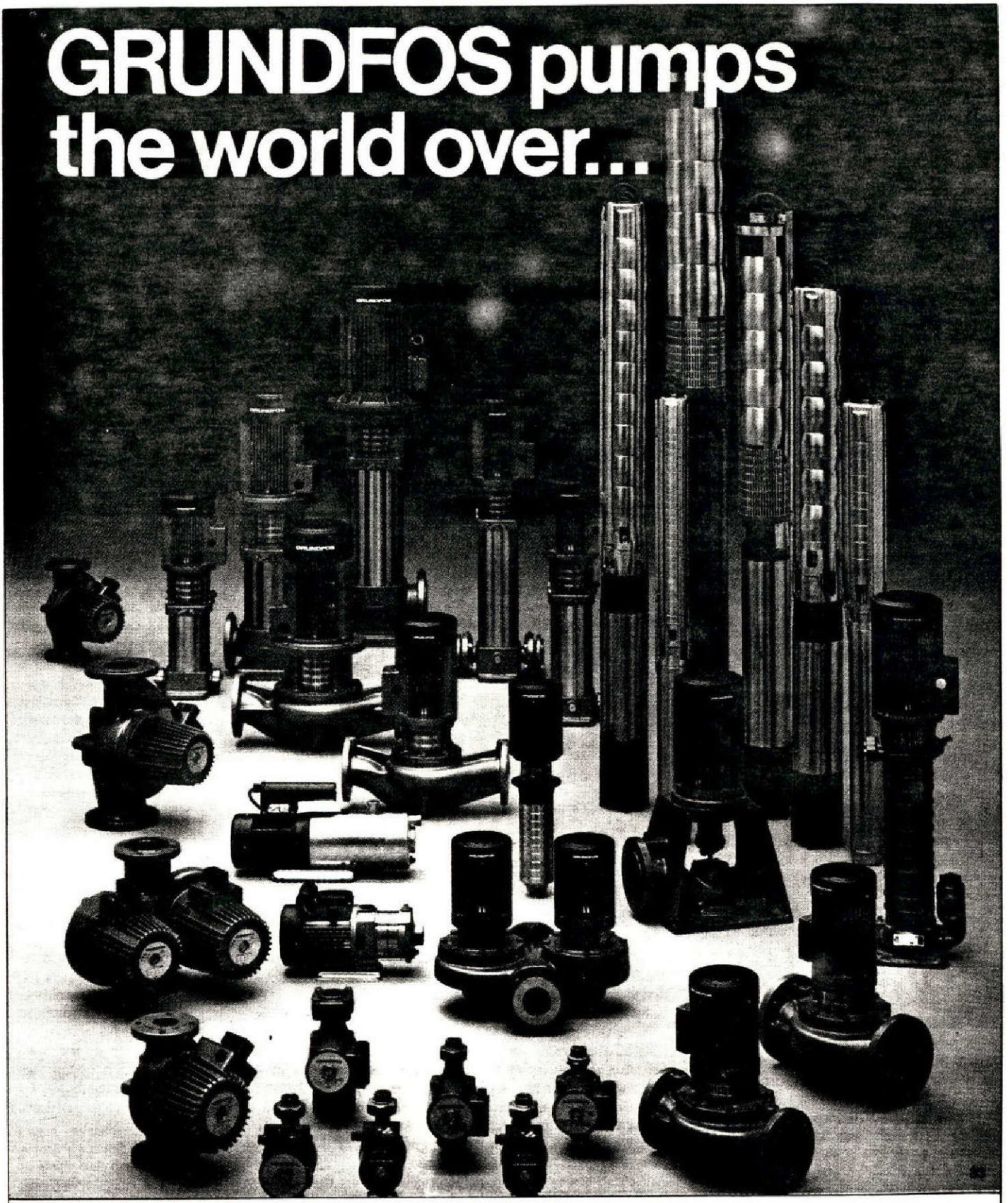
Borehole casing

The **Virtus** Tee-Kee Hammer Joint casing pipe for water wells provides a smooth ID and OD, with no projections, giving ease of installation. To join the pipes the straight Tee-Kee is engaged with the belled section and the protruding Tee-Kees are hammered into place.

To disengage for re-use, the Tee-Kees are hammered inwards with a suitable punch and the joint pulled apart. Cheaper and more convenient than threaded and welded pipes, Tee-Kee casing pipe provides a strong, economical and quick way of connecting casing without the need for site welding or the expense of threaded fittings.

Circle No. 17

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Circle No. 193 on enquiry card

Pump company subsidiary

The Grundfos Group, has broken new trading ground with the establishment of its first subsidiary in Africa. The company – **Grundfos Pumps (Nigeria) Ltd** – is already operational. Over half the first assignment of pumps from the Group's manufacturing base in Denmark were already sold before shipment, and service facilities for new as well as existing installations are in use.



Alhaji Alico Mohammed.



Jens Kragholm.

The new company has its headquarters in Kaduna, and regional service centres will be set up, according to demand. A full distribution network is being implemented.

Grundfos Pumps (Nigeria) has been established in conjunction with local partner Alhaji Alico Mohammed. Jens Kragholm of the Grundfos Group will be managing director. Says Alhaji Mohammed: "We are optimistic about the future prospects of Grundfos in Nigeria. I feel a natural responsibility that my country will again become self-sufficient in agricultural products. To succeed in this respect, the agricultural projects planned by the federal government and state authorities must be accomplished – and this can only happen if the necessary irrigation projects are carried through successfully".

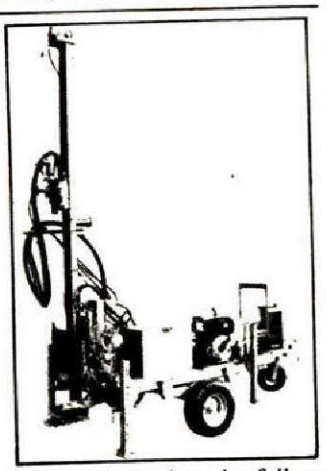
He added: "For many years, Grundfos has had the reputation of being a supplier of quality products and many Nigerian businesses use Grundfos pumps for big projects. So it is quite natural for me to contribute to the creation of a local Grundfos company in my own country".

The Grundfos Group undertook in-depth surveys and research to ensure that high standards of support and after-sales service are provided.

Grundfos has a tradition of appreciating local problems and needs, and this is particularly relevant to Nigeria.

Slim-hole rig

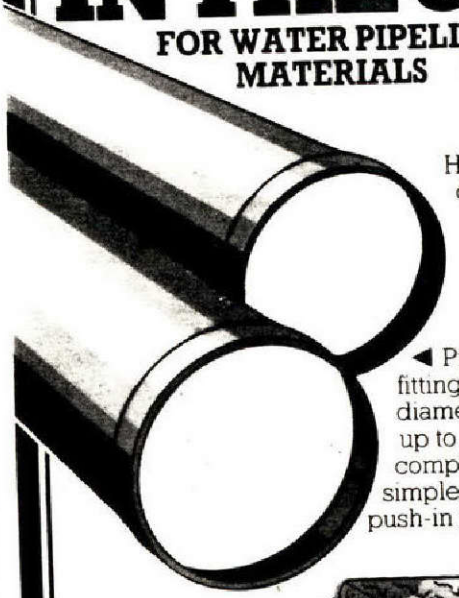
The LWD 200 from **WellDrill Systems** is a light-weight, trailer mounted drilling rig able to produce a 4½" hole through a solid rock at a rate of up to 50 feet per hour to a depth of max. 400 feet. The prime mover of the rig is a hand-started, air-cooled diesel engine, which operates the mast-raising cylinder, the feed and rotation and a break-out tongue for dismounting the DTH-hammer. The hammer is the only item requiring compressed air. Only a small compressor is therefore needed. Overburden up to 100 feet can be negotiated with the "Odex" method.



The manufacturers say that diameter holes has the following advantages: lower investment for the rig and accessory equipment; lower running costs; light and easy

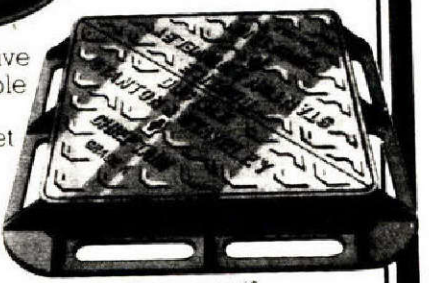
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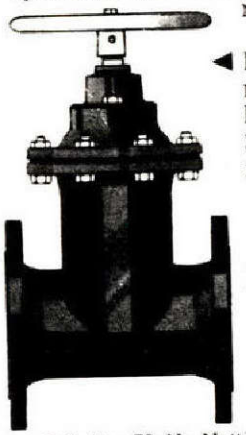


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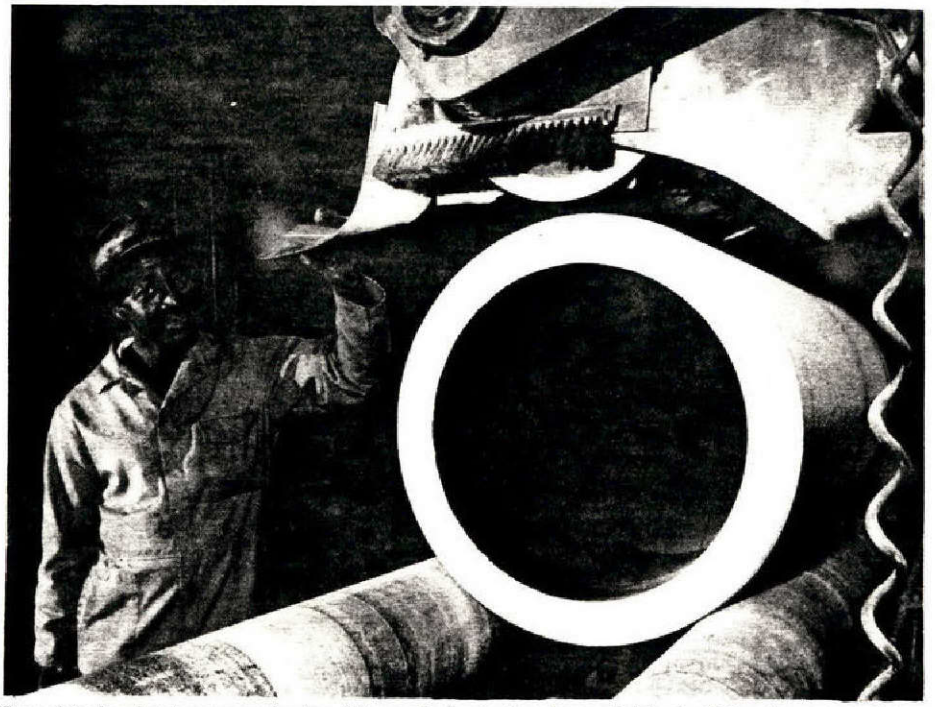


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Completed asbestos-cement pipe. The ends have just been finished off by the cutter disk above.

Can asbestos harm drinking water?

A number of investigative reports have indicated that the dangers of using asbestos in water engineering may be exaggerated.

IN MANY respects the engineering properties offered by asbestos can be considered unique. Modern technology has attempted to match its all-round capabilities but few materials can be said to achieve this. The search however will continue: perhaps because of the adverse reputation asbestos has earned itself on medical grounds.

In many countries the public has been introduced to asbestos through the media, which in turn has collectively brought blue, brown and white fibres into a nondescript health danger word – asbestos. The general public will probably remain ignorant of the facts concerning which asbestos fibres are seriously damaging to health, under what circumstances, and precisely how dangerous any or all of the fibres are. All this despite the fact that there has probably been more money spent in the last decade on establishing whether or not 'asbestos' is a health hazard than in the entire history of its development.

Most of the research seems to have been carried out in the US – a measure perhaps stimulated by public opinion and media attention in the wake of the discovery in 1973 of asbestiform fibres in Lake Superior. This incident is best described by Professor Ian Higgins MD in his forward to a report by Dr. B.T. Commins on Asbestos Fibres in Drinking Water.[1] Professor Higgins states that 'in 1973 asbestiform fibres were discovered in Lake Superior. Since Lake Superior is the source of drinking water for communities around the Lake, including Diluth, Minnesota, this discovery touched off widespread concern about the possible hazard to health of ingesting asbestos and other fibrous materials. By 1973, the serious consequences of occupational exposure to asbestos (eg asbestosis, lung cancer and mesothelioma of the pleura and peritnum) were well known and the potential hazard to those who, while not working with asbestos themselves, might be exposed to dust brought home on the clothes of household members who were, had been pointed out. Evidence also suggested that workers who were heavily exposed to asbestos might, in addition to lung cancer, also have an increased risk of other cancers, notably of the digestive organs. The simple explanation of this finding was that most of the dust (which was cleared from the respiratory tract) was swallowed – and in its subsequent passage through the digestive passages might penetrate the mucosa and this initiate cancer in various abdominal organs.

Fibre dangers

'The presence of the fibres in Lake Superior was attributed to the discharge of waste (tailings) after the extraction of iron from taconite rock. But it soon became clear that, apart from the activities of man, equally high concentrations of fibres might occur in drinking water from the percolation of water through fibrous-containing rock strata. Moreover, fibres were discovered in beer, wine and other beverages.

'One of the most widely used means of distributing water to homes is through asbestos-cement pipe. The spectre of dissolution of the pipe with release of fibres into drinking water, particularly in areas where the water is soft and acid or 'aggressive' has loomed over the problem of fibres in water, even to the extent that certain American states have considered banning the use of such pipes for the distribution of water.'

The last question raised by Professor Higgins, the use of asbestos-cement pipes with acidic or aggressive soft waters together with the possibility of ingesting asbestos fibres from potable water has been the subject of much research, many papers and various articles during recent years. It is generally accepted that highly acidic or soft water will attack the cement of uncoated asbestos cement pipes with a resultant release of small quantities of fibre into the water. Attempts have been made to correlate the amount of corrosion/acidity of the water but a precise relationship cannot be defined. This is primarily because of other factors, such as the presence of trace elements, which appear to markedly reduce the corrosion levels.

Investigative reports

In some countries, if the water is known to be aggressive then it is often common practice to include a bitumen lining within the asbestos cement pipe specification. It is generally accepted that such a lining overcomes any problem of attack on the cement.

Outside of the US, manufacturers of asbestos cement pipes, for example TAC Construction Materials Limited in the UK, have also worked hand in hand with the local water authorities to determine the actual asbestos levels in a variety of water samples. In one such study it was reported

that no significant difference could be observed between the levels of asbestos in water which had passed through asbestos-cement pipes and that which had not. In point of fact it was found that the mean asbestos contents were marginally higher in waters which had not passed through asbestos-cement pipes. This again returns to the difficulty of being unable to correlate corrosion with water aggressiveness, in that trace quantities were probably released by erosion from the ground.

Barely detectable

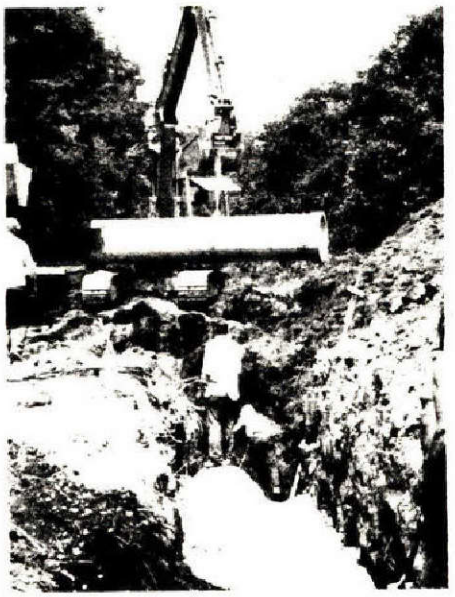
In addition to the studies of the effects of various waters on asbestos-cement pipes much has also been done on determining whether the very small concentrations of asbestos fibre which can be detected in water supplies might cause any ill-effect on water consumers. Much of this work has been carried out in the US where it has been found that relatively high concentrations of asbestos fibre are present in the water because of the erosion of asbestos-containing rocks. However, a note which should be added here is that one of the problems in dealing with the testing of fibre levels is the infinitesimal size of asbestos fibre. In the UK for example, one study indicated that the maximum fibre level observed was 2.2 million f/l. To put this into perspective it equates to something like one part in one hundred thousand million (10^{-5}ppm) and at this level is barely detectable even by electron microscope.

One study which did cause some consternation over the use of asbestos-cement pipes for potable water supplies was that published in 1978[2]. It relates to the San Francisco Bay area of the US, and received further publicity in 1980 following a paper presented by Dr. J. Millette to an International Water Supply and Health Symposium held in the Netherlands[3]. Based upon the work of the San Francisco study Dr. Millette drew various conclusions regarding the use of asbestos-cement pipes. In this study an association was claimed to exist between cancer rates for certain body sites and exposure to asbestos fibre in water supplies.

It has been found that high asbestos levels do occur in the water in this area, primarily due to geological erosion, and in several cases exceed 100 million f/l (of UK maximum levels 2.2 million f/l). However the results of this study have subsequently been disputed[4] and several re-analyses have been conducted. It has been suggested that the study did not take account of population densities, a factor which is known to have an effect on cancer rates. If one then re-assesses the study it is suggested that it nullifies any association between asbestos fibres and cancer risk. And perhaps by way of confirmation, the authors of this study do now accept that their results may have been spurious and that other factors were probably the cause for the increased cancer rates reported[5].



Above: an asbestos-cement pipe being rolled at TAC Construction Materials plant. Below: installation of TAC asbestos-cement pipe in a water contract.



Evidence

The lessons which can be drawn from the research work carried out in the US are: that despite a relatively high asbestos level present no consistent evidence has been found to support an association between asbestos in water and cancer; and that in no instance has any association between the incidence of cancer and the use of asbestos-cement pipes been indicated.

Further to this, the report by Dr. B.T. Commins[1], mentioned earlier, would seem to confirm this. Dr. Commins, in compilation of this report, studied some 200 papers from around the world. He concluded that at the higher levels of asbestos contamination in drinking water, eg from natural contamination or from effluent discharges to water sources in some areas, any health effects would appear to be sensibly zero or at the most very low indeed; while for the lower levels in water, eg those solely due to the use of asbestos-cement pipes, the health risk of ingested asbestos would seem to be sensibly zero or, at the most, exceedingly low. Although there may be no greater health risk for extremely aggressive drinking waters, the levels of asbestos fibre could be increased. No further research on this subject is planned by the US Environmental Protection Agency, and the World Health Organisation in its 1983 Guidelines for Drinking Water Quality has not specified a Guideline value for asbestos in drinking water.

Dr. Commins concluded by saying that it was his hope that his report would 'allay some of the past fears of ingested asbestos.'

References:

1. Asbestos Fibres in Drinking Water. Commins. Scientific and Technical Report – STR 1. May 1983. Commins Associates, Rippins, Altwood Close, Maidenhead, Berks SL6 4PP England.

2. Asbestos in Drinking Water and Cancer Incidence in the San Francisco Bay Area. Kanarek et al. American Journal of Epidemiology, Vol. 112. 1980.

3. The Need to Control Asbestos Fibres in Potable Water Supply Systems. Millette, Boone, Rosenthal and McCabe. Proceedings of 1980 International Water Suply and Health Symposium. Page 99.

4. Letter to the Editor, American Journal of Epidemiology. Prof. ITT Higgins, Department of Epidemiology, University of Michigan.

5. Report on Summary Workshop on Ingested Asbestos. WE Smith. Director, health Research Institute, Fairleigh Dickinson University, New Jersey, USA. □

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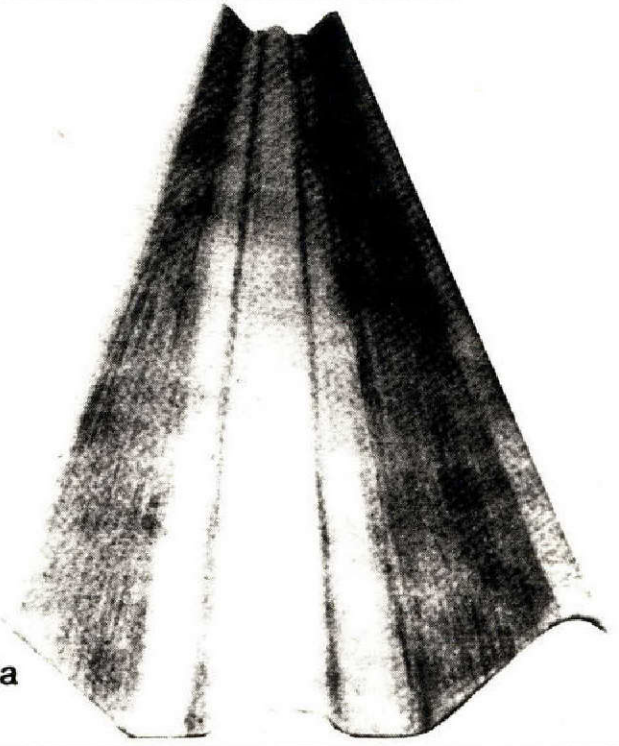
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THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

(18)

DATE February 27, 1984

TO Distribution

FROM A. Karp/ G. Tschannerl

EXTENSION 69273

SUBJECT WORLD BANK/UNDP GLOBAL HANDPUMPS PROJECT INT/81/026
Article Summarizing African Drought Situation

The enclosed summary of the African drought situation is from an article in the February 26, 1984, Washington Post, and may be of interest to you.

encl.

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African Countries Suffering As Drought's Impact Widens

ANGOLA*—Interior stricken; problem compounded by guerrilla war.

BENIN*—Less than 50 percent of normal rainfall in north.

BOTSWANA*—Hit by drought in southern Africa region.

CAPE VERDE*—16-year drought.

CENTRAL AFRICAN REPUBLIC*—Interior affected; exacerbated by rinderpest outbreak that is decimating cattle herds.

CHAD*—Interior affected; cattle dying from rinderpest; compounded by 19-year civil war.

ETHIOPIA*—Northern provinces of Eritrea, Tigray, Gondar and Wollo; cattle dying from rinderpest; compounded by 20-year guerrilla war.

GAMBIA*—Interior affected.

GHANA*—Countrywide drought, with northern region worst hit; compounded by long-term general economic deterioration.

GUINEA-CONAKRY*—Half a million northerners severely affected; compounded by earthquake.

GUINEA-BISSAU*—200,000 people severely affected in north and northeast; exacerbated by mealybug infestation.

IVORY COAST—Minor problems in remote northern areas.

LESOTHO*—Hit by southern Africa drought; 250,000 people acutely affected.

MALI*—Countrywide rainfall levels 30 percent below normal.

MAURITANIA*—Severe countrywide, 16-year drought.

MOZAMBIQUE*—Southern region of country stricken; compounded by guerrilla war.

NAMIBIA—Interior affected.

NIGER—Interior affected.

NIGERIA—20 million people affected in northern region.

SAO TOME/PRINCIPE*—Countrywide drought.

SENEGAL*—Countrywide; in parts rainfall level as low as 20 percent of normal.

SOMALIA*—Countrywide; compounded by refugees fleeing fighting in neighboring Ethiopia.

SOUTH AFRICA—Hit by southern Africa drought.

SUDAN—Parts of interior affected.

SWAZILAND*—Hit by southern Africa drought.

TANZANIA*—Countrywide; exacerbated by cattle-killing rinderpest and grain borer outbreaks.

TOGO*—Northern region stricken.

UPPER VOLTA*—Countrywide drought.

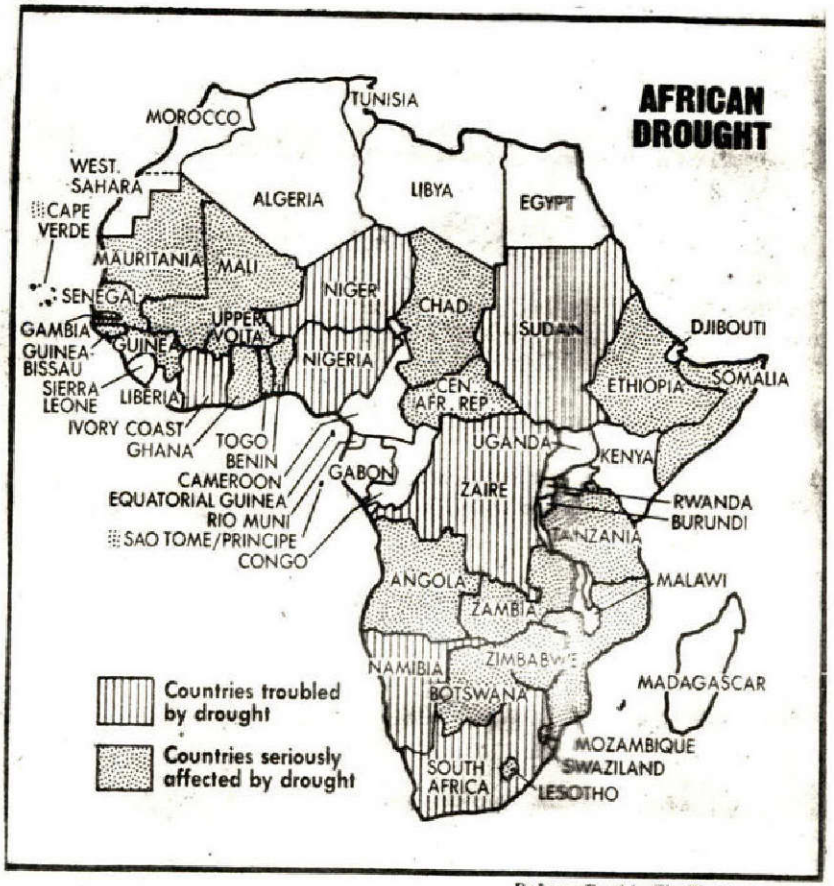
ZAIRE—Southern region; compounded by economic deterioration.

ZAMBIA*—300,000 people in south and west near Angola border severely affected.

ZIMBABWE*—Southern region stricken; compounded by migrants crossing border from Mozambique.

** The 24 most severely stricken countries of the 31 in all that are affected by the drought. Mozambique, Ghana, Mauritania and northern Ethiopia are the most severely stricken.*

Information gathered from U.S. Agency for International Development, World Bank and United Nations Food and Agricultural Organization.



By Larry Fogel for The Washington Post

INTERNATIONAL JOURNAL FOR DEVELOPMENT TECHNOLOGY, VOL. 1, 317–327 (1983)

THE AFRICAN WATER PROBLEM AND A PROPOSAL FOR ITS LONG-TERM SOLUTION

M. M. A. SHAHIN

International Institute for Hydraulic and Environmental Engineering, Delft, The Netherlands



Dr. Mamdouh M. A. Shahin received his *B.Sc* and *M.Sc* degrees in Civil and Hydraulic Engineering from the University of Cairo, Egypt, in 1952 and 1955 respectively, and received his *Ph.D* in 1959. Dr. Shahin has worked in the fields of irrigation and water resources engineering in his capacities as engineer and lecturer in the Middle East, some African countries, Europe and Central America. He is at present a Senior Lecturer at the International Institute for Hydraulic and Environmental Engineering, The Netherlands. Dr. Shahin has to date published over 25 papers and technical reports, mainly on hydrology, irrigation and drainage.

SUMMARY

In a number of African countries the shortage of water for domestic, industrial and agricultural usage is now so acute that it seriously threatens their development prospects. In this paper attention is focused onto the various factors which contribute to this problem, both individually and collectively, and a long-term proposal presented for its mitigation.

A general overview of the water resources and usage in Africa, including Madagascar, shows clearly that the African Water problem is essentially one of spatially non-uniform occurrence and distribution of the Continent's water resources. A long-term solution to the problem therefore calls for the implementation of effective measures whereby the water-poor basins can benefit from the excess waters of the water-rich basins. Clearly, such a long-term solution represents a mammoth undertaking, the implementation of which would require an organisational infrastructure embracing as it will political, technical and other aspects. The *African Water Resources Commission*, proposed in this paper, may be a suitable vehicle for this task.

1. INTRODUCTION

The problem of water shortage in Africa is now so acute that it seriously threatens the development of the entire Continent. The reasons for this shortage are separate and yet interconnected. For the sake of completeness it would be useful to focus attention in this Section onto a number of hydrological and climatic factors which operate, both individually and collectively, to create this acute problem.

1.1 *Long-term average precipitation*

The long-term average precipitation over a considerable part of the Continent is scanty: about 40 percent of the total surface area of Africa (including Madagascar) receives an annual precipitation of less than 250 mm, and about 32 percent of the same total area receives a meagre 100 mm or less annually. If the long-term average rainfall is taken as the descriptor of the type of prevailing climate, then the African climate can be classified into eight groups as[1] (Figure 1): tropical wet, tropical wet and dry, semi-arid, arid or desert, humid sub-tropical, middle-latitude steppe, mediterranean and highland. The percentages of the total area covered by these climates are, respectively, 9·0, 24·6, 22·4, 37·2, 0·5, 1·9, 1·5 and 2·9. These data also show that not more than a mere 15 percent of the total area of Africa, including Madagascar, remains reasonably wet (i.e. receives an annual rainfall of 1500 mm or more) all the year round.

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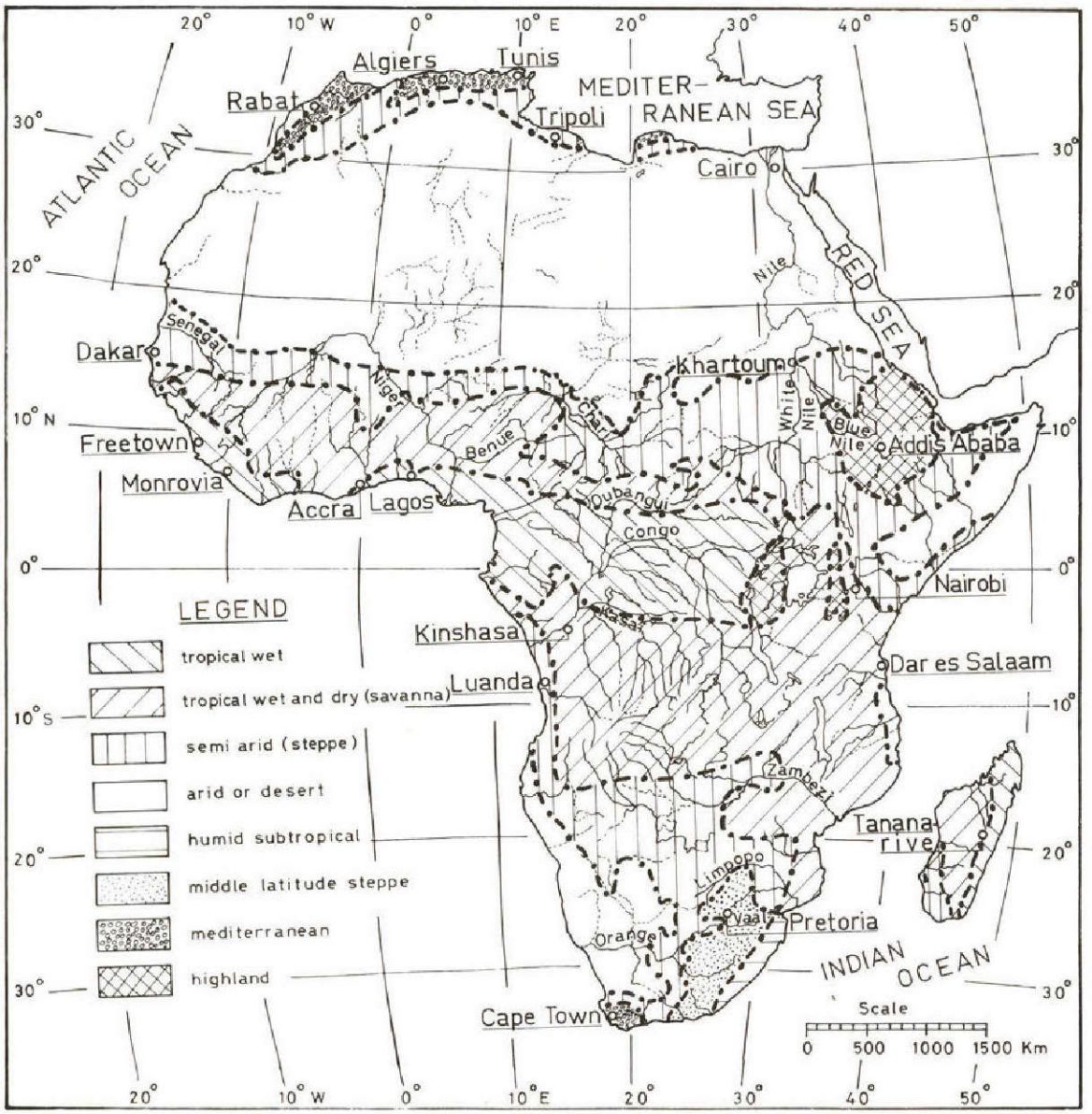


Figure 1. The climates of Africa (from Reference 1)

1.2 *Temporal variations of rainfall*

In several areas of Africa the rainfall regime shows extreme fluctuations from one year to another, and this often produces a single year (or a succession of years) in which the annual rainfall is considerably less than the long-term average. The droughts which occur in the *Sahel* region of north-central and north-western Africa are typical results of such fluctuations, and as may be seen from Figure 2, this region has experienced 20 droughts during the 1855–1975 period.[2] This figure also shows that the duration of these droughts varied from 1 to 7 years, and that the minimum annual rainfall in this period was just 30 percent of the long-term average.

Rainfall varies from month to month also in the same year (hydrological or calender). The succession of months in each of which a significant amount (usually 50 mm or more) of rain falls, dictates the

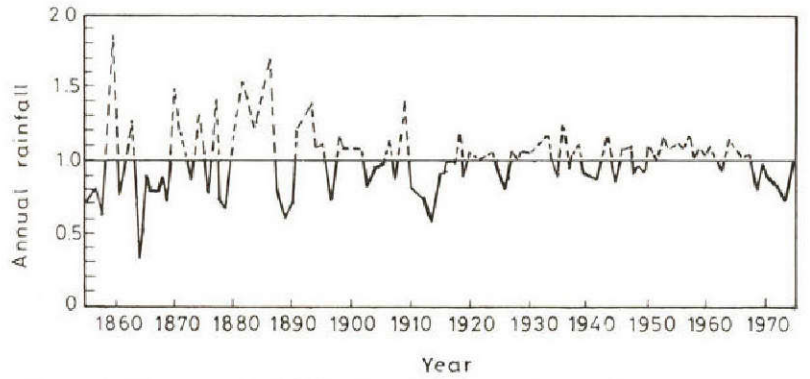


Figure 2. Mean annual rainfall in the Sahel region of Africa (from Reference 2)

length of the rainy season. Using climatic data[3] it can be shown that 30·4 percent of the total area of Africa and Madagascar receives no significant amount of rainfall in any month of the year; 19·4 percent has a single rainy season in the year lasting 1–5 months; 37·5 percent has two rainy seasons in the year, each lasting 5–9 months, and only 9·7 percent receives significant amounts of rainfall in each of 10 months or more in the year.

1.3 *The hydrological aspect*

Hydrological studies have shown that the runoff to rainfall ratio, usually referred to as the *runoff coefficient,* increases with the amount of rainfall for nearly every type of ground cover. This can be demonstrated, for example, by referring to Figure 3 which is based on the rainfall-runoff data collected by the Hydrometeorological Survey of the Equatorial Lakes for the Lake Victoria basin[4] (there is, as usual, a time-lag between rainfall and runoff).

The runoff coefficient is considerably affected by the nature of the surface cover upon which rain falls. The main African swamps occupy an area of about 340,000 km^2, and the surface covers of these swamps and *dambos* (intermittent swamps) are examples of covers that adversely affect runoff. Figure 4, produced from the rainfall-runoff data[5] on the swamps in the Central African Plateau, shows typically how runoff is affected by these swamps.

Hydrological investigations into the Victoria Nile basin in which the areal extent of the swamps is 22 percent of the total basin area, show that the runoff coefficient there varies from 1·1 percent in the dry years, to about 5 percent in the wet years; the annual runoff coefficient of the *Kyoga* basin was estimated[6] at only 3 percent. It is interesting to compare these low figures with the high runoff coefficients of 30–40 percent for the Rhine catchment area.

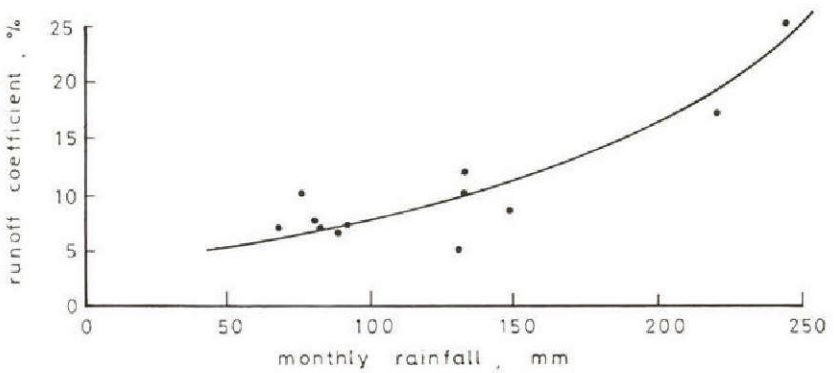


Figure 3. Approximate relationship between monthly rainfall and the runoff coefficient for the Lake Victoria basin

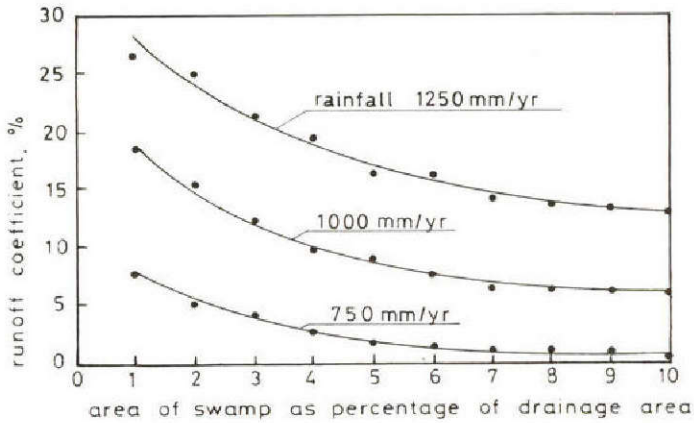


Figure 4. Annual runoff coefficient as a function of the size of swamp and annual rainfall (data from Reference 5)

It is interesting also to consider the specific discharges* of some of the major African rivers: for example, if we take the long-term (1901–1955) mean flow of river *Nile* at *Aswan* (Egypt) as 83×10^9 m^3/yr and the corresponding catchment area as $2{\cdot}9 \times 10^6$ km^2, then the specific discharge at Aswan is found to be only 0·9 l/s/km^2, which is probably one of the lowest figures in the world for a major river.[7] The specific discharges of the Nile at the upstream stations *Halfa* and *Dongla* (Dongla higher than Halfa) are 1·4 and 1·7 l/s/km^2, respectively;[7] clearly therefore, significant losses occur between Dongla and Halfa, and between Halfa and Aswan.

The headwaters of the *Niger* river flow from a richly wet area, but its tail-reach flows into a much drier part of the catchment area. This, together with the storage and withdrawal of its waters in the lower reaches, has led to the reduction of its specific discharge from 12·96 l/s/km^2 at *Koulikouro*, to 4·23 l/s/km^2 at *Mopti*, and to a mere 3·48 l/s/km^2 at *Dire*.[7] The specific discharge of the *Oubangui* rive. at *Bangui* (Central African Republic) is significantly greater[7] at 8·72 l/s/km^2, and that of river *Congo* at *Kinshasa* greater still at 11·1 l/s/km^2. The specific discharges of rivers *Sanaga* at *Edea* (Cameroon) and *Ogooue* at *Lambarene* (Gabon) are even greater[7] at 15·38 and 23·12 l/s/km^2, respectively.

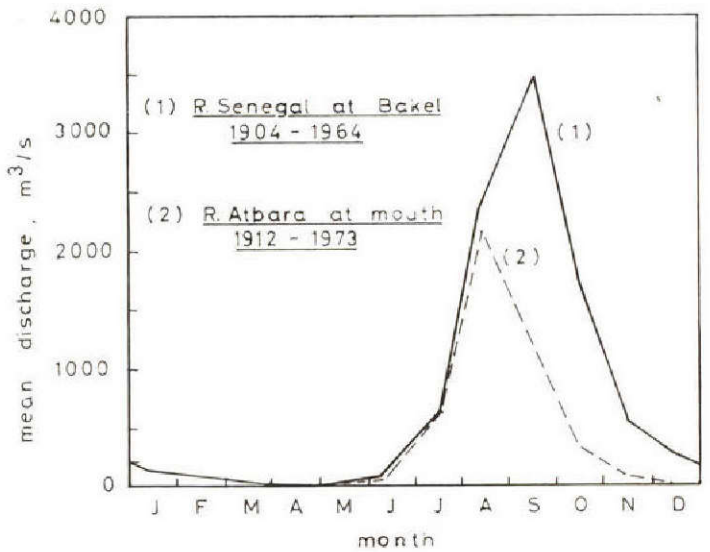


Figure 5a. Average hydrographs of the rivers Atbara and Senegal

* Specific discharge is defined as the ratio: long-term average discharge at a gauging station/catchment area corresponding to that station.

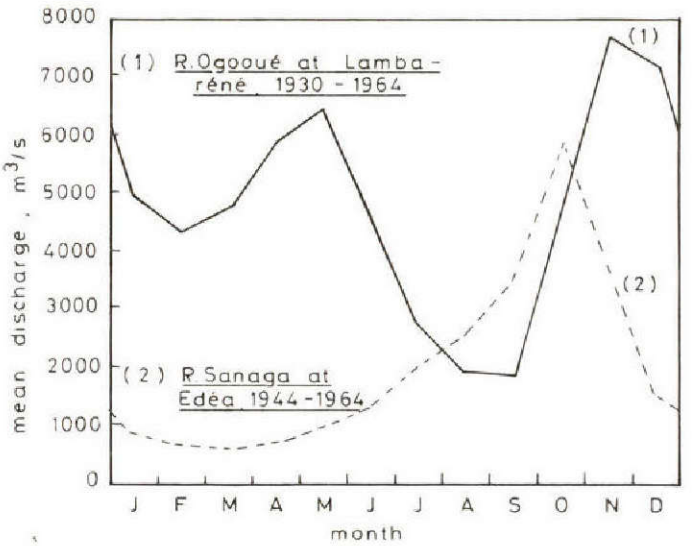


Figure 5b. Average hydrographs of the rivers Ogooue and Sanaga

An important feature of many of the major African rivers is the strong seasonality of their discharges. Most of the discharge hydrographs point clearly to a single and well-defined season with just one peak. The upper *Zambezi* has its peak discharge in March, and the low-flow season lasts from June to mid-January; its mean monthly maximum/minimum ratio is about 30. The *Senegal* at *Bekel,* on the other hand, has peak discharge in September; its low-flow season is from December to June with a minimum discharge of 3 m^3/s in May, and the maximum/minimum ratio is about 1000. The flow of the *Atbara* river (Figure 5a) is confined to the June-November period; consequently, its maximum/minimum ratio is very large indeed.

By contrast, there are several rivers in Africa whose discharge hydrographs show substantial uniformity: the maximum/minimum ratio of river *Sanaga* at *Edea,* for example, is about 11·7; that of river *Ogooue* at *Lambarene* is only 3·88 (Figure 5b). The flow in river Ogooue is twin-seasoned having two peaks; the first occurs in June and the second in November. A good summary of the seasonality of the flows in African rivers is given in Reference 5.

2. AVAILABILITY OF WATER IN AFRICA

2.1 *Precipitation and evapotranspiration*

The *ideal* hydrological situation, rarely achieved in practice, is obtained when precipitation and evapotranspiration are equal in magnitude over both space and time. If the positive difference between precipitation minus evapotranspiration is regarded as surplus and the negative difference as deficit, then the data given in Table 1 can be obtained from the surplus and deficit contours[8] of Africa and Madagascar. It may be seen from this table that the magnitude of the net deficit, uniformly distributed over the whole surface area, is about 1140 mm/yr. If about 37 percent of the total area occupied by the deserts and wastes is excluded, on the other hand, then the net deficit reduces to about 385 mm/yr.

2.2 *River drainage basins*

When rainfall during certain times in the year exceeds the sum of losses, the excess water runs off over or underneath the surface and eventually reaches the stream(s) in the drainage network of the river basin in question. Almost two-thirds of the surface area of Africa is drained by seven major rivers; they are: the *Niger,* the *Lake Chad basin,* the *Congo,* the *Orange,* the *Limpopo,* the *Zambezi* and the *Nile*. The *Niger* rises in the *Fouta Djalon* highlands in Guinea and has a catchment area of 1·1 million km^2; its largest tributary is the *Benue* river. River *Gambia* rises from these highlands also, and other

Table 1. Water surplus and deficit in Africa and Madagascar (from Reference 8)

Surplus (mm/yr)	Area subject to surplus (%)	Weighted surplus (mm/yr)
0–500	8·5	21·25
500–1000	2·7	20·25
1000–1500	0·8	10·00
1500–2000	0·3	5·25
Totals =	12·3	56·75

Deficit (mm/yr)	Area subject to deficit (%)	Weighted deficit (mm/yr)
3000–2500	0·9	24·75
2500–2000	22·4	504·00
2000–1500	13·0	227·50
1500–1000	20·5	256·25
1000–500	21·7	162·75
500–0	9·2	23·00
Totals =	87·7	1198·25

streams too, the confluence of two of which forms the *Senegal* river. These rivers, together with the Volta complex (White, Red and Black Voltas and the main Volta) drain the largest part of west and north-west Africa.

The *Lake Chad basin* is the largest of the inland drainage basins of the great Saharan (desert) regions· the lake is said to have an area of 32,000 km^2 and the surrounding swamps cover an area varying between 10,000 and 20,000 km^2. The two principal tributaries of this lake system are the *Logone* and the *Chari.* Rivers *Sanaga* (Cameroon) and *Ogooue* (Gabon), both to the sourh-west of the Chad Lake basin, drain the remainder of west Africa.

The *Congo* river rises somewhere south of *Lake Tanganyika* and many major tributaries join it before it flows into the Atlantic Ocean. The drainage basin of the Congo is in the Central African Plateau and occupies an area of about 3·6 million km^2 (or 12·5 percent of the total surface area of Africa). The rainfall in the Congo basin is fairly high and uniform throughout the year. The *Orange* river and its main tributary, the *Vaal,* drain the entire southern African plateau; the mouth of the Orange is in the Atlantic Ocean also, although the river bed is usually dry before it reaches the ocean. The most southern basin of the African Tropics, draining into the Indian Ocean, is that of the *Limpopo* river; it is one of Africa's lesser rivers which drains into a relatively wet region adjacent to the coast. River *Zambezi,* the largest stream draining into the Indian Ocean, also rises in the Central African Plateau; its total catchment area (including those of its tributaries) is about 2·5 million km^2.

The *Nile* flows from the Equatorial Lakes Plateau of East Africa, through the plains of the Sudan, to the deserts of Sudan and Egypt. The largest tributary of the *Nile* is the *Blue Nile* which drains a vast area of the *Abbysinian Plateau.* The total surface of the Nile Basin is almost 2·9 million km^2, or about 10 percent of the area of Africa.

2.3 *Precipitation, runoff and evaporation*

In his report on world water balance Lvovitch[9] gave the annual depths of precipitation, runoff and evaporation in Africa as 683 mm, 139 mm (91 for surface and 48 for underground runoff) and 544 mm, respectively, although these figures differ significantly from those given in Reference 10. Revised data for the African Continent up to the year 2000 (Figure 6) have been obtained by de Mare[11] by subjecting the data of References 9 and 10 to a series of critical controls. According to this study the African

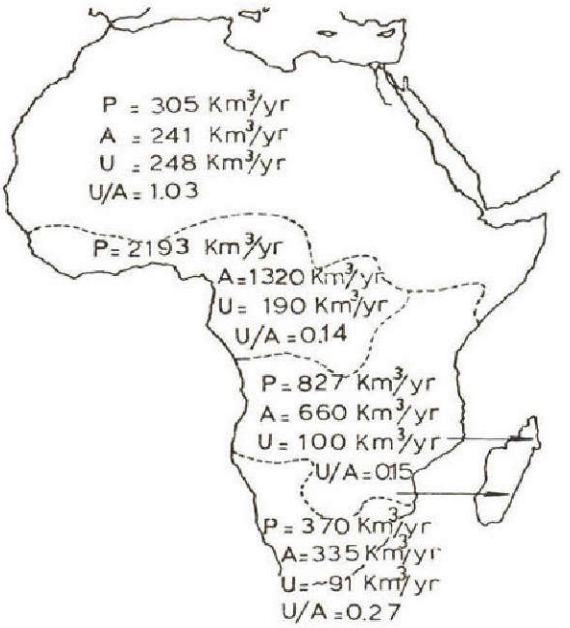


Figure 6. Annual water resources and use by the year 2000 (from Reference 11); P denotes precipitation, A availability and U usage

Continent may be subdivided into four zones in terms of readily available water and its usage, as shown Figure 6. Clearly, both water availability and usage vary greatly throughout the Continent, with significant deficit in the north and substantial under-usage in the remainder of the Continent; indeed, the under-usage becomes even greater if the total potential for water is considered instead of the readily available volume of water.

3. POSSIBLE REMEDIAL MEASURES

With reference to the water availability situation outlined in Section 2, two principal measures can be identified for mitigating the severity of water shortage in Africa; these are: *water control* and *water conservation.*

3.1 *Water control*

The control of water through drainage and flood-control facilities is needed wherever heavy rains fall permanently or occasionally. When control in the sense of stream flow regulation is necessary for a river with distinct wet and dry seasons, reservoir storage can be used effectively for securing protection against floods, and/or for improving the low flow conditions of that river. The benefits of reservoir storage can also be extended to the development of hydro-electric power, and to the improvement of navigation facilities in the lower reaches of the river. Indeed, a number of African countries already enjoy the benefits of such multi-purpose facilities. For example, the storage and control works on the Nile and its tributaries have greatly improved the lives of many Egyptians; the *Kariba* dam has ensured some control over the *Zambezi* floods, improved the navigation facilities in the lower reaches of the river, and enhanced the downstream flow thus providing more reliable supplies of water for riparian users.

Olivier[12] has suggested that the construction of a number of dams downstream of *Cabora Bassa* would render the entire stretch of that river up to its mouth at the Indian Ocean navigable. He believes that the construction of these dams is essential for the economic development of Mozambique and the

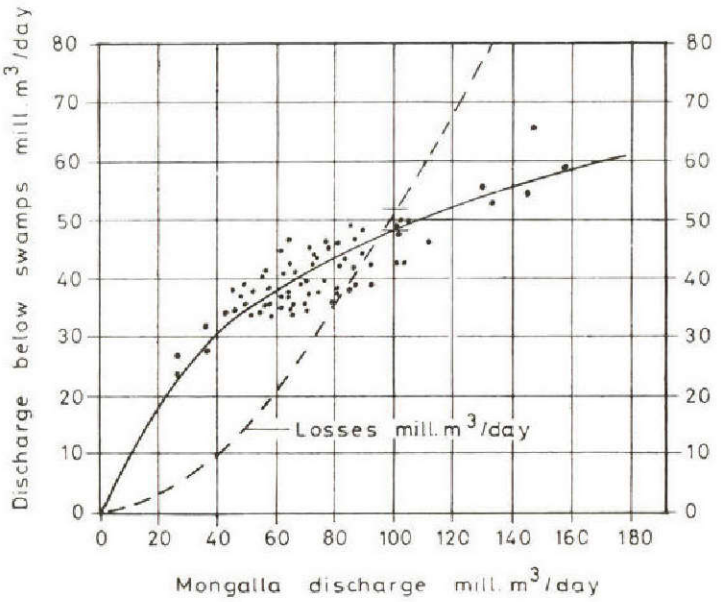


Figure 7. The losses in the Bahr el-Jebel Sudd area; relationship between flows above and below swamps at Mongalla

land-locked countries of Malawi, Zambia, Zimbabwe and Botswana. Reference 12 also contains an illustration of the growth of water storage in Zimbabwe during the 1958–1973 period; the storage by large dams in this period increased from about 700×10^6 m^3 to 3000×10^6 m^3, and by all dams in the same period from about 900×10^6 m^3 to 3600×10^6 m^3. The *Volta*, the *Kainja*, the *Inga* and the *Ower Falls* dams provide Ghana, Nigeria, Congo Zaire and Uganda, respectively, with relatively large amounts of much needed electricity.

3.2 *Water conservation*

Marshes and swamps are substantial sources of water loss. During high flows when a river becomes unable to confine itself to its cross section, the excess water spills over the levees and flows into the river's flood plain(s). In general, the water inundating the flood plain(s) does not return to the river through the surface routes; it remains in the flood plain(s) from where it is lost be evapotranspiration and/or evaporation. For a given area loss through evapotranspiration is generally assumed to be greater than that caused by free-surface evaporation.

Every year in Africa a very considerable amount of water is lost by evaporation and/or evapotranspiration from the marshes and swamps. The volume of water lost in this way in the *Bahr el-Jebel sudd* area (from *Mongalla* to lake *No*), for example, is about 14×10^9 m^3. Figure 7 shows the relationship between flows above and below the swamps in this area. The *Jonglei* canal scheme was proposed with the aim of diverting the excess water in the Bahr el-Jebel to the White Nile, through the Jonglei canal outside the swamps. The first phase of this project, now being implemented, will help save 4×10^9 m^3 of water (as measured at Aswan) that would benefit both Egypt and the Sudan.

Diversion, embankment, drainage and reclamation schemes can be implemented for substantially reducing the water loss occurring in the swamps of the *Bahr el-Ghazal* and the *Machar* basins, and also in the swamps of the Zambezi and the Luapula river basins. Clearly, such schemes could be vitally important to many African countries, especially those in which water shortage is acute and chronic.

3.3 *The water trade; basin management and water import–export*

The present national boundaries of the African countries are not based on local conditions, but are in fact legacies of Africa's European colonial history. The partition and fragmentation of Africa by the

colonial powers have to some extent added to the Continent's water problem. For, a comparison between Figure 6 and a recent political map of Africa will show that while some countries are too rich in their water resources, others have hardly any.

With reference to the above and in an attempt to find a solution, we may think of what may be called 'water units', each 'unit' being composed of a number of unequally water-rich countries. By definition a water unit is a river basin whose surface covers a number of countries; the Nile and the Niger basins are typical examples of the proposed water units. The management of water within a unit will be based on feeding the dry parts of that unit from its wet parts. It would thus be possible to improve the discharge of the Niger, for example, by augmenting its headwaters situated in Guinea, and by increasing supplies to the *Benoue* (Cameroon) and the *Benue*, the latter being the main tributary of the Niger. However, if in a basin dry parts do not exist, or if its wet parts do not have sufficient water to satisfy the demands of the dry parts, then inter-basin management will be undertaken. A water-rich basin may be prepared, or even willing to offer some of its surplus water to another basin which needs more water than it receives naturally.

If this (proposed) scheme has to be implemented against any return from the group of countries sharing the water-poor basin, which is justified in many instances, then the process clearly becomes one of trade characterized by supply and demand, purchase and sale, import and export, and so on. Exporting drought to the water-rich areas by this process, a cynical view held by some, is not worthy of attention since the main objective of the excerise is to achieve greater spatial uniformity of water availability than at present, thus incidentally reducing the risk of floods in the water-rich areas.

Owing to its great size the mighty Congo basin would naturally be the centre-piece of the proposed scheme; river Congo annually receives a volume of about $1{,}300 \times 10^9\ m^3$ of water at *Inga*, and its hydro-electric potential is rated at 40,000 MW (the corresponding figures for the Nile at Aswan are $84 \times 10^9\ m^3$ and 2100 MW, respectively). At present only 14 percent of river Congo's readily available $1300 \times 10^9\ m^3$/year is used (Figure 6), and the remainder finds its way to the Ocean. If all or part of this ocean-bound water could be exported to some of the water-poor countries, through the proposed scheme for example, then no doubt the quality of life in these countries would improve significantly. Similar inter-basin management schemes can possibly be developed between the water-rich basins in West Africa comprising Sierra Leone, Liberia, Guinea and Guinea Bissau, and the water-poor basins of Gambia, Senegal, Volta and the Niger.

4. THE PROPOSED AFRICAN WATER RESOURCES DEVELOPMENT COMMISSION

The mitigation of water shortage in Africa through inter-basin management (or a near variant of it), outlined above, would obviously embrace political, technical and other aspects, and would therefore require a suitable organisational infrastructure for its implementation. The proposed *African Water Resources Commission* (AWRC), described below, can be a suitable vehicle for this.

4.1 *Character and composition of the AWRC*

The AWRC shall be a central organ, attached to the *Organisation of African Unity* (OAU). By design AWRC shall be a high-level commission, its technical functions being similar to those of a consulting engineering bureau. Every African country shall have the right, in principle, to be represented in the AWRC by an expert working member. Alternatively, a group of countries sharing interest in a hydrologic unit, a river basin for example, may also be represented in the AWRC by one or more expert working members. Thus, if the CILSS* countries (i.e. Cape-Verde Islands, Chad, the Gambia, Mali, Mauritania, Niger, Senegal and Upper Volta) wish to be represented by less than 8 members, for example, then they will be entitled so to do; and similarly for the countries sharing interests in the Nile and the Niger basins.

Normally the working members of the AWRC shall be suitably qualified African citizens, and non-Africans will be recruited through suitable international agencies only when qualified African

* Comité Inter-état pour la Lutte contre la Sécheresse Sahelienne.

personnel cannot be found. The tenure of all members, African and non-African, shall be four years, with the possibility of extension for a further four-year term.

The headquarters of the AWRC shall be in one of the politically stable African countries, to be chosen by the Secretary General of the OAU, and its funding shall be raised through contributions from the member states of the OAU. This funding shall be distinct from and independent of the *special* funds that have to be raised for financing the projects themselves. These special funds shall be raised from the African countries directly, or through 'soft' and long-term loans from the World Bank, the African bank, from aid funds and donations from the rich countries and the EEC, and from all forms of assistance available from the UNDP, the WMO, the WHO, the UNESCO, etc.

The execution of the development projects can start two years from the formation of the AWRC. The estimated cost of the development project is US$500 million in each of the first two years, increasing to US$1,000 million in each of the next four years (these estimates are based on 1980 prices). The AWRC shall have a 5-member management Board, and the Chariman of the Board, who also acts as the Chairman of AWRC, shall work in close collaboration with the OAU.

4.2 *Tasks of the AWRC*

With a view eventually to addressing itself to inter-basin management and associated problems, the initial major tasks of the AWRC shall be the following:

(a) Evaluation of present research, teaching and training activities in the fields of hydrology, water resources planning and management, and related subjects; this should cover secondary, undergraduate and postgraduate levels.

(b) Planning and follow-up for future research, education and training programmes, including the enhancement/initiation of plans and proposals that were made some time ago but not yet executed. (The recommendation made to the UNESCO some twelve years ago to set up a Water Resources Research Institute in Nigeria, is a typical example of this. Another example is the AGRHYMENT Training Centre in *Niamy* (Niger), to serve some of the interests of the French-speaking West African countries, which needs support and reinforcement. A third example is the need for establishing training courses and research programmes on the hydrology of swamps and related topics.)

(c) Making more efficient use of the already existing international courses in hydrology and related subjects. The number of African participants in the course for hydrologists, offered by the *International Institute for Hydraulic and Environmental Engineering*, Delft, is modest, and so is the number of African participants in the course in Padua, Italy. Unfortunately there are African countries which hardly send anyone to participate in these courses.

(d) Raising the general awareness of the African people regarding water and water consumption, use of water for agriculture, pollution of water and water-borne diseases, and so on. This can be effectively achieved through mass media, both printed and electronic.

(e) Setting out standards regarding the collection, storage and processing of hydrologic data, including the reinforcement of existing hydrological and hydrometeorological networks. The ways in which data can be shared and disseminated between the various users in different countries, should be formulated and/or recommended by the AWRC.

(f) Implementation of water resources development plans that have been fully investigated and their execution recommended. The *Quattarah* hydropower project in Egypt, the reclamation of the *Machar* marshes in the Sudan, and the second phase of the *Roseires* reservoir also in the Sudan, are just three examples of many in this context. Bidding for international tenders for these projects should be called upon shortly after the AWRC assumes its function.

(g) Completion of investigation into development schemes which have not yet been 'rounded off', e.g. the reclamation of the Niger delta, the salt barrier at the mouth of river Gambia, and groundwater exploitation from the *Nubian* sandstones in north-west Africa.

(h) Planning new in-basin and inter-basin development and management schemes; for example, water diversion from Central Africa to Chad, and water storage, lifting and transport from the very wet parts of West Africa to the dry areas of the *Sahel*.

The above list is by no means exhaustive, and AWRC's priorities and functions would evolve with time like those of any other comparable organisation. It is clear, however, that project execution by AWRC would be subject to mutual agreement between itself and the Secretariat of the OAU.

5. CONCLUDING REMARKS

The root causes of the acute shortage of water in a number of African countries which seriously threatens their development, have been identified in this paper. Admittedly, considerable effort is now being directed by various national and international agencies to diminish the severity of the water shortage problem in these countries through water control, water conservation, handpumps, and so on. In the long-term, however, these solutions would appear to be 'piece-meal' in that the African water problem is fundamentally a manifestation of spatially non-uniform distribution and occurrence of water resources in that Continent; the South of the Continent is far more prosperous in terms of water resources than the North. It is clear, therefore, that an effective long-term solution to the problem can be achieved only by implementing projects designed to bring about a more equitable spatial distribution of the available water. No doubt the planning and implementation of such projects, based on in-basin and inter-basin (and therefore involving more than one country) management and leading possibly to water 'import–export', will be very great undertakings calling for a considerable political will. An organisational infrastructure, the *African Water Resources Commission* proposed in this paper, could be a suitable vehicle for the execution and overseeing of such projects.

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REPORT

August-September 1983

News and views from the World Bank

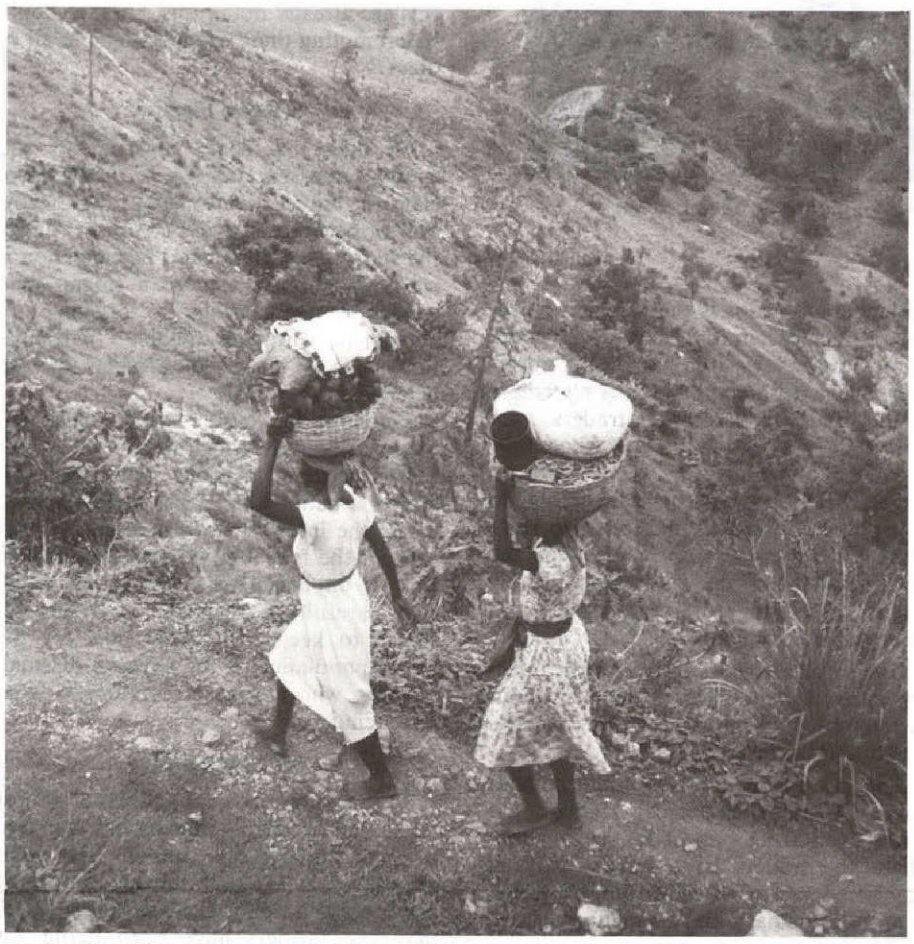


Photo: ILO Newsphoto

Lack of land is a major constraint to making progress in rural development. Here, a rural scene in Haiti.

Eradicating rural poverty: the questions are limitless

By Barbara Koeppel

In the early 1970s, as poverty in the countryside persisted throughout most of the developing world, governments anxiously sought solutions.

The goals were straightforward: raise productivity, production, and incomes and create more jobs for the mounting population. And more generally, stimulate the economy, increase the intake of food (both in the countryside and cities), improve the quality of rural life, and stem the tide of migrants pouring into urban areas, searching for work.

As the problems were so profound, a broad attack would have to be launched. There would be credit to enable small, poor farmers to buy items like fertilizers, pesticides, and better seeds, so as to increase yields. Research, technical assistance, and information would also be essential, since farmers would have to know how to use the new inputs, cultivate heartier strains, and streamline farming and marketing techniques.

Where nonexistent, roads would have to be built, to allow farmers to bring crops to regional markets. And irrigation would be introduced where rainfall was erratic. Education would be offered: Besides the general goal of reducing illiteracy, it would be essential to teach farmers to read, for they would be unable to follow directions, say, for using new fertilizers, unless they were literate.

"There have been some successes," says Olivier Lafourcade, an agricultural economist at the World Bank. "In a small, highland area of the northeast of Brazil, for example, potato farmers planted improved seeds and within four or five years, production had increased from three to twelve tons per hectare."

Others point to Bangladesh, where wheat was planted for the first time and because the strain was well suited to the region, production rose from nothing to 1 million tons a year. And the rice revolution, by now legend, was under way: new varieties (dwarf plants that could absorb higher levels of fertilizer) were introduced and yields soared throughout Asia.

How great the gains have been, however, is hard to measure. "It's difficult to quantify success," says Peter Greening, an agriculturalist at the World Bank. "But when an area is coming up, you can see it. Things are blossoming, people are

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Student loan programs seen aiding scholastic efficiency

By Maureen Woodhall

Throughout the world, students frequently borrow money to finance their education. There is nothing new in this; students in many countries have always borrowed from family or relatives to finance either the costs of tuition or their living expenses, and a few have borrowed from banks or other financial institutions. The riskiness of lending to students who lack collateral, and who may be unable to repay the debt for many years, has meant, however, that few students are able to finance their education by borrowing, unless their families are wealthy or special loans are made available.

In the past twenty years, many countries, both developed and developing, have established programs of student loans, or educational credit, to enable students to borrow in order to invest in their own higher education. The spread of the notion of education as an investment in human capital and the belief that education contributes to economic growth has encouraged the idea that students should have greater access to capital markets in order to help them finance this investment. Student loans were advocated as an ideal way of ensuring that individuals of high ability but limited financial means should not be denied the educational opportunities that would lead to higher levels of personal and national income.

During the 1950s, student loans were introduced on a small scale in Europe and in the United States, and in Colombia and India, as well. During the 1960s and 1970s, student loan schemes were established, or expanded, in many developed countries; at the same time, loan schemes were established in other Latin American countries and the Caribbean and in some countries in Africa and Asia.

Many economists argued in favor of greater use of loans as a means of financing education and urged international agencies and development banks to encourage the creation and development of student loan institutions. At the same time, however, other commentators were highly critical of student loans and argued for scholarships, fellowships, and grants as a better way of providing financial aid for students. These same critics also favored direct subsidies to institutions, to allow them to provide free or highly subsidized tuition, as a better way for governments to ensure adequate investment in education.

In some countries, a fierce debate developed about loans versus grants. Opponents of loans argued that they would not extend opportunities, since working-class students from low-income families would be discouraged by the fear of accumulating large debts, that the costs of administering a loan program would be prohibitive, and default rates would be high. Advocates of loans, on the other hand, argued that loans were more equitable than grants, would encourage efficiency, improve motivation of students and would allow governments to assist a larger number of students with a given budget.

During the 1970s, the question of equity and the role of student loans in extending and redistributing educational opportunities were frequently emphasized. More recently, the difficulties of financing rising levels of educational expenditure have focused more attention on the importance of student loans as a cost-recovery mechanism that would allow governments to expand enrollments without imposing impossible burdens on public funds.

For example, the World Bank's *Education Sector Policy Paper,* in 1980, pointed out that "If education systems continue to grow at the present rate and under the same structural and managerial conditions, they will require funds that—while far below those allocated to education in developed countries—will be beyond the financial capabilities of many developing countries." The two solutions proposed in that paper are finding additional sources of financing and reducing unit costs by improving the efficiency of the education system. A "system of fees and loans, balanced by scholarships" is suggested as one way of overcoming financial constraints in developing countries.

On the other hand, critics of loans suggest that administrative problems, particularly the problem of securing repayment, inadequacies in the banking system in many developing countries, and the problem of "brain drain," make loans an inappropriate method of financing education in developing countries, and it is argued that they would be so unpopular among students that student loan schemes would not be feasible, except in rare cases.

Although this controversy has been raging for a number of years, there has been surprising little systematic research —especially in developing countries— on student loans as a means of financing education. It is more difficult to evaluate the experience of developing countries, since information about student loan programs and critical assessments of their effectiveness are not widely available.

Experience in developed countries shows that student loan schemes can and do work.

In Sweden and in other Scandinavian countries, a high proportion of students receive loans, combined with grants, to finance their living expenses while they are following free courses of higher education. In Canada, Japan, and the United States, students receive loans to help them finance tuition fees, as well as living expenses.

In these countries, student loan schemes are well established; they have been adapted to respond to social, economic, or educational changes. Even though they have encountered problems, notably increasing costs of interest subsidies and, in some cases, high rates of default, these problems can be solved, and in all the countries where loan schemes are used, governments intend to continue to rely heavily on student loans. Although critics predicted that students would not be willing to borrow, that loans would discourage low-income students

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Poverty . . . *Cont'd*

fixing their huts, they are looking better fed and dressed. Even the dogs have fattened up."

Unfortunately, many agriculture experts say, the gains are the exception and where conditions have improved, only a relatively few benefit.

The chief constraint, they insist, is land —or the lack of it. In Latin America, for example, as many as half the rural families are landless, and in Brazil's northeast, the figure could be as high as 70 percent.

"Since our rural development programs are tied to improving the soil and yields, the people who have no land are hard to help. In addition, the lack of secure tenure has been the single most important factor in limiting our success," says Phyllis Pomerantz, an economist at the Bank.

In the view of Mr. Lafourcade, "Where there are simply a great many people and too little land, one has to try other courses, like creating off-farm jobs, based on the natural resources in the area. Therefore, in several rural development projects in Brazil, training is being emphasized for creating carpenters, blacksmiths, and those who can make repairs, for producing jams and sweets where fruits are grown, leather goods where there are cattle, or for preparing those who will migrate to cities like Sao Paulo, since it is better if they arrive there with skills."

Difficult to Reach

The largest group needing help, however, are those who lease their plots from landlords, either as tenant farmers (paying rent with cash) or sharecroppers (paying with part of the crop). These, says Ms. Pomerantz, are also very difficult to reach—for a whole array of reasons.

First, because the land they rent is usually quite poor, improving it requires a large amount of capital. Scarce funds, however, are generally put to potentially better investments.

Most critically, because they have no land to show as collateral, (required by most banks, even where credit is subsidized), these peasant farmers are not considered creditworthy—and farmers need credit to buy improved seeds, fertilizers, equipment, and other items.

Moreover, even if they can obtain credit, they still can't or won't adopt many of the techniques being recommended. "Farmers will not invest in the land to make it more productive unless they are sure it will be their's to work the next year," says Maritta Koch-Weser, an anthropologist at the World Bank. She explains that most of the outlays are heaviest the first year and results only begin to be seen after three or four.

"This is obviously the case with irrigation systems. But even with fertilizers, there are residual effects the second year after they have been applied, so farmers need less and overhead costs are cut. Or, if they try to stop the soil from eroding, they must plant trees. But again, the process takes several years for results.

Solutions Are Risky

"In the same way, these farmers can't make use of our recommendations to diversify, to move from seasonal crops like beans, corn, and rice to fruit trees. Even though these bring potentially higher profits, it takes several years, at least, for the trees to start producing," she notes.

Ms. Pomerantz says that "even low-cost solutions, like using just a little better fertilizer or trying a new seed, are risky, because crops can and do often fail. Many times, for example, the seed doesn't germinate.

"What happens," she asks, "if they try planting a new drought-resistant variety of bean (as was done in Brazil) and later learn that people don't like the taste or color and refuse to buy it? They still have to repay the loan, besides paying rent to the owner, and are wiped out.



Photo: P. Muncie

Receiving cash for milk in India. In that country, cooperatives have proven very successful.

"We have learned that farmers are not irrational. They carefully weigh the risks against the gains, because they don't have the luxury of making mistakes or testing things that might not work." She adds that to reduce the risks connected with using new inputs or methods, technical assistance—with plot demonstrations showing how new techniques work—have been very useful.

As many of these problems emerged, still newer solutions were sought. According to Ms. Koch-Weser, "One response was to include some type of insurance along with the credit, so that if the crop failed, farmers still had some way to repay their loans. Another was to introduce advance purchase of production schemes for farmers who sell their crops to the government. Here, cash is paid to cover the family's labor and provide food before the harvest, when they have the least to eat. Afterwards, they are obliged to sell the crop at an agreed price. But if they choose to sell on the open market, they must repay the money advanced." Where both alternatives were tried, some projects, she says, have gone well.

However, most observers note that only some form of land redistribution will change past patterns significantly. One project, for example, in the state of Piaui (in Brazil's northeast) has provisions to finance the sale of 200,000 hectares to about 5,000 farmers over five years. "Some governments are beginning to see how important it is to redistribute land, in order to improve the rural economy. But it is often very difficult to do, politically," notes Ms. Pomerantz.

Others stress that even if farmers can't get titles, they would be happy with secure tenure, say, with seven-year to ten-year leases. Until now, however, most landlords have been unwilling to grant them. Moreover, even where laws are passed that promote some type of land reform, they are often not enforced.

Mr. Lafourcade notes that patterns of land ownership vary greatly. While land is held privately in Latin America, often by a very few, in Africa, much is held communally. Here, the tribal or village chief determines who will work which plots, and the same ones may be farmed by one family for generations. One problem, he says, is that "attempts have sometimes been made to allocate land to individuals through the administration of projects, which caused conflict with the traditional systems. Now, however, those working on projects try to be more sensitive to local conditions."

Another obstacle to the farmers' achieving any gains is the marketing process. "Even when the harvest is good, farmers have very little bargaining power over prices. Either they are set elsewhere or they have to take what traders, who collect the crops, offer, even when they know the prices are low. They have no choice because they have no way to transport the crops to market or to store them until prices rise. Or, as is often the case, they need the cash immediately and must sell regardless of conditions," observes Ms. Pomerantz.

One solution has been to inform farmers, either by radio or in leaflets, about current prices. Thus armed, they can refuse to sell for less.

Another course is to promote competition. "If there are more traders, the prices are bid up," she adds, noting that where the traders have a monopoly, it may be necessary for governments to act as an intermediary and do some selective buying.

"They don't have to intervene in a massive way to have an effect," Ms. Pomerantz says. But she warns that governments should not set up their own monopolies, because they tend to be inefficient. "So it's best to promote competition among both the public and private marketing operations."

Still another response has been to form marketing cooperatives that take over the traders' functions and leave more of the profit with the farmers: They pay farmers immediately, build storage facilities to hold nonperishable crops until prices rise, and transport crops to regional centers.

The problem with these groups, observes Ms. Pomerantz, is that they have a history—at least in Latin America—of not working very well, mostly due to poor management. First, neither the public employees running them nor the farmers know very much about commercial activities, such as when to sell or hold on to a crop. Second, since there's a long tradition of working individually, farmers find it difficult to make collective decisions. Finally, there is the matter of trust. "It's one thing to talk about trust, but another to entrust your entire crop to someone who will take it to market. If the price the cooperative representative receives the cooperative representative receives for the crop is low, there is a great deal of resentment."

Despite such problems, many observers of the development process believe that cooperatives should be strengthened, as they are a potentially important tool. Moreover, in some parts of the world, where collective traditions exist, such as in India and in the countries of sub-Saharan Africa, cooperatives have a greater chance of succeeding. When they operate efficiently, it costs less to provide the farmers with services.

According to World Bank rural sociological adviser Michael Cernea, development projects should support both formal and informal farmers' associations.

"We need to pay much more attention to forming all sorts of groups at the grassroots level—like farmers' associations, road-maintenance groups, and marketing cooperatives. For example, where irrigation systems are introduced, in addition to providing the physical infrastructure, we must help organize the farmers into water-user associations to operate and maintain their systems. Some projects are already doing this, but we should be promoting these organizations in all of them."

"More a Slogan"

He adds that some governments and agencies are not anxious to create associations, either because they don't know how or because they don't want to change the status quo. "The word participation is used a lot, but it's more a slogan than a precise methodology to organize involvement. However, people's participation is crucial if we want projects to work beter or work at all."

Jacomina De Regt, a World Bank sociologist, notes that to improve the prices farmers receive, markets should be studied on a nationwide basis, particularly to locate the infrastructural bottlenecks that prevent the free flow of goods to market. Just as important, she says, is to weigh very carefully government subsidies designed to keep food prices low for the urban population at the expense of small farmers, who are often discouraged from producing.

All Urge Caution

With regard to new solutions, almost all in the development community urge caution. "Before we promote new techniques," says Mr. Lafourcade, "we must ask if we know how to do anything better than the farmers have been doing for generations. Also, we must identify the most urgent problems and focus on just a few, because the effort gets diluted if we try to tackle too much at once.

"In many cases, we also have to realize we may only be able to help the richest of the poor farmers or the poorest of the rich, since these are the ones with land. And they can be helped with long-term and medium-term credit so they can make durable improvements like fencing in their land to keep off animals, or building storage facilities, so the crop isn't eaten away. Unfortunately, we may not know how to address the problems of the far more numerous landless farmers."

Some say that because funds are scarce, areas in which investments are to be made must be chosen very carefully. "Where the land is desperately poor, where there are draughts two years out of five, unless the entire area is irrigated, the land stays poor. If we invest where there is more potential, from either better soil or climate, we can see some gains," says Ms. de Regt. She warns, however, that "we err on the side of capital-intensive solutions and should try to avoid them."

Ms. Pomerantz adds, "Even where farmers have access to as few as two or three hectares, where the soil is naturally rich or irrigated, some of the mechanisms being tried are working."

Says Robert Mizrahi, an economist at the Inter-American Development Bank, "Until now, we've focused on improving land, either with low- or high-cost solutions. But we have to ask, 'Is this correct?' Peasants have bad land, a lot of labor (most of it underemployed), and very little funds or equipment. So even if we improve the land, the gains are generally marginal. And though a few peasants may see their incomes rise, most remain poor." Thus, more emphasis should be placed on nonagricultural solutions.

The informal sector: Can it offer housing to the poor?

By Lata Chatterjee

Because a house is a large investment for people of nearly all income groups, credit is crucial both for assisting individual households obtain homes and increasing the total housing supply.

But low-income households in developing countries generally have no access to credit from the formal sector; and if they can raise resources only from relatives and friends or from selling assets such as jewelry, the construction process and growth of the housing stock will be quite slow, costly, and inefficient. On the other hand, if credit were available at the various stages—for acquiring land, purchasing building materials, paying labor and contractor services—the level of home ownership and the pace of construction could be increased dramatically.

The problem is that the methods used to provide credit in the developing world have yet to match the particular abilities of the poor to save and repay loans. Thus, housing finance has been largely out of their reach and has benefited only a few —usually the upper-income groups.

The mismatch is as much due to the structure and requirements of conventional institutions as it is to the income and savings patterns of the poor. To begin with, since housing loans are likely to be large, relative to income, they take a long time to repay. Thus, banks judge long-term creditworthiness by individuals' employment histories, potential earnings, and yields from the assets (for example, rent obtained from a portion of the house being bought). Also, because long repayment schedules carry risks, lending institutions require homeowners to have legal titles to the land and sizable collatoral. But these conventional criteria are not suited to the earnings patterns of most of the population in developing countries and are, in fact, exactly what the poor can't provide.

In addition to the problems related to the financial institutions' requirements, there are others that stem from the way low-income groups earn their income, which is quite different from the pattern of middle-income and upper-income groups. To a large degree, the poor are self-employed in the informal sector (operating small, family-run businesses, driving taxis, painting houses, doing repairs, and other similar activities) or have several jobs in this sector to augment the low wages they receive from their primary jobs in the formal sector.

Thus, while their total income may be enough to pay for low-cost housing, it may be irregularly received; for example, construction workers might earn a relatively good income for four months, but be without work for the next two. Also, they are less likely to be judged positively by other conventional criteria, since they do not, as a rule, have savings accounts or significant assets. For while a bicycle or other household items reflect a serious savings effort by poor households, these items are seen by financial institutions simply as consumer goods, and not as a measure of a family's ability to save or repay debts.

For a host of reasons, such as creating jobs in the construction and related sectors, stimulating the economy in general, increasing the housing supply, and helping the poor, a few governments have attempted to get housing finance to low-income groups.

In the mid-1960s, for example, the Brazilian government gave housing a high priority in its development agenda. It created the National Housing Bank (BNH) in 1964, allowing it to obtain its funds from compulsory payroll taxes and giving it sweeping powers to use its resources to, among other things, provide housing finance with low-interest subsidized rates to low-income and moderate-income borrowers. It also had the power to require lending institutions to provide funds to these same groups. The effort became a model for several other countries, such as Mexico, India, and the Philippines.

Unfortunately, these attempts have failed. Despite the good intentions, the share, for example, received by these groups (in the BNH program) consistently declined during the 1966-1975 period: For households with less than ten minimum salaries (one minimum salary equals one minimum wage), it dropped from 70 percent to 5 percent of the total program; for those with more than ten minimum salaries, it increased from 25 percent to 68 percent, although the majority of BNH resources were drawn from lower-income groups. Indeed, BNH could not meet its objectives precisely because it used conventional financing methods.

But despite the poor's inability to meet conventional criteria, they often save, take loans, and repay debts—on time. The framework, however, is quite different, as they depend almost entirely on self-financing and "informal-sector" loans from money lenders, building materials suppliers, friends and relatives, and rotating credit associations. Although this unorganized capital market appears to be quite large, its workings have until now almost entirely been ignored by policy makers. But precisely because it meets the needs of low-income groups, it should serve as a starting point for formal sector programs seeking to supplement self-help efforts.

Rotating credit associations (RCA), in particular, offer an important mechanism for providing financing to the poor. Already, they operate in many countries and in all parts of the developing world, such as Mexico, India, Zambia, Sudan, Nigeria, and Egypt. And though the particulars vary from place to place, they are generally associations of individuals who voluntarily agree to contribute a small fixed sum at certain intervals—either daily, weekly, or monthly—for a certain time period, say, one year. The funds collected during each interval are immediately turned over to one of the members, the order being based on the urgency of household needs. Once all the members have received their allotments, the association is disbanded.

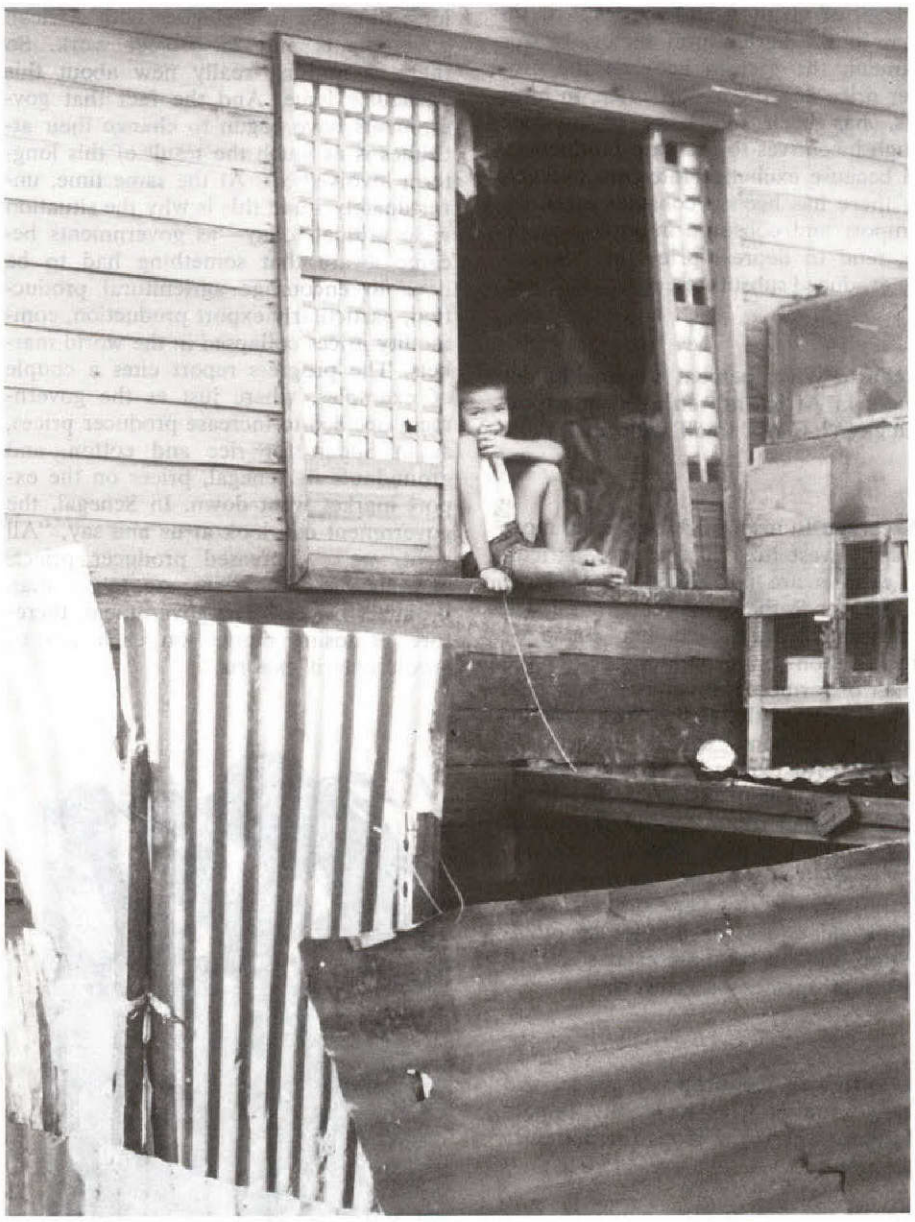


Photo: P. Muncie

Most often, members join the association for a specific goal, such as accumulating money to make house repairs, add a new room, or expand a tiny business. Most important, these associations are completely suited to low-income household earnings patterns and needs; this explains why they are so popular and widespread. For example, creditworthiness is based not on the members having regular incomes (the chief criterion in formal institutions) but rather on past credit behavior and trustworthiness. Further, the short-term savings period fits well with most low-income households' inability to predict their cash flows over a long period. Just as essential, the mechanism allows them to contribute quite small amounts at one time (which is all the surplus they can spare after paying for necessities) but over a long enough time period. And finally, the incentive to continue to make regular payments, even after having obtained one's share, is based on the fear of losing face in the community and on not being able to join a similar association in the future. In fact, surveys show that delinquency is rare; where it occurs, due perhaps to severe illness, death, or another catastrophe, members in the group divide equally the loss caused by the default. What is clear is that mutual support and community control are crucial.

For various reasons, formal sector financial institutions cannot meet the needs of the low-income groups in the same fashion. First, loans for low-cost housing are relatively small and the institutions are not interested in administering them, as their overhead costs tend to be high and therefore, unprofitable. Second, they cannot, in place of foreclosures, use the moral and social pressures (to repay) that are employed by the RCAs because they do not have this kind of moral authority. Finally, it is difficult for them to base creditworthiness on a knowledge of personality traits, as they have no administrative way to obtain this information.

Yet if low-income groups are to obtain housing finance, loans will have to be small and geared to the households' capacity for repaying. And as the RCAs are already promoting savings among the poor, helping collect and transfer small savings into economic sums and providing interest-free credit (as there are no administrative or overhead costs) in a highly personalized, community-based context, they are a potentially important complement to the formal system.

Thus, if governments hope to mobilize funds, improve housing conditions, expand ownership opportunities, and channel savings into the formation of assets, a major objective should be to link these rotating credit associations with private and public financial institutions. Governments alone cannot intervene; they cannot depend on the private-sector institutions to seize the initiative, as these financial institutions have not shown interest in this market to date, and, left on their own, would probably not channel finance to these groups in the future.

Though they function well, RCAs do have limitations. They do not, for instance, have enough capital to meet larger needs, like the purchase of land or housing. At present, the sums their members obtain have only been large enough to pay for consumer goods or add a room to an existing home, and to cover the cost of key money, as in Egypt, that enables families to rent apartments.

Until now, governments have not linked up with these informal associations and, more importantly, very few seem to be thinking about ways to draw from their experiences. One possible course would be for governments to experiment with providing selective RCAs with some seed capital that would be returned and used in a rotating fund. Or, all banks could be required to "adopt" an RCA and channel some of their funds to the association (conventionally defined in the "high risk" category). The banks could thus be spared the administration of many small loans and would need to monitor the activities of just one RCA. And they could operate with the same accountability principles as these associations; that is, they could continue the stream of funds (for housing and other needs) to those that had proved they were creditworthy.

While the details need to be worked out further, what is important is that the model is workable and offers strong possibilities for financing the poor in a large-scale fashion.

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Sub-Saharan prospects, problems revisited

New World Bank report sees progress despite weakening external economic environment

In the fall of 1981, the World Bank published a report, prepared at the request in 1979 of the African Governors of the Bank, that analyzed the basic causes —both domestic and external—of Africa's slow growth. *Accelerated Development in Sub-Saharan Africa: An Agenda for Action* focused on policy reforms that could reverse the declining trend of per capita incomes and agricultural output during the 1980s.

Two years later, the World Bank has taken another look at the situation through the publication of *Sub-Saharan Africa: Progress Report on Development Prospects and Programs.*

Report recently talked with Luis de Azcarate, who will become Director of the Bank's Country Policy Department in December, about the latest Bank study on Africa's prospects. From 1975 until this year, Mr. de Azcarate served as Chief Economist in the Office of the Regional Vice President for Western Africa. He also served three years (1970 to 1973) as the Bank's Resident Representative to Zaire.

Report: Is it stretching a point to call this current study a "Progress" Report? Would "Status" Report be more accurate?

Azcarate: There is no connotation either that progress in Africa was necessarily involved or that the recent report is an accounting of what has happened in Africa as a result of the previous report. Rather, it is simply a second look at the situation. Because the first report on accelerated development is forward looking and action oriented, it is natural that from time to time we would want to see where things have gone. It is also clear that economic conditions have changed for the worse in the past two years.

Report: The new report says there must be major changes in domestic policies to achieve a significant turnaround in growth prospects. Three areas of policy are to be of central importance. First, the development of more appropriate price policies. Second, improvement in institutions, particularly those serving the agricultural sector; and third, increased efficiency of resource use in the public sector. Let's take these one at a time. As to the first, what role does trade and exchange rate policy play in increasing agricultural production?

Azcarate: For twenty years—roughly, since independence—the pricing system, by and large, has been far more favorable to the urban areas that consume imported goods, because exchange rates in practically every country have remained overvalued, making imports relatively cheap. And the prices of agricultural products have remained low, relative to world prices, over a period of time, because governments have found that the difference between the producer price and the export price represents a convenient way of taxation. In other words, by buying cheaply, the government extracts a significant profit. And while it is supposedly indirect, it amounts to a direct income tax on the producer.

Report: Is the government, in almost all cases, the major buyer of agricultural produce?

Azcarate: Of those items produced for export, yes—either the government directly, or a marketing board that buys at government-regulated prices. For this reason, governmental pricing policy is a powerful instrument for determining both the level of taxation and the level of incomes in the agricultural sector. In our judgment, the margin between the producer price and the export price, in most cases, has been too large to produce enough incentives to increase production. And because exchange rates are overvalued, there has been a constant incentive to import and consume imports that, in turn, tend to depress prices of domestically produced substitutes, especially food.

Report: What percent of smallholder farmers in Africa are engaged in export production? Is it a small minority?

Azcarate: In most of Africa, even more so in the west than in the east, agriculture exports are not produced on large plantations. Rather, they are produced by peasant farmers, whether cocoa or coffee, cotton or groundnuts. A large number of farmers is involved. The whole southern part of the Ivory Coast, for instance, is, to some extent, engaged in production for export. In Senegal, in the so-called groundnut basin, practically all farmers produce some amount of groundnuts for sale. But even where estates exist, as in the Ivory Coast, the production of palm oil, say, by very large government-owned estates, is in fact the combined production by those estates as well as by small-farmer outgrowers.

Report: Do inappropriate price and exchange-rate policies have any impact on farmers who grow crops for domestic markets only?

Azcarate: Yes they do, because if the currency is overvalued as we just noted, there is a tendency to cheapen imports. Urban consumers turn to imported cereals, wheat and rice, to a much greater extent. The more you import these things at a low price, the more you tend to depress the local price. So there is obviously a relationship between the price of imported rice and local rice, as well as imported rice and other grains of local origin. The numbers that were presented in the first report on rice and other imported grains are really staggering. There were three or four countries in Africa before independence that were traditional consumers of rice, like Guinea and Liberia, but were also producers. In the old days, if anything, these countries—and Madagascar as well—had a little surplus for export. What has happened is that many countries now have become accustomed to importing cheaper rice; and in other countries, where rice had always been a luxury, rice became a staple food—at least in the urban areas. Governments have done two things—import rice, because it's cheaper, and, at the same time, push domestic production, even in areas and under conditions where costs are extremely high. So they lose on both counts: by subsidizing imports and by subsidizing production under conditions in which there is no hope of competing with imports.

Report: Has there been any progress in exchange-rate and price policies?

Azcarate: Yes, there has. First, most governments have taken stock of the problem. I'm not claiming that, having read our report, they discovered the truth. For one thing, this is an area that the Bank, as well as others, had identified a long time ago in dialogues with African governments and in project work. So there is nothing really new about this particular issue. And the fact that governments have begun to change their attitudes is as much the result of this long-term involvement. At the same time, unfortunately—and this is why the situation is so critical today—as governments became aware that something had to be done to encourage agricultural production, particularly export production, commodity prices collapsed in the world markets. The progress report cites a couple of examples, where just as the government decided to increase producer prices, as in Sudan for rice and cotton, and groundnuts in Senegal, prices on the export market went down. In Senegal, the government can look at us and say, "All right, we've increased producer prices, and now export prices are lower than producer prices." The government, therefore, is losing money on each ton of groundnuts it exports.



Photo: Ray Witlin

Picking groundnuts in Senegal: losing money on each ton exported.

Report: The latest report also observes that often, even when governments do increase producer prices, the internal terms of trade do not shift in favor of the farmer because governments often raise urban wages at the same time, thereby cancelling any rural gain.

Azcarate: Right. That's the difficulty. If the question were simply one of increasing prices and forgetting about the indirect impact, there would be no great problem. The point is that if you increase the price of agricultural products, including domestically consumed products, and then you adjust urban wages, or if you adjust the exchange rate to make imports more expensive and compensate for that by wage increases or by providing subsidies on so-called basic imports, you are annihilating the impact of the devaluation. You are getting exactly nowhere.

Thus, there are cases where successive devaluations, even very large ones, as in Zaire, for example, have not really been successful; in other similar diffcult situations, as in Uganda, they seem to have had the desired effect of improving terms of trade for agriculture. One good illustration is also Ghana, where the extent of the overvaluation was massive. Not a 20 percent or a 30 percent maladjustment, but more like 1,000 percent. In fact, Ghana had to devalue by that proportion, which they recently did.

This being said, there are no reliable statistics that would permit us to say whether, in general, the movement of relative domestic prices has or has not been in favor of agriculture—although I think it has.

Report: And these compensatory measures—such as adjusting urban wages—are inflationary.

Azcarate: Yes, they lead to inflation and inflation leads to an overvalued exchange rate over time, and you're back where you started from. This is a continuous problem in many African countries. They say, "Devaluation does not work; look at such and such a country. It devalued last year and now it has to devalue even more again. So what's the point?"

The point is that when you devalue, you devalue so as to cut the real incomes of some categories of people, normally the urban groups. If you don't achieve that—increase relatively the incomes of the nonurban groups—you haven't achieved anything. Very often we hear, outside the Bank, that the problem with devaluation is that it's going to reduce real wages. And we say, "That's exactly the objective!" The fact is that this is a political issue—there's no question about it. But if you don't achieve that, then you can save the trouble of going through the political difficulties of devaluation.

Report: The progress report says that major increases in nominal producer prices, even where they had been larger than input prices, have frequently been less than the cost of living to the farmer as represented by the consumer price index. It gives Tanzania as an example. Isn't it true, though, that a small farmer's pattern of consumption is quite different from that of items that figure in a cost-of-living index?

Azcarate: Yes, in a statistical sense, definitely. In most African countries, the cost-of-living index is really an urban index. However, the important thing to remember is that even though the index for farmers would have a very different composition, there are a number of imported items that farmers are interested in obtaining. In fact, when we talk about producer prices for farmers, we are really talking about real purchasing power for farmers to buy a number of things, including some imported items like inputs for farming such as fertilizer, but also construction materials, kerosene, and a variety of consumption goods, as well. In that sense, the exchange-rate regime, the way foreign exchange is allocated between groups, the extent to which some of these critical imported goods reach the farmer at affordable prices is extremely important. If you increase the nominal price of domestically produced crops in local currencies, and the farmer, when he goes to buy something, eith doesn't find

it—because the quota has been allocated to the urban centers or the army—or finds that prices have increased even more, he's nowhere. Farmers react very quickly to that situation. So, efforts by governments are needed that result in increased purchasing power of the farmer for each kilo of coffee or cotton or maize he produces. When the world market prices are going down, however, it means that a relative shift to the farmers at the cost of urban incomes must be undertaken.

Report: The progress report says that governments should try to decrease subsidies, not only for urban groups but for farmers as well, including those for inputs. If you want to shift the terms of trade, wouldn't it be better to keep up subsidies on imported inputs like fertilizer, and do away with the subsidies that favor urban groups. Why cut both?

Azcarate: Subsidies to urban groups for consumption goods such as for rice are the worst type. As far as subsidies for inputs used by farmers, two points should be raised. One is that relative prices of both outputs and inputs should reflect real costs and scarcity so as to encourage users and buyers to allocate their resources accordingly. If you subsidize inputs, which are very costly for the country, you are encouraging their use. And though, in a general sense, that may be a good thing, you don't want to encourage it beyond what you can afford. The second point is that subsidized inputs, like fertilizers, are terribly costly for governments, and what happens is that since there is only a maximum amount the government can afford, the quantity that is provided to the farmer is insufficient. So you end up by rationing the use of fertilizers by farmers, and more often than not, in some totally unsystematic way. Those lucky enough to have access tend to use them generously; others will not have access, because when they go to the government warehouse to buy it, none is left. They then have to dispense with it or turn to the black market.

Report: But when the World Bank finances a fertilizer import credit or loan, that's a subsidy. So isn't the Bank subsidizing inputs?

Azcarate: When the Bank finances such items, it finances the foreign exchange cost of importing the good; at the same time, it reaches an agreement with the government that the internal subsidy will be reduced or eliminated. A good example of this is the recent fertilizer loan to Nigeria. When we finance these imports, we do exactly what we do for anything else we finance. IDA is by definition a subsidized fund, and if we finance the import of fertilizer in a country, yes, it is in that sense a subsidy, but no more than for any other project; the justification here is the same as for IDA in general: the need to take account of the country's general poverty and lack of creditworthiness. And when it's an IBRD country, the subsidy element does not exist.

Report: Could we turn to the second point made in the progress report: the need to improve institutions, particularly those serving the agricultural sector. The report makes the basic point that governments should improve the efficiency of parastatal marketing agencies. It goes on to state that in the past couple years, there seems to have been a greater willingness to accept the private sector, including coops, to complement them and to provide farmers with alternatives they can legally use. At the same time, both the 1981 and the 1983 reports stress that domestic policies must be associated with increased external assistance to African governments. What possible role can external finance play in having governments adopt rational exchange-rate policies and in persuading governments to improve the efficiency of parastatal marketing agencies? Surely such measures can be taken without external financial assistance.

Azcarate: That is quite correct. Before answering your question, let me say a few things about institutional efficiency. Progress on the institutional side is much more difficult to gauge than the price and exchange-rate aspects of domestic policies. The inefficiencies in the parapublic sector have been gradually, and are now generally, recognized. They are often strongly denounced by governments themselves. The awareness is there. The problem is first that the governments are not sure what they have to do to get more efficient systems. Most governments do have a point, at least in part, when they say, "O.K., we will dispense with the parastatal for the procurement of fertilizers or for the marketing of groundnuts or cereals, but what is going to replace them?" Usually, there is no thriving private sector. In some cases, it's not there because the government has been so heavy handed, intervening in every sector to the smallest detail of retail trade. Private traders get discouraged and do something else or go somewhere else.

The marketing of domestic food crops has also been extremely costly and inefficient. The prices fixed by the governments have regularly been too low or too high because the price of domestic sales depends almost entirely on the level of the crop. Small changes in the volume of the crop result in large changes in prices because only a small fraction goes to the market—the bulk being consumed on the farm. If governments decide *a priori* what the price is going to be each year, and if it is too high, everybody wants to send their produce to the public agency, and the agency goes broke very quickly. If the price is too low, no one will want to sell to them, and black markets develop very quickly. The system has never worked. In quite a few countries today, governments have become convinced that it wasn't their business to go into retail trade. In Mali, there was a powerful central agency responsible for the purchase of local cereals—millet, sorghum, and rice. It has practically been completely dismantled now and supplies to the cities have improved rather than deteriorated.

Report: And replaced by what?

Azcarate: By commercial traders. The organization still exists, but it only has a marginal role as a regulator of the market at the margin. Obviously, if there's a serious drought, the government has to take charge of needed imports. Private traders will not do that very well, at least for bulk imports from abroad.



Photo: E. G. Huffman

◄ **Reducing real wages in the cities: "That's the objective!"**



Photo: Y. Hadar

◄ **Distributing fertilizer in Nigeria.**

Report: To the part of the question dealing with external finance . . .

Azcarate: Obviously there's no direct relationship between these reforms and a given amount of external financing. But measures designed to increase efficiency have a social and political cost. There are vested interests in the organizations themselves and in the groups that benefit from their activities. To decide that in the name of greater efficiency you are going to change institutions overnight is not very easy. There is a cost involved, and governments naturally want some kind of compensation. It's not unnatural to think that if we discuss the dismantling of a whole governmental network of marketing and procurement, and the government is not terribly keen to do it for political reasons, we have a better chance of achieving results if we can help the government achieve its objective by providing some financing for inputs, spare parts, and consumer goods—provided they are not luxuries.

Report: Much of external finance is directed towards projects or programs benefiting the poorest segments of the country. Would the World Bank deliberately finance a project that would result in a reduction in the purchasing power of formerly priviliged groups?

Azcarate: What we would finance in connection with institutional reform are activities and projects that those same institutions are in charge of. The financing in this sense is much more directly linked to the institutional reform itself than in the way I first suggested. Although we have to offer something on top of the advice we can give on institutional reform, we do not offer a blank check provided changes in this and that are made. More generally, through project financing, and through structural-adjustment financing, financial assistance contributes to the implementation of reforms.

In Senegal, there are a number of projects in irrigation, cotton, and groundnuts. In each, there is a particular agricultural institutional set up that we think should be improved. We say, "If this institution changes its personnel policies, its cost-recovery policies, its management, its finances, and so forth, we can provide funds to refinance this institution, provide it with a better capital structure and revolving funds, as well as finance for a particular project that is in the domain of that particular organization." Now, although we have achieved some objectives in Senegal, we have not succeeded in all of them. There are some organizations in that country that we would very much like to finance, if they could be properly reorganized and strengthened. But it has been difficult to finance them because institutions have not been appropriately strengthened.

Report: If governments take steps to reform domestic policy, the impact of those reforms is felt almost immediately on formerly privileged groups. If Bank projects take two or three years to identify and appraise, and five to seven years to disperse, you're almost talking a decade before the benefits begin to flow, although the hurt of reform is being felt almost immediately.

Azcarate: That's right as far as project financing is concerned. Institutional changes, however, can have a dramatic and immediate impact. In Mali, for instance, dismantling of the government monopoly in cereals has had an immediate and beneficial effect on the supply of cereals in general and on the cities in particular. The point is that the benefits of institutional reform should flow from the reform itself, not just from the associated financing from the Bank and other aid sources.

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Loans ... *Cont'd*

and women, who would be frightened by the idea of a "negative dowry," there is evidence that loans are popular with students, and no evidence exists that they discourage women or students from low-income families.

The introduction of most student loan schemes in developed countries represented an increase in financial support for students, rather than a reduction; this experience, therefore, does not provide a guide to what would happen if governments introduced loans in place of grants, or simultaneously increased tuition fees. Germany has recently increased loans in relation to grants for students, and the United Kingdom is considering substituting a combined loan-grant system for the present system, which relies exclusively on grants. Few countries have reduced the level of subsidy for higher education by means of loans.

In developing countries, however, where both tuition and living costs are often highly subsidized, the introduction of student loans would involve a reduction in the level of subsidy for higher education. Loans have been advocated as a way of shifting the balance between public and private financing of education. Loans, the argument continues, would be more equitable than the systems of free tuition and scholarships that persist in many developing countries. However the question of the equity of loans is closely linked with the issue of tuition fees, and few developing countries have yet been willing to increase tuition fees.

Efficiency of Loans

Student loans, or educational credit as they are often called, were first introduced in Columbia and India, and student loan programs have now spread throughout Latin America and the Caribbean and are found on a small scale in Kenya and Nigeria, India, Pakistan, Sri Lanka, Hong Kong, Egypt, and Israel. A short-lived experiment in Ghana led to the introduction of student loans, combined with an increase in fees, but this scheme was abandoned after only a year, due to a change in government. (See accompanying article.) Some useful conclusions can be drawn from this experience, however, and it does not prove that loans are infeasible in an African context.

The implications of student loans on equity have been emphasized in the past, but much less attention has been paid to the arguments for loans on the basis of efficiency, which are also important. It has been suggested that loans would improve efficiency by reducing wastage and helping to reduce the length of study, by improving student motivation, and increasing cost consciousness among students. Although there is little evidence to support or refute these arguments, it seems that an argument can be made that loans should be evaluated in terms of their effects on efficiency as well as equity, and in terms of their capacity to generate long-term funds for education.

The review of student loan programs shows that there is a great variety of administrative patterns and terms and conditions of student loans. In general, however, loans are subsidized by the government through interest subsidies and long repayment periods. The loan schemes are designed to fulfill a number of objectives, the most important of which are to increase the supply of trained manpower and to widen access to higher education by removing financial barriers for poor students.

In some developing countries, loans are provided for t[illegible]on fees as well as living expenses, but in several countries, where tuition is free, loans are available for living expenses and the purchase of books. Many of the loan schemes in Latin America have received financial assistance from the Inter-American Development Bank or the United States Agency for International Development, and both agencies continue to support student loan schemes in Latin America today.

Defaults Are Troublesome

There have been problems with student loan programs. Default rates and delayed payments have proved troublesome in some countries; but there have also been improvements, and in many countries, collection is no longer regarded as a very serious problem. The problem of brain drain does not seem severe. However, there is one problem that does deserve further study: What to do about students who do not complete their studies?

Experience also shows that it is important to distinguish between genuine defaulters and those who need to postpone repayment as a result of unemployment or financial problems.

Evaluations of educational credit in Latin America show that student loans have been successful in increasing enrollments in many countries, and that they have enabled poor students to enroll who could not otherwise have afforded higher education. One significant benefit is that many student loan institutions have been successful in attracting new sources of finance for student support, for instance from commercial banks or business enterprises. However, no student loan scheme is self-financing, and because of the extent of interest subsidies and the long repayment periods, student loan programs will continue to need regular injections of capital from government or other sources, including the international agencies.

No Immediate Savings

As a cost-recovery mechanism, therefore, student loans do not provide immediate savings. Nevertheless, in the long run, student loans could provide a significant source of funds for higher education.

The introduction of student loans can have greater impact—if accompanied by other changes, particularly increased tuition fees and attempts to reduce costs. A student loan program is not a substitute for cost-reduction measures designed to improve the efficiency of higher education; rather, it should be accompanied by attempts to increase internal efficiency and reduce waste.

Even more important in many developing countries is the question of tuition fees. The pattern of subsidy for higher education can be regarded as a continuum. At one extreme would be a system of full tuition fees, combined with loans. At the other extreme is a system of free tuition, combined with scholarships for living expenses. The introduction of student loans in developing countries simply involves a shift along this continuum; but to effect a major shift, most governments would have to increase the level of tuition fees substantially, as well as introduce student loans.

Many countries now recognize that to promote equality of opportunity it is necessary to provide financial support for students in more than one part of the education system. In some countries, loans are now being extended to upper secondary and vocational education. Further research needs to be carried out on practical questions such as the maximum burden of debt that is feasible for

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One student loan program: the Ghanaian experience

The student loan scheme in Ghana was short-lived; introduced in June 1971, it was abandoned in October 1972 after only a year because of the overthrow of the government that had introduced it and the opposition of the new head of state to the idea. Although it cannot be counted a success, since its unpopularity with students was one major cause of its abolition, there are nevertheless some interesting lessons for other developing countries, both in the experience itself and in the fierce debate that surrounded the introduction and abolition of the program.

The introduction of a student loan scheme in Ghana was first suggested in 1968 by a committee, which recommended that the government should no longer provide full scholarships to all university students, but provide three types of financial aid—scholarships for students of outstanding merit; bursaries for students taking "manpower-priority courses"; and interest-free loans for other students.

Before introducing such a scheme, the government appointed another committee to examine the case for student loans and produce detailed proposals. At that time, every Ghanaian who won a place on an undergraduate, diploma, or certificate course was granted a "scholarship" representing full tuition fees, board, and lodgings. This was far more generous than the system prevailing in secondary education, where pupils were expected to pay their own board and lodgings expenses; in the case of sixth-form pupils, they were also expected to buy books and stationery. The fortunate university student, on the other hand, received a scholarship to cover all out-of-pocket expenses, as well as free tuition, board, and lodgings.

In the Parliamentary debate that accompanied the introduction of the student loans bill, the Prime Minister pointed out that "Under present arrangements, the people who get higher up the education ladder, even though their earning capacity is greatly increased, are subsidized to a greater extent than those lower down. It means that the taxpayer pays more for those who are receiving higher education."

The arguments for loans was thus linked with the question of fees for maintenance (though not for tuition), and the two measures must be seen, together, as part of the same strategy of reducing the financial burden of higher education by recovering part of the costs from those who, it was argued, would benefit substantially from their university education.

The committee proposal, which was accepted by the government, was that students should pay fees of NC500 a year for board and lodgings, but should receive loans which must be repaid over twelve years by means of monthly deductions from salary. The statement by the Government of Ghana, explaining and justifying the new student loan scheme, makes it clear that students would still receive free tuition, that all students would be eligible for loans (regardless of income), and that there would be scholarships and grants, awarded partly on grounds of manpower priorities, available to about 10 percent of new entrants. No interest would be charged, although a "service charge" of 1 percent would be levied, after a grace period of four years.

Thus, the system of loans was far more generous than that in any Latin American country; nevertheless, it was bitterly attacked by students and by others, who argued that if it were necessary to recover part of the costs of higher education, it should be done by means of a compulsory graduate tax, which would affect those who had already benefited from free university education, and not impose an unfair burden on new students.

Others argued that if it were necessary to make savings, this could be done by improving university efficiency and reducing extravagance, rather than charging fees and introducing loans. Nevertheless, the loan scheme was introduced, and Peter Williams—Ford Foundation Advisor to the Ministry of Education—points out that "the alleged deterrent effects of student loans on university entry did not appear to materialize. In the year the loans scheme was introduced, the number admitted to Ghanaian universities for the first degree courses rose substantially, reversing a declining trend since 1967."

However, political events overtook the student loan scheme. The government that had introduced loans was overthrown in 1971. The leader of the new government announced that "As a matter of principle, I am opposed to the student loan scheme and it is my intention, as soon as practicable, to take steps to abolish it. I believe faithfully that every citizen of the land has an inalienable right to free education."

Thus, the system of fees and loans was withdrawn after only a year, and all that remains of a loan scheme in Ghana is a small loan, administered by the banks, to enable students to buy essential equipment. Mr. Williams, in his article, "Lending for Learning: An Experiment in Ghana" (*Minerva,* Vol. XII, July 1974), argues that it is "plausible to explain the abandonment of the scheme in political terms." In other words, the new government needed to win support, and "it was the unrelenting opposition by students to the scheme which caused the (new government) to kill it."

However, Mr. Williams draws some valuable lessons from this experience about the political acceptability of student loans, and about their feasibility in an African context. He argues that the first mistake was that no real attempt was made to mobilize public opinion. "The scheme was introduced at short notice, and no sustained campaign of public explanation was launched." Secondly, he argues that more should have been done to reduce costs of university education in other ways, so that students did not have "a real feeling of resentment at being made the scapegoats of the country's failure to control higher education costs." He does not argue that this would have been an alternative to introducing fees and loans, since he believes that "reduction of costs and charges are essentially complementary rather than conflicting approaches to the financial problem."

However, he concludes, "Those who preach austerity to students should be perpared to practice it themselves. Student loans are not a soft option for African governments, an easy alternative to difficult policies. They can usefully contribute to the improvement of higher education in Africa and to fairer African societies. But if they are to be fully accepted, they must be part of a program of common endeavour, with equality of sacrifice by leaders as well as led."

M. W.

Socialist reform: moving inexorably towards change

By Peter T. Knight

After the Second World War, the newly established socialist states of Asia and Europe adopted, with few modifications, the system of centralized physical planning practiced in the Soviet Union. Attempts at reform of this system began in the 1950s and have continued since then. By and large, they have stemmed from the perceived need to increase economic efficiency, except in Yugoslavia, where until recently, political considerations were a primary motive.

While the reforms vary from country to country in their timing, extent, and persistence, they also have certain elements in common. First, the role of centralized planning in physical terms has decreased, while the autonomy of enterprises or subnational entities (such as industrial associations and local governments) in determining investments, wages, hiring, the purchase of inputs, product mix, and the conduct of foreign trade has increased. Also, the economic authorities have relied on the price system and financial mechanisms to guide enterprise decision-making. Moreover, the reforms have linked the earnings of managers and workers more closely to enterprise and individual performance, and they have provided a constructive role for the private sector, especially in agriculture, but also in small-scale service and industrial activities.

At the same time as reforms were being attempted, however, there was a strong resistance to change, and many of those implemented were often reversed. Thus, in view of the partial and shifting nature of the reforms in most countries —not to mention the changes in the international economic environment and the limitations of the data available— it is hard to determine whether the reforms have indeed spurred economic efficiency. Nevertheless, the general movement towards change is quite clear.

* * *

In the Soviet Union and the countries that adopted its model, central planing produced significant achievements: the industrialization of backward countries, the build-up of military power, survival in a hostile environment, victory in war; impressive improvements in standards of education, health, social and private consumption; full employment of labor; price stability; and the development of natural resources, science, and technology.

But the system also had its drawbacks, as is well documented. One fundamental problem that has been cited is that the center is out of touch with popular wishes. Democratic centralism is, in theory, the central execution of decisions democratically reached; but, in practice, it turns into the pursuit of the wishes of the current leaders. Moreover, the model's drawbacks have been felt sooner and more deeply in the socialist countries of Eastern Europe than in the USSR itself. Unlike Russia in 1917, these countries had already reached a higher level of economic development, social diversity, and growth of democratic institutions when they adopted traditional central planning. And the existence of such elements makes the authoritarian and bureaucratic tools of central planning relatively inefficient and, moreover, resented by various groups in the population.

The first country to make fundamental changes in the traditional model was Yugoslavia, after its expulsion from the Cominform in 1948. The economic reforms begun in that country in 1950 were regarded by their designers as part of a broader attempt to build a self-managed socialist society distinctive from the Soviet type of state socialism. The role of the state was to be gradually curtailed in favor of self-managed enterprises that would increasingly respond to market forces rather than state directives. Since 1950, the process has continued, though not without some backsliding.

There are two major milestones in the reform process. In 1965, central planning was ended and the self-managed enterprises were left relatively free to respond to market forces. Then, in the 1971-1974 period, a series of new laws was passed and a constitution adopted that attempted to institutionalize a form of bottom-up planning compatible with the concept of self-management which, at the same time, would retain substantial elements of market guidance. At present, the country is again moving towards greater reliance on market forces to guide enterprise decision-making; this time, the quest for economic efficiency is the foremost motive.

In the rest of Eastern Europe and the Soviet Union, economic reform was basically an outgrowth of the quest for greater economic efficiency from the start, although some reforms can be traced to broader movements of political change. Even the most radical blueprint for reform, that of Czechoslovakia in 1968, upheld the principle of central planning, which was to become more efficient and better adapted to economic needs through a regulated market mechanism.

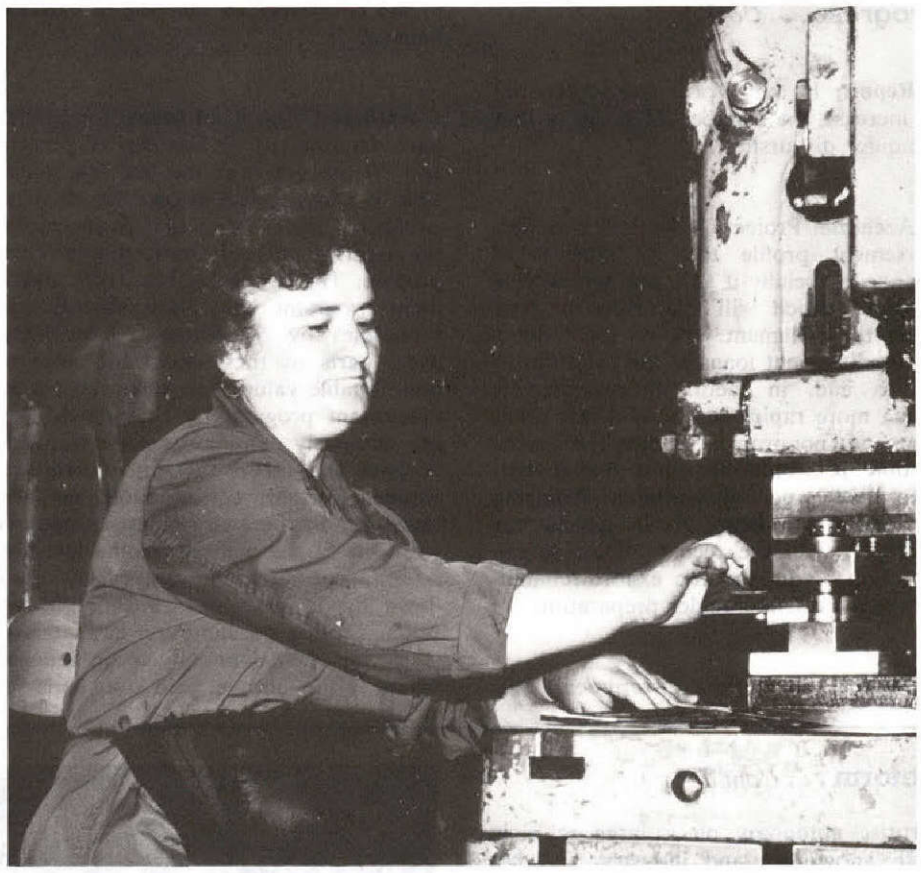


Photo: Y. Hadar

An employee at the Kikinda Iron Foundry, Yugoslavia. Until recently, reform was propelled by political motives.

At one stage or another, every East European country—the Soviet Union included—has announced the intention to proceed with decentralization of economic decision-making and a wider use of market instruments. But for various reasons, all but two countries, Yugoslavia and Hungary, turned back (if not fully, at least basically) to the traditional model. Hungary introduced its New Economic Mechanisms in 1968, and since that time has been the most market-oriented economy within the Council of Mutual Economic Assistance (CMEA) (despite some backsliding during the 1972-1978 period). Although Romania's reforms have fit the general East European pattern, since 1979, this country has moved towards linking domestic and world market prices; this movement could facilitate Hungarian-style reforms in the future—if the Romanian authorities decide to take this course.

China's system of central planning was created in the 1950s, and the central control of resource allocation continued for the next two decades. Since the late 1950s, however, central planning (in the sense of a medium- to long-term plan) has been practiced only infrequently, owing to the disruptions caused by the Great Leap Forward (1958-60) and the Cultural Revolution (1966-76). A debate in the mid-1950s on the role of planning and the market led to a few experiments with the use of market forces to guide enterprise-level decisionmaking, but not to serious reforms. Some significant efforts at administrative decentralization were made between 1957 and 1958, but most of them were reversed by 1961. No fundamental reform was attempted during the 1960s and early 1970s, though periodic moves away from centralization occurred. After 1977, system reform again became an issue of debate, but criticism is now directed at the performance of the economy, particularly the slow improvement in the general standard of living (despite high levels of investment) in the two decades following the completion of the socialist transformation in the late 1950s, and persistent poverty in some regions.

Since 1979, China has experimented with market mechanisms and greater en-

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Loans ... *Cont'd*

students and capital ceilings for student loan institutions.

Governments considering the introduction of student loans need to pay particular attention to such questions as:

- The capital requirements of a student loan program: experience shows that this has often been underestimated.
- The extent of subsidy: The lower the rate of interest charged on loans, and the longer the repayment period, the greater will be the cost of subsidizing loans.
- The choice of administrative model: Some developing countries have chosen to establish state loan institutions, while others use commercial banks. The choice will depend on the conditions in the country. The fact, however, that commercial banks and private capital can be involved in the financing of education may be one of the main benefits of student loans in some developing countries.
- The determination of repayment terms: It is important to establish efficient procedures for collecting repayments, for granting postponement to graduates in financial difficulties, and for dealing with defaulters. Experience shows that although administrative problems have often been underestimated, they can be solved.
- The need to secure widespread recognition of the advantages of a loan scheme: Experience in several countries shows the importance of appropriate publicity and the need to persuade both students and the general public of the arguments in favor of student loans.

Although the introduction or extension of student loans schemes in developing countries could be worthwhile in the long run, it will not provide any quick savings for governments. The introduction of loans needs to be weighed against alternatives, such as a graduate tax, which has been suggested in some developing countries. One advantage of student loans is that they are a "multi-purpose tool" and can be a very flexible means of finance.

Nor will the introduction of loans by itself solve problems of cost recovery, or efficiency, or equity. There are practical and administrative problems to be overcome, and no student loan scheme is likely to be fully self-financing. Nevertheless, it is recognized that to subsidize higher education by means of free tuition and scholarships or grants imposes an increasing burden on public funds in many developing countries, and is neither efficient nor equitable.

Student loans should not be regarded, therefore, as a panacea, but as a method of finance which, when combined with tuition fees and selective scholarships, has many advantages. A final conclusion, is that they are more equitable than existing patterns of highly subsidized tuition and maintenance for a privileged minority, and may contribute to greater efficiency by influencing student motivation and cost consciousness.

Student loans are flexible and can be used to provide objectives for particular groups of students or to fulfill manpower objectives. Finally, loans can provide a significant source of finance for higher education and vocational and technical education in the long run.

The introduction of student loans needs to be carefully planned, and be accompanied by appropriate changes to fees and, if necessary by cost-reduction measures, and also by an appropriate campaign of publicity to convince both students and taxpayers of the merits of a scheme that allows students financial support today, when they need it, in return for a promise that they, in turn, will contribute directly to the financial support of the students of tomorrow.

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Progress ... *Cont'd*

Report: Is the World Bank prepared to increase the number of projects that are quick disbursing?

Azcarate: Projects have their own disbursement profile that is difficult to change, especially if they are agricultural projects, which will take three to four years to implement. We do have structural-adjustment loans in six countries in Africa and, in them, disbursement is much more rapid. We have a few other types of nonproject lending or sector lending in which we assist the government with quick disbursement financing for essential imports. As in Ghana, for example, with the recent import reconstruction credit and the export rehabilitation project now under preparation.

Report: Are African governments able to use effectively an increase in external finance?

Azcarate: Terms of trade for Africa have deteriorated by between 10 percent and 30 percent over the last few years. That is a loss in real income for all these countries, and it's one that is enormous, representing probably more than aid can provide. The result has been that investment programs have been sharply cut, sometimes by 50 percent. Admittedly, some parts of these programs were of questionable value. But when you cut an investment program by that much, you are obviously eliminating some valuable projects and others that are socially desirable. Further, consumption has also been cut. In the Ivory Coast, a country with one of the highest income levels in Africa, consumption must have gone down by 15 percent over the last two years. Cutting consumption at that level is not very easy. Nor is it easy in Senegal, where it has been eroded over time, or in Nigeria, where imports decreased by over one-third overnight. Some of those imports might not have been essential, but others obviously were.

African countries can absorb more aid. Not necessarily aid in the form of traditional project financing only, but aid through a combination of traditional project lending, more sectoral lending, and structural-adjustment lending with quick disbursing patterns and a much broader, deeper program of policy reform. There's a problem of absorbtive capacity for financial flows at a certain point, but we are not there yet, by any means.

Note, however, that there may be also a problem of limits of "absorbtive capacity" in terms of the ability and the political will to reform policies and institutions. Again the progress report shows that movement is there. The extent and pace is obviously a problem. And that's why we've got to continue assisting, both in analysis and technical assistance, and financially, as well.

Reform ... *Cont'd*

terprise autonomy on a large scale in both agriculture and industry, and has given considerable attention to foreign experience, particularly that of Hungary. Reforms appear to have been dramatic in agriculture, where gross output increased at an average annual rate of 6 percent of the 1978-1982 period (roughly double the rate for the previous twenty years). These statistics present one of the few relatively unambiguous examples of the impact of reform on economic performance.

Economic reforms in socialist countries, particularly those involving economic decentralization, are not easy to carry out. Since they involve changes in the locus of decisionmaking, the process of price formation, the structure of incentives to producers, the degree of competition, and in some instances, the ownership of the means of production, such reforms inevitably influence the distribution of power and income. They thus threaten powerful vested interests and require strong political backing if they are to be implemented successfully.

Because the elements of reform are highly interrelated, they should be internally consistent and simultaneously implemented as part of a comprehensive package. If managerial incentives are keyed to profits, for example, but lack of competition or administrative price setting do not allow prices to reflect scarcities, the impact of the incentives on economic efficiency will be open to question. If there is any priority, it would appear to be reform of the price system so that it can link the various aspects of decisionmaking by providing a comprehensive and mutually consistent expression of relative values that can be used to evaluate alternatives in production, consumption, and investment. But price reform, other than periodic revisions of administered prices, has proved to be very difficult to implement, particularly in view of the market power of many industrial firms and the scarcity of foreign exchange that limits import competition.

To achieve maximum impact on productive efficiency, reforms must be pursued over long periods—preferably measured in decades rather than years or months—so they can guide transformation of the stock of physical and human capital used in the productive process as well as the use made of pre-existing plant, equipment, and labor force. Energy-inefficient plants and vehicle fleets cannot be made instantaneously and drastically more efficient by instituting scarcity pricing and linking managerial rewards to profits rather than output, even though some immediate savings are possible through the elimination of waste. Workers may not respond to profitsharing schemes or take the risk of establishing small private firms or cooperatives until there is sufficient evidence that the rules of the game will remain reasonably stable. Nor can factory managers, accustomed to taking orders or bargaining with official agencies to obtain preferential treatment, be converted into dynamic, customer-oriented entrepreneurs overnight.

Successful implementation of reforms also depends on the linking up of political support, technical consistency, and a time period of sufficient duration to see results. Without continued political support, even a series of consistent reforms may not survive long enough to provide measurable benefits in terms of improved economic efficiency. Inconsistent reforms may generate obvious inequities or inefficiencies that threaten political support, halting or reversing the reform process before the inconsistencies can be eliminated.

In practice, reforms have not been implemented in a fully consistent fashion over a period of many years, even in Yugoslavia. Internal resistance, external shocks (economic or political), and inconsistencies in the reforms actually implemented have resulted in numerous adjustments and periods of regression which, even when reversed, lengthen the time required to achieve positive results. These factors may help explain why it is difficult to find convincing evidence that socialist economic reforms to date have had a significant impact on economic growth rates or other indicators of macroeconomic performance.

Nevertheless, pressure for and attempts at reform persist, and the general thrust of the reform movement is in the direction of economic decentralization, which appears to be the best way to induce increasingly complex economic systems to respond more efficiently to domestic and foreign consumer demand in a rapidly changing international economic environment. This is perhaps the most significant finding emerging from this review.

Experience to date suggests that economic decentralization requires a reduction in the power of central bureaucracies (including cuts in their staff) in favor of enterprise managements, the substitution of indirect "economic regulators" for direct controls, closer linkage of performance indicators to overall financial results rather than physical targets, and a price system that allows substantial scope for the operation of market forces and significant competition among production units. These factors appear more important than changes in the formal ownership of the means of production.

Mr. Knight is Senior Economist, Brazil Division, Latin America and the Caribbean Country Programs Department II of the World Bank. This article summarizes the author's World Bank Staff Working Paper No. 579, "Economic Reforms in Socialist Countries: The Experiences of China, Hungary, Romania, and Yugoslavia," Management and Development Series No. 6 (Washington, D.C.: The World Bank, 1983) prepared as a background paper for the 1983 World Development Report *while the author was a member of the Country Policy Department. That working paper provides an extensive bibliography of literature dealing with this subject, including a number of published World Bank reports and books.*



Photo: R. Ng

In China, criticism is directed at the slow improvement in the standard of living.

The debt to Gerard Debreu

By F. Graham Pyatt

Following this year's award to Professor Gerard Debreu, the Nobel Prize of Economics has now been received by some twenty-one distinguished academics. It is readily admitted that some of these awards have been controversial. But there is evidently no controversy, inside the economics profession or more broadly, attendant on this year's award. This is surprising if a recent statement on behalf of the Nobel officials is taken literally: "Computer models based on Debreu's work are routinely used by the World Bank and similar agencies for analyzing trends in national economies and world markets." In economics, to be both useful and uncontroversial is not an easy trick to pull off, while, as we have come to realize, almost anything the Bank might do is regarded as having an element of controversy. How then has Debreu done it?

Within economics, Gerard Debreu is a high priest of pure theory: so pure that he is disinclined to speculate on the relevance of his theoretical contributions to any policy issue, and so abstract that, since 1975, he has been simultaneously Professor of Mathematics at Berkeley, as well as Professor of Economics. His contribution has been mainly to demonstrate in a rigorous way that economies can in fact work the way economists have assumed they do, namely that the various demands and supplies of goods and services in an economy emanating from the self-interested behavior of individual producers and consumers can be balanced out through a system of price allocations to yield a stable market equilibrium. We owe to Debreu, therefore (and others, also, especially former Nobel laureate Kenneth Arrow), the knowledge that under certain conditions of completeness, stable competitive market equilibria exist: The laws of demand and supply, on which so much of economics depends, are therefore given foundations to rest on.

Many—some economists among them—will consider this a pretty rarified contribution. And to make matters worse, Debreu's work, showing what markets can do, does not tell us how they should be organzied in practice, or what to make of the fact that the conditions from which his theoretical constructs derive are at best only approximated in reality.

It would be surprising, then, if much of the World Bank's analysis and forecasting were to depend directly on Debreu's contribution. In fact they do not, except in the sense that it is good to know that Debreu's contribution exists.

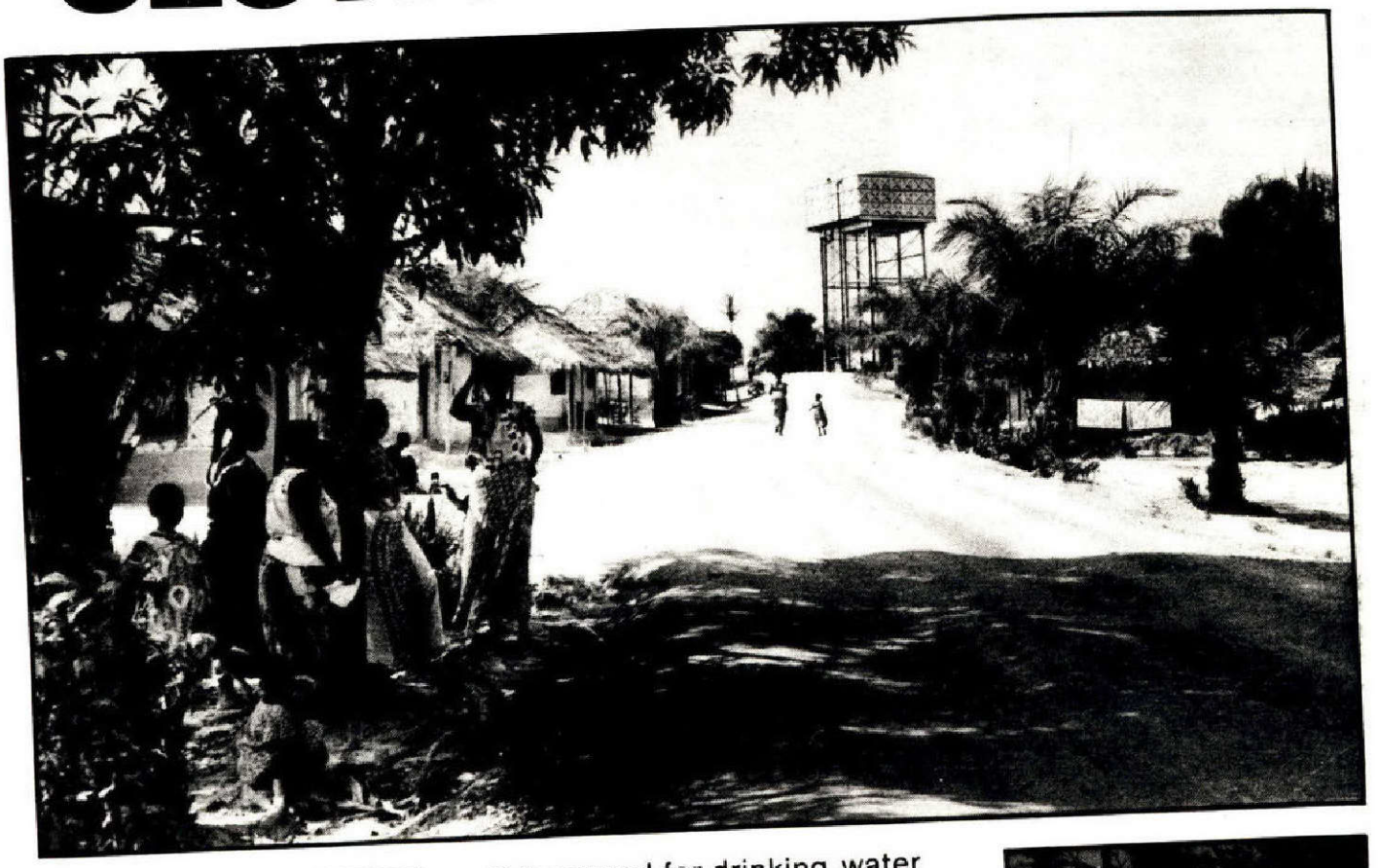
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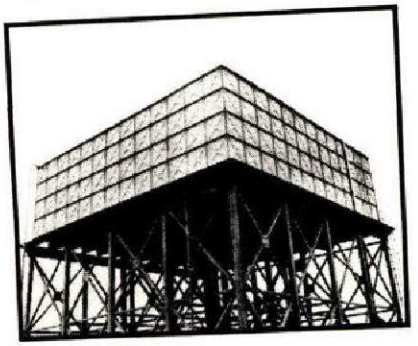
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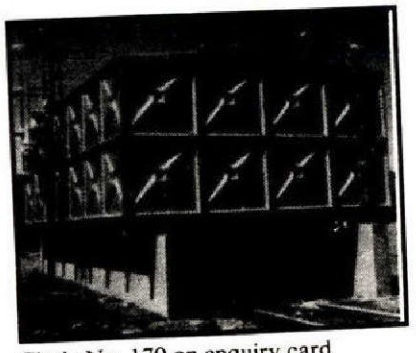
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continued from page 39

Niger state: Minna dam

Contracts have been awarded by the Niger River Basin Development Authority to local companies for construction of a dam at Minna, Niger State capital. The dam will serve to irrigate 90,000 hectares of land for agricultural produce.

Haama Engineering will be constructing the canals and other structures; Afro Works (Nigeria) the spillway and outlet. Niko Engineering (Nigeria) will be handling the distribution system. The contracts' total value is ₦68m ($92.5m).

Botswana to increase urban water supply

Gaborone, Bostwana's capital, will have its water supply needs met up to 1988 through a third water supply project to be assisted with a $22 m loan from the IBRD.

The project will help prevent water shortage during the mid-1980s in Gaborone, which is undergoing rapid population growth. In addition, it will speed up the second phase of the development of Gaborone West, and provide Lobatse, the centre of the country's meat-processing industry, with more water.

Site investigations for two dams on the Kolobeng and Metsemotlhaba rivers, west of Gaborone, will be carried out to ensure water supply for Gaborone and Lobatse into the 1990s as the combined population doubles to an estimated 150,000. The project will also finance manpower development programmes for the Water Utilities Corporation, the implementing agency.

The Government of Botswana and the Water Utilities Corporation will contribute a total of $17.2 million towards the costs of the $50m project.

Kenya: Turkwel dam

Kenya is planning a multi purpose dam project on the Turkwel Gorge with French technical help and European Economic Community cash. A feasibility study on the $148m scheme was completed recently. A report of the study was given to Nicholas Biwott, Kenya's Minister for Regional Development, Science and Technology.

The project belongs to the Kerio Valley Development Authority and construction is expected to begin before the end of 1984. The dam will have a storage capacity for more than 1 billion cubic metres of water to be used for irrigation, wild animals and live-stock and for generating electricity.

According to the report, the hydropower plant will be located underground and will generate 150Mw but initially, it will generate 106Mw. It will comprise three units of 50Mw with three phase transmitters situated outside the cavern. The transmission line connecting Turkwel to Lessos sub-station will run along the escarpment fo the Kerio Valley and will carry 220kw.

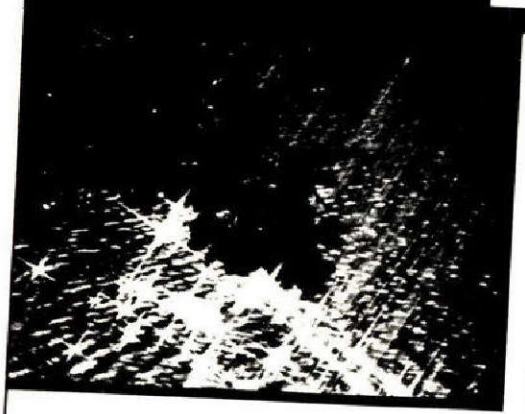
Minister Biwott said it was encouraging that the dam will also enable people in the area to irrigate 20,000 hectares of land which will produce enough food to make the people in the area self-sufficient. He said that his Government's forecast was that by 1990, both Turkwel and Kiambere hydropower stations should have been included in the main grid, and the two projects will be developed together.

Gongola contract

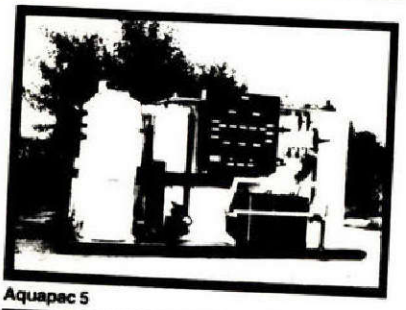
A contract from Gongola State Water Board is expected to go to the UK company Paterson Candy International (PCI). UK banks have agreed to provide finance with the Export Credits Guarantee Department guaranteeing $86.5m of the total cost. National Westminster Bank, Standard Chartered Bank and Midland Bank International have already signed loans for $106.9m.

The Gongola project includes the supply of water to ten villages and the drilling of 86 boreholes. Paterson Candy International is already employed on a similar project in Benue state and has formed a new company, Paterson Candy Nigeria.

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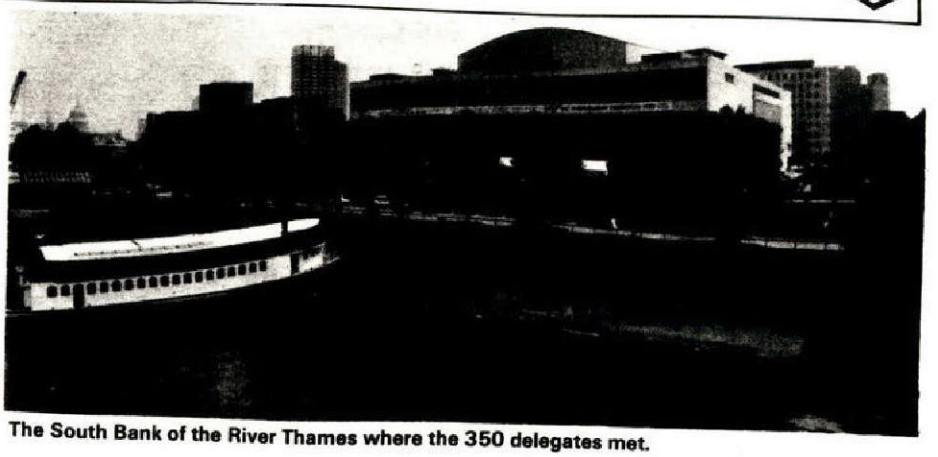
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The South Bank of the River Thames where the 350 delegates met.

World Water 83

Delegates and visitors from all over the world recently converged on London to attend the International Water and Sanitation Congress, Conference and Exhibition. The event provided a unique opportunity for those involved in the water industry to meet, view the latest technology and debate the needs of all nations in their search for and use of water services.

THE UNITED NATIONS has designated the years 1980–1989 as "The Drinking Water Supply and Sanitation Decade" with World Water 83 as one of the major focal points. As stated at the United Nations Water Conference in 1977, "All peoples, whatever their stage of development and social and economic conditions, have the right to have access to drinking water in quantities and quality equal to their basic needs. Similar considerations apply to all that concerns the disposal of waste water, including sewage, industrial and agricultural wastes, and other harmful sources, which are the main task of the public sanitation systems of each country." World Water provided a platform for progress towards meeting these needs.

The Conference was opened by the Secretary of State for the Environment, the Rt. Hon. Patrick Jenkin, MP on 12 July. Organised by the Institution of Civil Engineers it attracted around 350 delegates from 45 nations. Representing the African continent were delegates from Nigeria, Cameroon, Zimbabwe, Somalia, Kenya, Tanzania, Egypt and Swaziland. India, Indonesia, Saudi Arabia, China, Jamaica, Thailand and Australia also sent delegates whilst there was a large contingent from the UK, Europe and the US. The Conference formed the first global review of progress and achievement in the Water Supply Decade and brought together experts from all sides of the international water industry.

Conference papers

Speakers were chosen for their expert knowledge of the major themes of the Decade: Finance; technology; training; health. Papers were taken as read with authors introducing and highlighting their papers. Ample time for discussion was allowed after each paper with delegates speaking freely from the floor and debating topics raised.

Papers were presented over a three-day period from 12 to 14 July and divided into 10 sessions. A complete breakdown of the proceedings is detailed below:

Tuesday 12 July

Official Opening and Session I

1. The International Drinking Water Supply and Sanitation Decade – The scale of the world problem.
G.A. Brown, Chairman of the Steering Committee for Cooperative action of the Decade

Session II – Financial

2. Assessment of priorities for investment in water supply and sanitation in developing countries.
M.B. Grieveson, Principal Engineering Adviser and Head of Engineering Division, OAD.

3. World Bank financing.
J. Freedman, Operations Policy Staff, World Bank.

4. Generation of income from water projects.
B.L. Schroder, Director, J. Henry Schroder, Wagg & Co Ltd.

Session III – Training

5. The need for training.
N.F. Carefoot, World Health Organisation.

6. Public and private sector teamwork for overseas needs.
D.J. Kinnersley, National Water Council

Wednesday 13 July

Session IV – Private Sector Contributions

7. The role of the consultant.
D.A. Howarth, formerly Water Supply Division, Asian Development Bank.

8. The role of the non-governmental organisations.
D. Collett, Director, Water Aid.

Session V – Management

9. River basin management.
Dr M.C. Dart, Director of Scientific Services, Thames Water Authority.

10. Water quality.
J.I. Waddington, Director, Environmental Health Service, and W.M. Lewis, Consultant, WHO Regional Office for Europe.

11. A twinning partnership in managing the Central Water Authority in St Lucia.
K.F. Roberts, Chief Executive, Wessex Water Authority.

Session VI – Water Conservation

12. Ground water development.
Dr E.P. Wright, Institute of Geological Sciences and Hydrogeological Advisor to Overseas Development Administration.

13. Dealing with leakage.
M.J. Rouse, Director of Engineering, D.B. Field, Manager, Water Mains Group, Water Research Centre.

14. Rural water supply technology.
S. Arlosoroff, UNDP Projects Manager (TWD) Handpumps Testing and Development, Integrated Resource Recovery, World Bank.

Session VII – Case Studies

15. Development of water supplies and sanitation in Saudi Arabia.
M.A. Khan, Ministry of Agriculture and Water, Riyadh, and C.M. Cullen, Watson Hawksley.

16. Water and wastewater treatment in South East Asia.
Professor M.B. Pescod, University of Newcastle on Tyne.

Thursday 14 July

Session VIII – Urban Waste Disposal Problems

17. Rehabilitation of old systems.
D.J. Power, Melbourne and Metropolitan Board of Works.

18. Greater Cairo wastewater project.
A. Safwat, Chairman of the Organisation [illegible] Execution of the Greater Cairo Wastewater Project.

Session IX – Water and Health

19. Infections related to water and excreta: the health dimension of the Decade.
Dr R.G. Feachem, London School of Hygiene and Tropical Medicine.

20. Water in the service of food production.
T.H. Mather, Food and Agriculture Organisation of the United Nations.

21. Bangladesh and the water decade.
M.G. Beyer, United Nations Children's Fund.

Session X

22. Appropriate technology.
J. Pickford, Loughborough University

Final Session

Summing up.
Dr. P.G. Bourne, President Global Water and Consultant, Halcrow Balfour Ltd

The Exhibition

The exhibition portion of World Water was promoted by the City of Westminster Chamber of Commerce. Over 160 exhibiting companies from 14 nations displayed the latest developments in water and sanitation related products and services featuring both high and low technology. Six thousand square metres of open space were provided for exhibitors. A spokesman for Westminster Chamber of Commerce reported that "The exhibition has been a sell-out which augurs well for the future. This is the first in a series of three congresses to be held in London during the UN Water Decade and we hope to accommodate all applicants next time."

In the following pages the "African Technical Review" looks at some of the equipment and products exhibited.

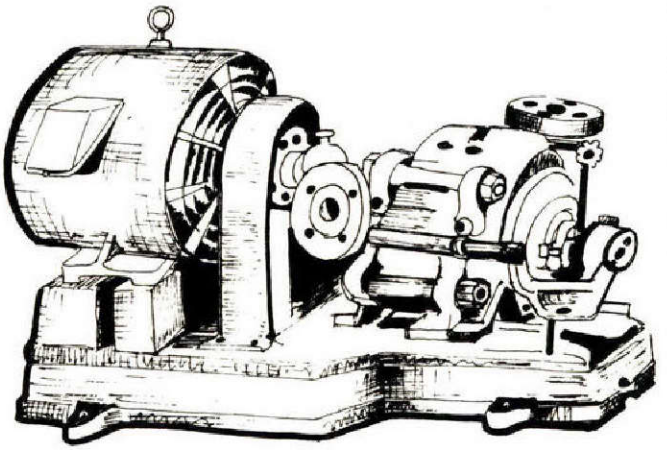
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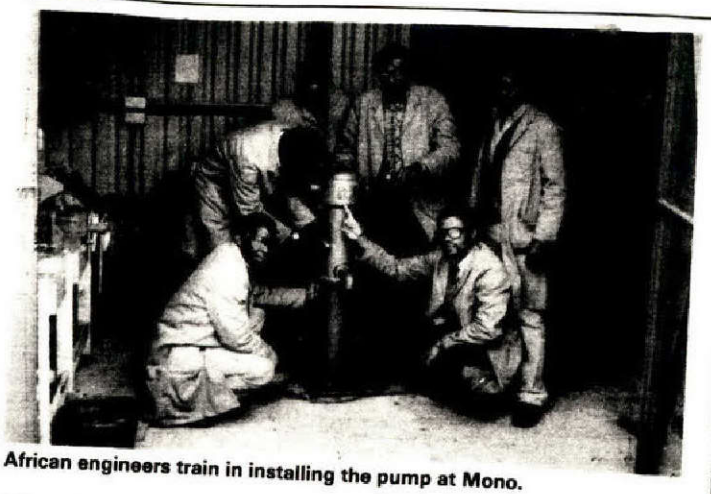


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African engineers train in installing the pump at Mono.

Hand drive borehole pump

The new Monolift Hand Driven Borehole Pump gives 300 per cent increase in volume, a 30 per cent increase in depth and a lower unit cost, compared with Mono's previous model. **Mono Pumps Limited** of Britain undertook the large scale development work, incorporated design improvements and introduced their new pump as a planned project to meet VLOM (Village Level Operation and Maintenance) Water Decade ideals for hand driven borehole pumps.

The newly defined and unbiased technical criteria provided a set of design objectives for product improvement. Following test phase in the field and on Mono's specially equipped site in Manchester, the results can be summarised as follows: increased output to 3400 litres/hour, lifts from 60m depth, much lower cost per unit, and better spout design.

The traditional Monolift features, relevant to VLOM requirements, are retained in the new pump and include: consistent non-pulsating output directly proportional to handle speed; self priming pumping action; ability to handle sandy or silty water with minimal abrasion damage; suitable for a wide span of borehole temperatures, and sanitary well seal.

The pump element now suits ground water temperatures between 5°C and 35°C.

The number of drive shaft bobbin bearings was decreased to improve flow, and reduce turning torque, without adverse effects.

The drive head is now manufactured in a cylindrical cast form that enables Mono Pumps to reduce the unit cost of the pump. Also, operation is easier to the extent that a child can exert the lower torque required to lift water from moderate depths.

The gearing within the drive head has been changed to no-lubrication stabilised Nylatron gearing, incorporating a uni-directional ratchet which allows the handles to be rotated in one direction only. No maintenance is needed and the drive head is sealed with tamper proof bolting. The outlet spout has been modified to make filling of vessels easier, to allow buckets to be hung on it and to incorporate a right angle bend to prevent foreign objects getting in. *Circle No. 1*

Deep well hand pump

Kenman Corporation have announced a new deep well hand pump, called the JAMHP, for community use in villages without electricity.



Designed to meet Village Level Operation and Maintenance criteria for reliability, durability, easy maintenance and low cost, the Jamhp Handpump is suitable for depths up to 30 metres. Installation is accomplished in less than 30 minutes by two people without the use of lifting equipment.

Jamph Hand Pump requires little maintenance. When replacement of the leather cup is required, it can be done in one step by anyone who uses the pump. This is possible because the Pump uses an above-ground-level cylinder and piston which provides access without the need to remove the pump from the well.

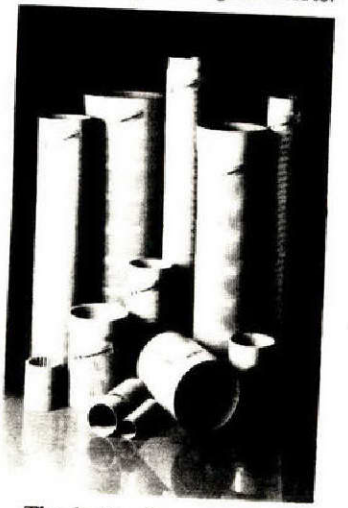
Using very little down force, which makes it easy for child users, the Pump will produce anywhere from 26.5 litres of water per minute at shallow depths, to some 11.2 litres at 30 m depth. *Circle No. 3*

WW 803

Borehole casing

A completely non-corrosive, non-toxic lightweight PVC borehole casing and screening system which may be specified to provide an open area of 50 per cent has recently been added to the **DMS** (Drilling Materials and Services Ltd.) range of well liners.

Believed to be the first system in the UK to incorporate the continuous slot design to maximise open area, Aquascreen 400 offers a slot width range of 0.30mm to 3mm according to application. Although an open area of 30 per cent is achieved by the smooth screen version a further 20 per cent screen is afforded by the ribbed well screen. It's external and internal ribbed design promotes longevity and efficiency by preventing abrasive sand and gravel impeding water passage through the slots.



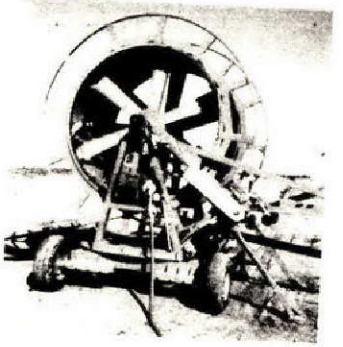
The hydraulic nature of the screen is particularly advantageous in wells that have a high yield but relatively small screen diameter. High flow capacity reduces well inlet resistance and allows for increased well life. Other slot configurations are available on request. *Circle No. 4*

Hard hose travellers

Irridelco Corporation has introduced it's new line of Hard Hose Travellers with capacities from 14m³/hr to 153m³/hr. The Hard Hose Travellers feature a lifting device for ease of transport, an easily removable revolving joint, high grade polyethelene hose, a v-shaped rectangular steel frame for greater structural strength, and an adjustable track two wheel gun trailer.

The heart of the Hard Hose Traveller is the "bellows" drive system. It operates via a rubber bellows which is filled with water under pressure from the main supply and emptied by means of a spring which compresses the bellows. Acting an an interface between the irrigation water used as the drive medium and the mechanical component of the drive linkage, the bellows offers a corrosion resistant, efficient and trouble free facility. Drum movement is via a track and pinion mechanism which assures consistent and uniform application of water with very little maintenance.

Circle No. 2



more on page 46

Passport to Productivity

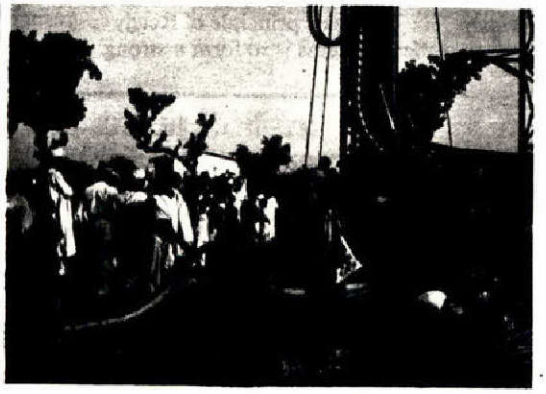
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08 BP 78
ABIDJAN 08
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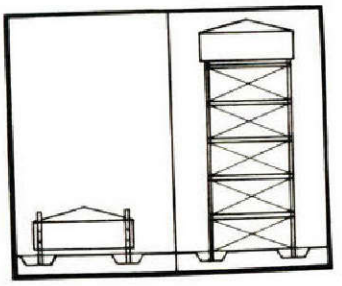
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Containerised treatment plant

Rural 20, from **Unit 20 Ltd.**, is a complete water treatment plant incorporating the processes of flocculation, settlement and filtration to provide drinkable water.

Being standard container size, the Rural 20 lends itself to modular installation. It is a low technology plant relying on the



use of natural hydraulics; the diesel or electric pumps being the only two moving parts.

Rural 20 can be used wherever there is a suitable water source, for example, rivers, streams, ponds, lakes. It can be a permanent or temporary installation. It is largely preassembled by the makers, so getting it on stream can be done quickly, usually requiring only the setting up of the suction hose, pumps, chemical equipment and storage tower. No special vehicles are necessary for transportation.

The unit has its own jacking system for unloading on toi a suitable firm standing. Concrete is not essential. The Rural 20 Tower too is easily transported. It is also off loaded by means of Rural 20's jacking system; cranes or other lifting equipment are not necessary.

However, lifting tackle is supplied to raise the platform with the storage tank on.

Circle No. 5

Borehole pumps

The new **Lee Howl** borehole pumps feature a pump bowl normally made of cast-iron or Ni-resist but other materials and special coatings are used when necessary.

Open vane, mixed-flow impellers are used which can be adjusted from the surface to vary flow rates, or to correct for wear, or to reduce wear in silt-laden waters in new wells. Closed vane impellers are also available.

Spigots ensure accurate location of the column pipe and drive unit. Detachable stuffing box and neck bush allows for variation in sealing arrangements, there is a provision for collection of gland leakage, prelubrication tank, cooling and flushing water.

Circle No. 8

Sectional tank

The Pressed Steel Sectional Tank manufactured by the **Horseley Bridge** unit of NEI Thompson Ltd., is a means of providing bulk storage of water and other liquid materials.

Consisting of a basic one metre square bolted plate with stays and cleats, the sectional tank can be constructed to provide storage from 200 to over 1,000,000 gallons.

Components can be manhandled into a restricted tank room at the top of a building and assembled there, or lifted by simple means to the top of a structural tower to provide elevated storage, or built on the ground.

The tank can be extended, reduced in size or taken down and re-used elsewhere.

Circle No. 9

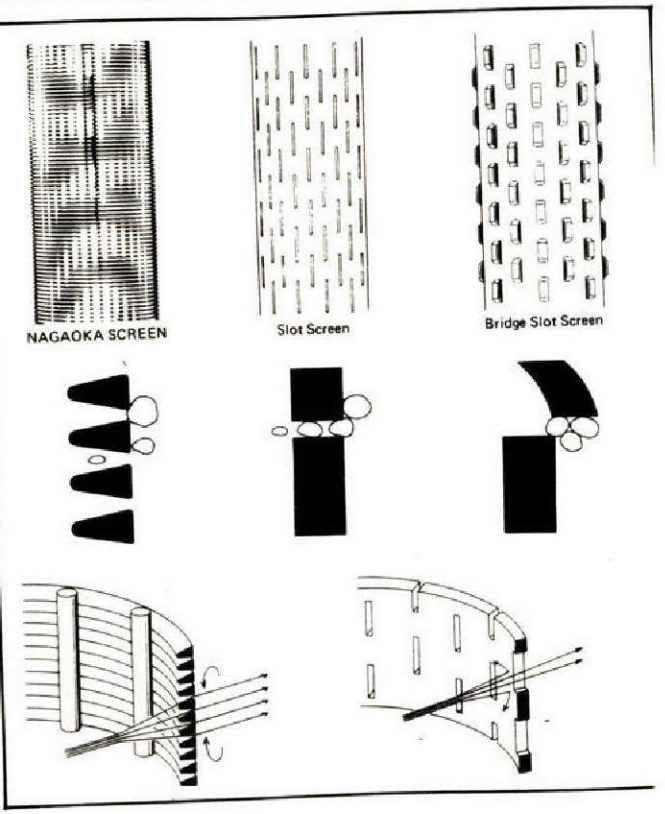
Project training

Training is always viewed as a very important part of work done in developing countries by **Groundwater Developments Consultants International**. One of the major aims of all their water supply projects – such as supply and sanitation – has been to create a cadre of skilled local staff, who could carry on with the operation and maintenance of any on-going scheme and also undertake new projects of the same kind.

The usual approach is to use on-the-job training, formal lectures and explanatory talks by project staff, and academic training. Groundwater Development Consultants have also had counterpart technical staff working temporarily at their Head Office in the UK and have organised visits to on-going projects in different countries.

They offer training in all fields associated with water supply and sanitation, but in recent years they have become increasingly involved in groundwater development projects where the main objective has been counterpart self training.

Circle No. 6



Multi-purpose drilling rig

The **Hydreq Javelin** is a patented design multi-purpose top head drive drilling rig. The Javelin is capable of being builtup in modular form so it may be used in various configurations to suit site requirements.

For the purpose of manhandling or helicopter transportation into remote inaccessible sites, the Javelin can be supplied in small lightweight packages ready for assembly into a multipurpose top head drive rig. The Javelin can be built on to any one of a large range of carrying vehicles and if required, specialist Ancillary Drilling Plant can be incorporated, thus producing tailor-made equipment.

The rotary head comes in three sizes, all with variable speed control and are supplied with an air/water swivel.

Circle No. 7

Well screen

The **Nagaoka** well screen has a continuous V-shaped slot and the area of the opening is very large so that the construction is suitable where particles make contact at two points.

The in-flow resistance is low and the screen allows a large quantity of water to be easily obtained. The opening area percentage is 20-50 per cent as opposed to ten per cent by s screens and 30 per cent by bridge slot screen.

With the V-shaped sl clogging is avoided and sn particles are pulled in to well.

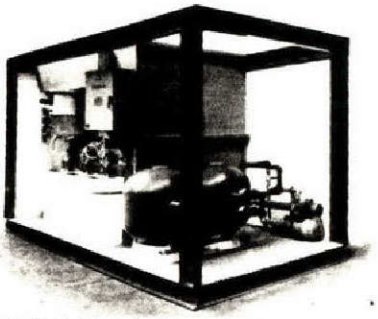
The screen consists o wedge wire and support r with all points of con welded. *Circle No*

more on pag

WATER

- DRINKING WATER PLANTS
  PACKAGED UNITS

Wanson



POTABLOC C 6 – 6m³ per hour

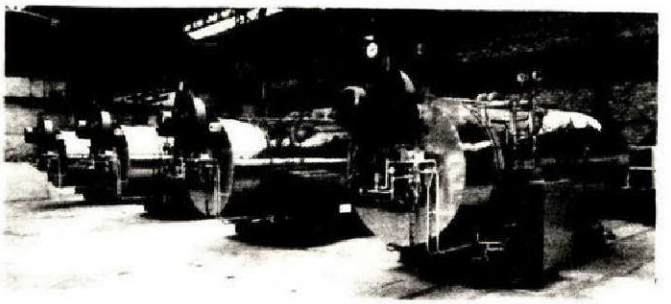
2 to 50 cubic metres per hour (larger capacities also available)

- INDUSTRIAL WATER TREATMENTS
  - Softening
  - Filtration
  - Deironization
  - Reverse osmosis
  - Deionization
  - Sewage treatment

STEAM

- STEAMBLOC BOILERS
  fire tube type
- VAPORAX BOILERS
  coil type
- Other activities
  THERMOPAC hot oil boilers
  EXTRAC economisers

4 STEAMBLOC boilers – 3 t/h



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Circle No. 291 on enquiry card

Water Storage is our Business

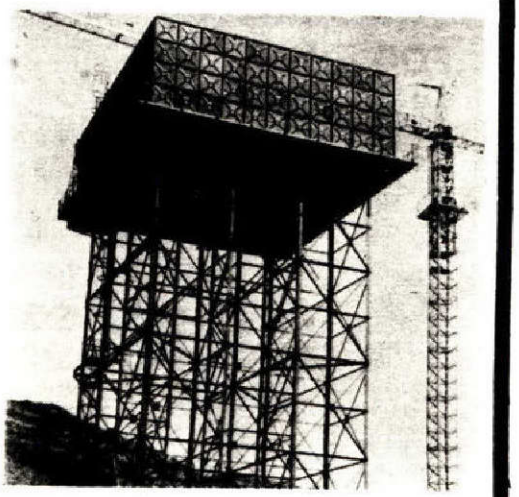


Our experience of exporting to West Africa extends over many years and the success of our pressed steel sectional tanks is due to several factors including ease of transportation and simplicity of erection using local labour. Capacities are practically limitless commencing at 200 gallons.

Our welded storage tanks are supplied prefabricated for site erection with a capacity range commencing at 150,000 gallons up to 1¼ million gallons.
Technical Literature is available on request.

Sole Agents and Distributors:
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Tel: 834027-834439
Telex: 21438 Senafr NG

North: 134 Murtala Mohammed Way,
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Hors ley Bridg

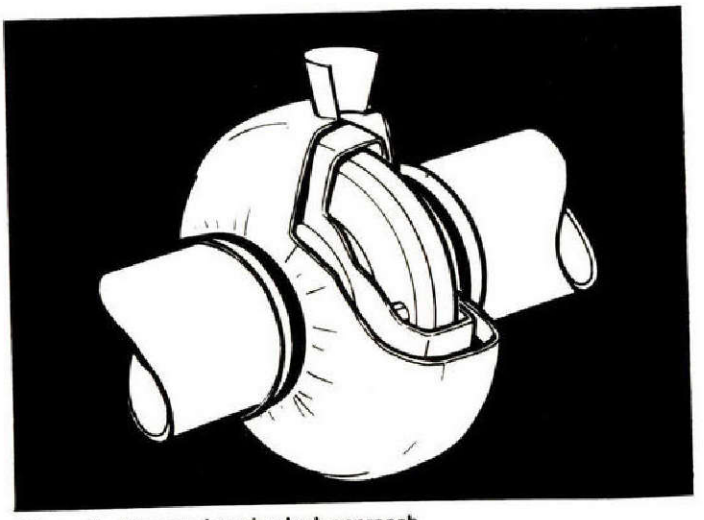
NEI

Leak repairs

ReadySeal Ltd. came into being to manufacture and supply the ReadySeal system for external repair of leaking gas pipeline joints.

The ReadySeal Multikit has been developed for leaking water (and other liquids) at pressures up to six Bar and has been tested at 10 Bar for six months without failure. It is designed for repair of moderate leaks without interruption of the flow of water but can also be used for severe leaks when reduction in water pressure can be tolerated.

As with all ReadySeal systems, the Multikit is provided with all the items needed to complete a repair apart from usual excavation equipment and the like.



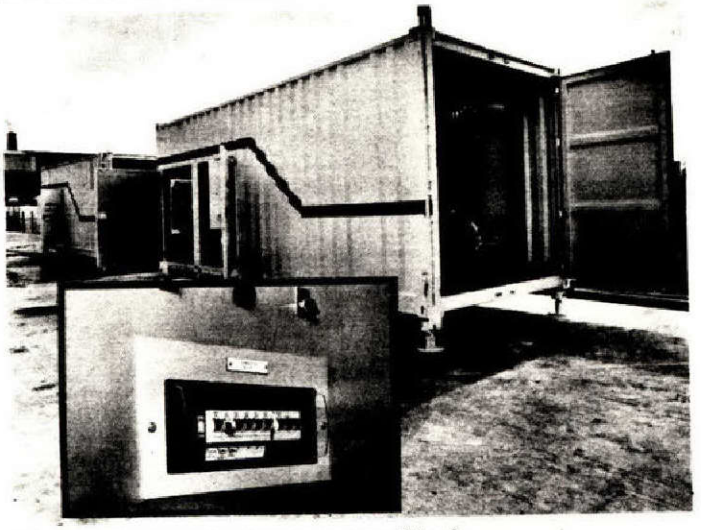
Above: liquids carrying pipe leak approach.

The basic principle of ReadySeal systems is to form a strong envelope of resin-impregnated felt around the leaking pipe installation and compacting it with an elastic film.

When the resin has hardened and become strongly bonded onto the adjoining pipes a plug is fitted into the vent socket to complete the repair.

Resin is applied only in the thickness required at the place required. It is not wasted in filling all the various concavities of an installation as occurs with a pressurised moulding system. Large pipe movements can be safely accommodated because the resin is applied to form a bellows type of convolution and the resin is intrinsically flexible.

Circle No. 11



Above: Wylex modular plant en route to Nigeria.

Water treatment plants

Wylex Electrical Products installed in three containerised modular water treatment plants are now en route to Nigeria.

When Stockport based Capstead Controls Limited was contracted to design and manufacture the plants in twelve weeks – they selected Wylex miniature circuit breakers (mcbs) and consumer units for the protection of each plant's lighting and air conditioning systems and motor starters. This second application is typical of one where Capstead Controls have found that standard Wylex 'KHB' type triple pole mcbs perform with a high degree of reliability.

Fifteen mcbs have been used for motor control and the plant's comprehensive protection is assured by a nine way "NN" consumer unit, flush-mounted with a protective perspex cover in the main control panel.

The totally self-contained plants are equipped with their own diesel generators, pumps and pressure vessels. Readily transportable, they are designed to be set to work in a matter of hours to produce clean drinking water at the rate of 500,000 litres per day from rivers, boreholes, or springs – thus helping to combat the water borne diseases, for example, cholera, yellow fever, often rife in the remote bush lands.

The Wylex range of electrical products is manufactured by **George H Scholes** at Wythenshawe, Manchester.

Circle No. 12

Treatment and desalination

Over the last 20 years **Paterson Candy International** have undertaken several hundred contracts for potable water treatment plant in Nigeria. Resident staff continue to build upon PCI's experience and reputation in the territory and offer advice on treatment plant design, operation and servicing – whether for city and village waterworks, major swimming pools or industrial abstraction schemes.

Turnkey schemes are undertaken, covering all aspects of process, chemical, civil mechanical, hydraulic and electrical engineering. Additionally PCI offers techniques based on the Deep Shaft Process for the treatment of waste waters, and major plant for the desalination of sea and brackish waters by reverse osmosis.

Circle No. 1

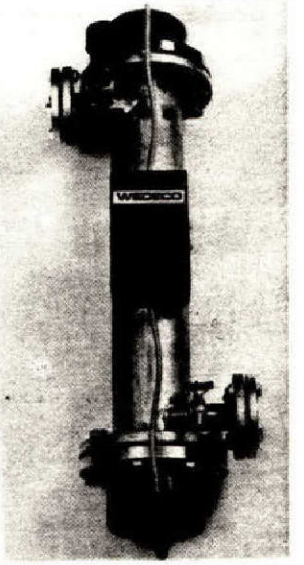
Uv purification systems

The units in the Series B range of **Wedeco** purification systems are applicable for flow rates up to 150m³/h. The appropriate model size is determined by the flow rate as well as by the required effect in the purification process.

The special feature of these uv-reactors is the use of germicidal flatlamps. Low pressure mercury flatlamps are of flat-oval cross section with an increased surface-to-volume ration in comparison to classical cylindrical lamps. Therefore, a higher electrical load can be applied, resulting in a considerable higher uv-radiation flux as achievable with conventional uv-lamps.

The design incorporates: stainless steel reactor-chamber with quartz jackets and uv-flat-lamps; uv-sensor; in-and outlet with multifunction valves for draining, ventilating, cleaning and sampling; terminal box with starters. The uv-reactors are mounted directly into the pressure line. The control cabinet is mounted separately.

Circle No. 1

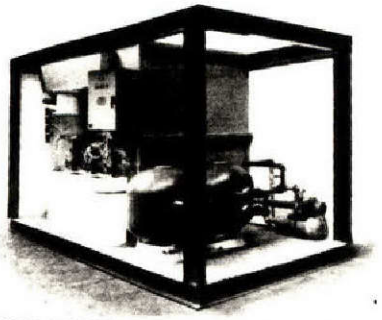


WATER

- **DRINKING WATER PLANTS PACKAGED UNITS**

Wanson

2 to 50 cubic metres per hour (larger capacities also available)



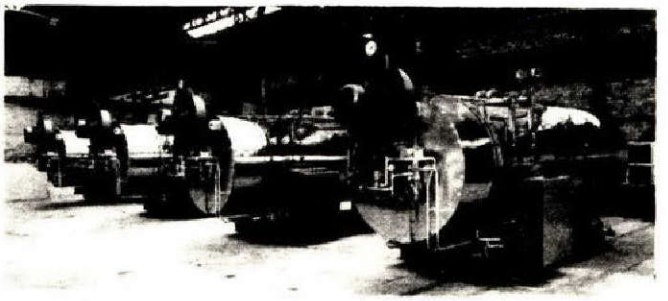
POTABLOC C 6 – 6m³ per hour

- **INDUSTRIAL WATER TREATMENTS**
  - Softening
  - Filtration
  - Deironization
  - Reverse osmosis
  - Deionization
  - Sewage treatment

STEAM

- **STEAMBLOC BOILERS fire tube type**
- **VAPORAX BOILERS coil type**
- **Other activities THERMOPAC hot oil boilers EXTRAC economisers**

4 STEAMBLOC boilers – 3 t/h



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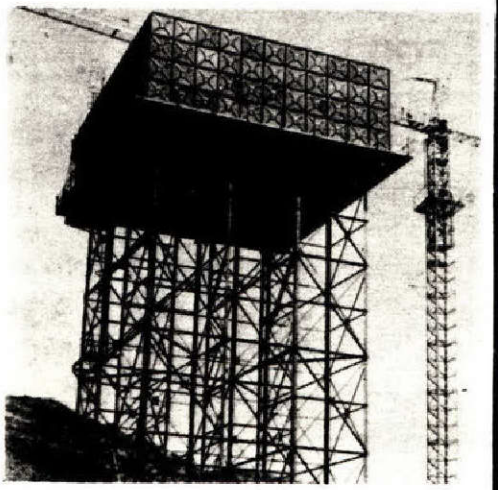


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Tel: 3853, 3854 and 7546



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P.O. Box 5, Horseley Road,
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DY4 7LY, England.
Telephone: 021-557 1104
Telex: 337359

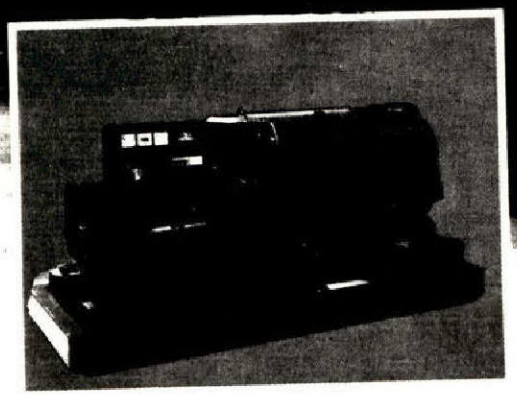
Hors ley Bridg

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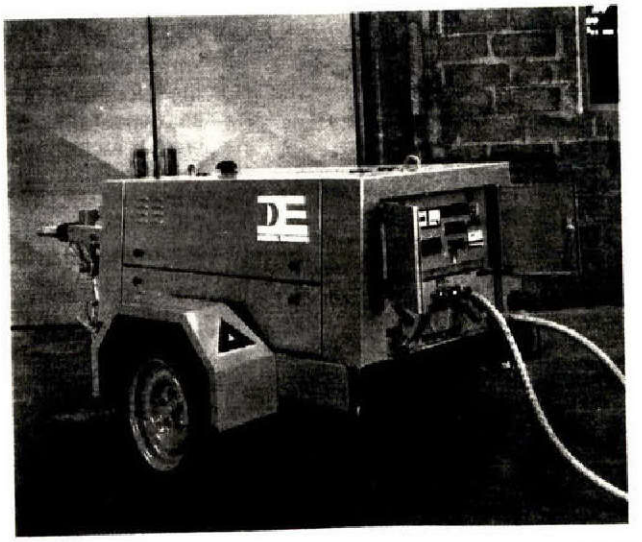
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We would like to receive, without obligation, your complete documentation regarding

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- water epurator mobile unit ☐

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Water tanks

Bridgestone Panel Type Water Tanks are made of glass fibre reinforced plastic (GRP), a material 40 per cent lighter than aluminium and stronger than steel.

The panels are free from the growth of bacteria and the accumulation of algae, enabling clean drinking water to be stored.

The convex panels are designed so that any increase in water pressure is distributed to the joined borders of the panels. The joined borders are sealed with a special rubber sealant, eliminating the possibility of disengagement of the panels.

The bottom of the water tank is a combination of the convex panels and collecting panels assembled so that no water remains in the tank after drainage.

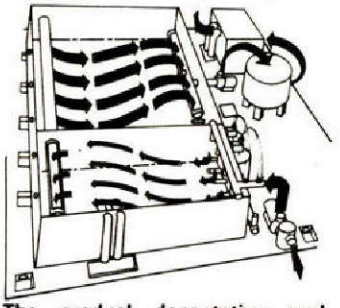
For the connection of pipes without the need for an angled flange, Bridgestone has developed a panel with a level surface so that a pipe can be connected directly at a right angle.

It is possible to assemble tanks of any desired capacity, from 220 gallons for home use to 66,000 gallons for commercial use. Larger tanks are possible. When necessary, a supervisor is dispatched for consultation during installation.

Circle No. 38

Potabilisers

Culligan Vertical Sauvegarde pack-systems are compact operators. The water passing through undergoes the complete range of potabilising processes: aeration, pre-chlorination, flocculations, decantation, filtration, (post-chlorination and neutralisation optional).



The gradual decantation and clarification process of raw water.

The company also makes horizontal sauvegardes designed to potabilise surface water from lakes, rivers or wells naturally polluted by biological impurity, organic matter and turbidity in general. The module concept of the decantation and clarification tank enable installation anywhere. There are four different models differing only in dimensions and capacity.

Culligan also specialise in vertical pressure water filters. The design of the Hi-Flo 6, for instance, provides for the maximum possible quantity of filtered water with the minimum possible consumption of water for backwash.

Circle No. 41

Drilling rigs

One TH-100 and three TH-60 truck mounted drilling rigs from **Ingersoll-Rand** were used for a water resource exploration and exploitation in Mauritania.

The TH-100 generally drills holes of 152mm finished diameter to depths of 700m. Mounted on an all-wheel drive 6-wheel carrier truck it is equipped with an HL-600 compressor to deliver 17m³/min air at 17.2 bar. For mud flushing of the deep holes it has a 5x8 pump on board and a similar skid-mounted pump in support.

The three TH-60 rigs are drilling 203mm finished diameter water wells to depths of 110 to 150m using DHD and rotary methods with air and mud flushing as appropriate.

Mounted on all-wheel drive 6-wheel carrier trucks, the units are equipped with the same compressors as the TH-100 and smaller 5×6 piston mud pumps.

The TH-60 was also used for drilling wells for village water supply in Ethiopia and for rural domestic water in Somalia.

Circle No. 39

Valves and fittings

Valves and fittings for drinking water and waste water systems from the **MAW-Kombinat** are being tried and tested every day in various industrial centres worldwide. The valves concerned are mainly plug and shut-off valves and are frequently exported to Africa.

Some foreign contracting firms are manufacturing their versions with additional functions by taking MAW-Kombinat's fittings and basis.

Circle No. 40

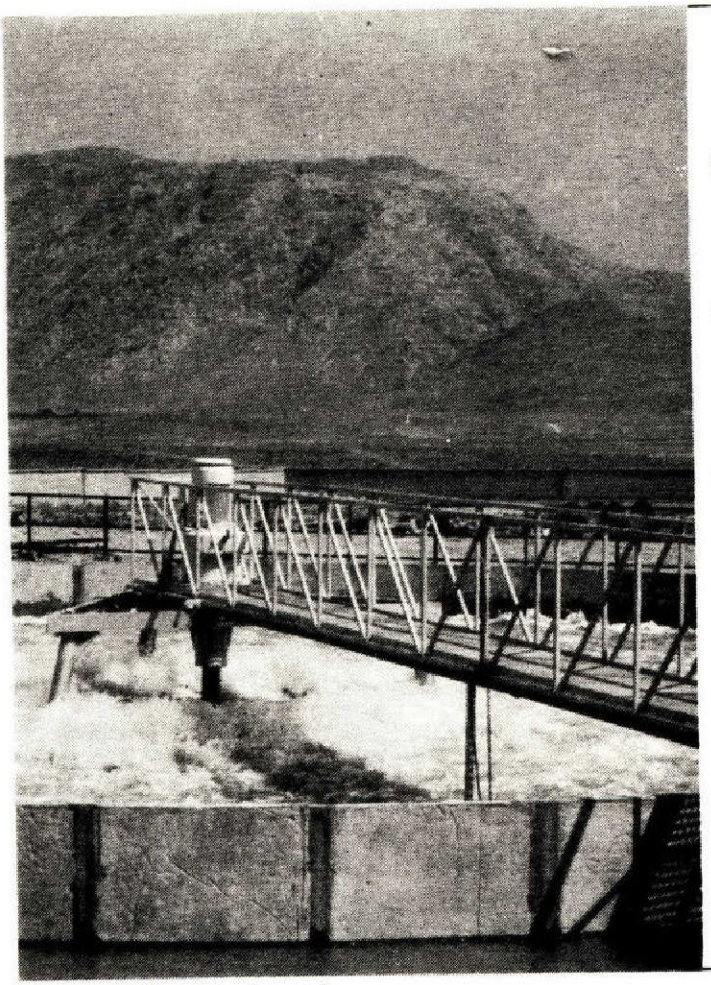
Biwater brings water treatment to developing countries

1983

The tower not only supports half a days storage but contains the water treatment plant in a prefabricated structure. Biwater Treatment Limited also designs, constructs and commissions many other types of drinking water treatment plants throughout the world.



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- **Complete turn-key services for water supply systems and sewage treatment schemes.**
- **Operation, maintenance and staff training services.**

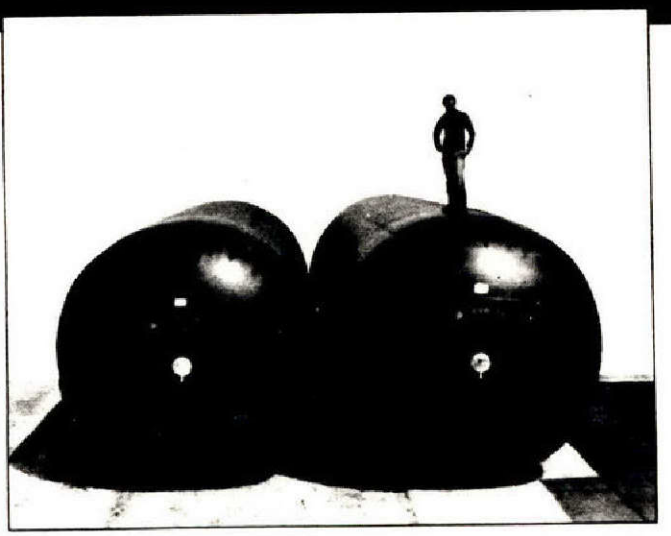
SNT-Standard Sewage Treatment Plant erected for a Dairy in Isfahan, Iran. Capacity: 8,000 person equivalents. Commissioned in 1978.
The SNT-plant is developped by Scanwater. Suited for treatment of both domestic and many types of industrial wastewater.

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Well drilling – a potted history

THERE IS LITTLE DOUBT that municipal and rural water supply in most countries on the continent has been a project slow to progress in recent years. The reasons to which this protraction may be attributed basically stem from lack of funds and in training drilling personnel to operate the more modern, sophisticated equipment which is now available.

The percussion method was the first to be adopted for water well drilling. The subsequent three decades saw the steady introduction of rotary drilling, initially using rigs of simple design escalating to the employment of the current complex top drive units which necessitate considerable maintenance in areas where back-up facilities are not always readily available.

Although British and United States armies used both percussion and rotary rigs for water protection on military bases and emergency air strips during the Second World War, the post-war years yielded slow development. As a point of interest, the first Failing rig was moved into Zimbabwe during 1947 for Cementation Limited, a rig that is still operating albeit in Zambia on cores in a copper mine.

Extensive use

The importation of water drills began to increase during the early fifties assisted by the aid of the area governments. A few mineral exploration rigs, originally manufactured by Craelius and Boyles were diverted from exploration to small borehole constructions in Nigeria. Two Failing rotary rigs were supplied to PWD in Ghana and used extensively in the south between Takaridi and Ada. Nigeria was the next country to receive more rotary water well rigs and the importation of these commenced during the mid-fifties. As far as North Africa was concerned, a large number of shot hole rigs were imported by various geophysical companies and as their respective contracts expired, these rotary rigs were sold to local contractors for use on small borehole construction.

Hard formation in East Africa caused considerable problems for anything other than either extremely strong percussion rigs or hammers. The development of hammer drilling for water wells was therefore expensive and took much longer to be accepted as an economical operation by comparison with the former percussion type.

Each country, as it gained independence, initiated its own water drilling operations and in the early stages these proved to be adequate as long as the funds to operate the rigs were available. Inevitably funds dwindled in the majority of these countries and the cost of employing skilled personnel to operate the equipment became prohibitive. With the advent of the energy crisis, more money became available for the development of water wells especially in countries such as Nigeria, Algeria, Libya. These water wells had several purposes to fulfil. Firstly, of course, they were to supplement the water requirements for oil production rigs. Then, as funds became more readily available both municipal and domestic water needs were developed.

More complex methods

The advent of more complex drilling methods and equipment became commonplace. Straight forward mud circulation was superceded by air drilling and then foam drilling. The development of each of these new systems in no way eliminated the previous system any more than percussion rigs were eliminated by rotary rigs. Each



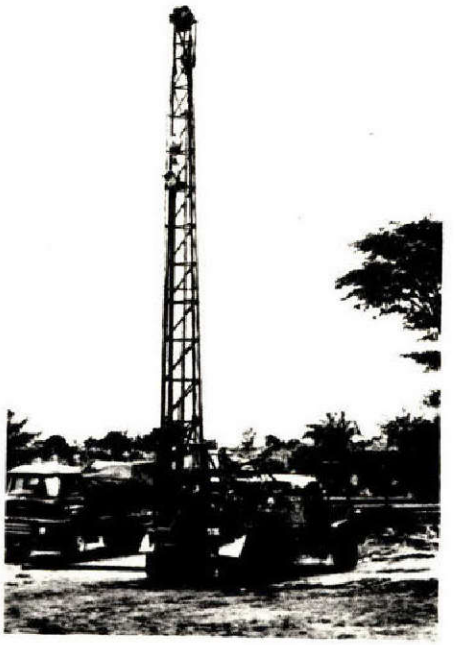
There is a need for the original type of drilling equipment.

was fully justified according to application. Both percussion and rotary rigs now successfully find applications in Nigeria. In East Africa, where the drilling requirement is different, the presence of the diamond drilling rig continues to dominate and in recent years, more top drive rigs rather than mechanical drive rigs have been introduced to that part of the continent.

As outlined, there are many problems for the rig operator and one that is not always reviewed by the manufacturers is the difficulty of moving heavy rigs in rural areas. The operator's main criteria for selecting a rig should be two-fold: the rig should be as lightweight as possible yet still be capable of operating within the capacities for which the contractor is interested or committed. All too often bridges are totally incapable of withstanding heavy rigs, major detours sometimes result to skirt villages and small towns through which these heavy units cannot pass. A further restricting factor, especially when operating complicated rigs, is obtaining skilled personnel. This applies basically to the lack of experienced drillers but also to securing people sufficiently qualified the equipment once it is put on-site.

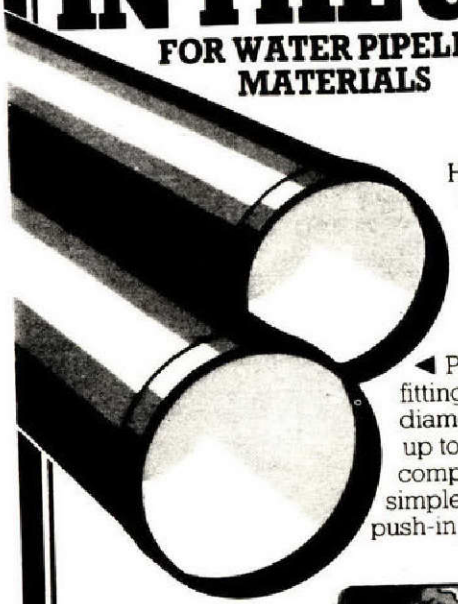
In conclusion, there is a requirement for the original type of drilling equipment used on the continent. The applications are comparatively simple and, in certain cases, advantageous for the speed of drilling under difficult conditions. Equally situations demand more sophisticated rotary hammer drilling equipment; one of the basic problems is, complexity means additional weight and less manoeuverability. To re-establish a healthy progression in ground water production more attention must be paid to a correlation of all contributing factors. Simply, it's not just a question of 'horses for courses', how the horse gets to the course and its subsequent subsistence is of equal importance. □

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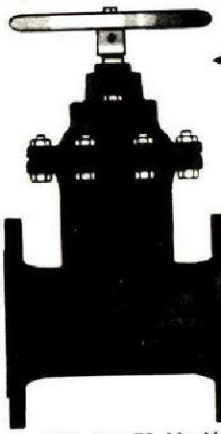


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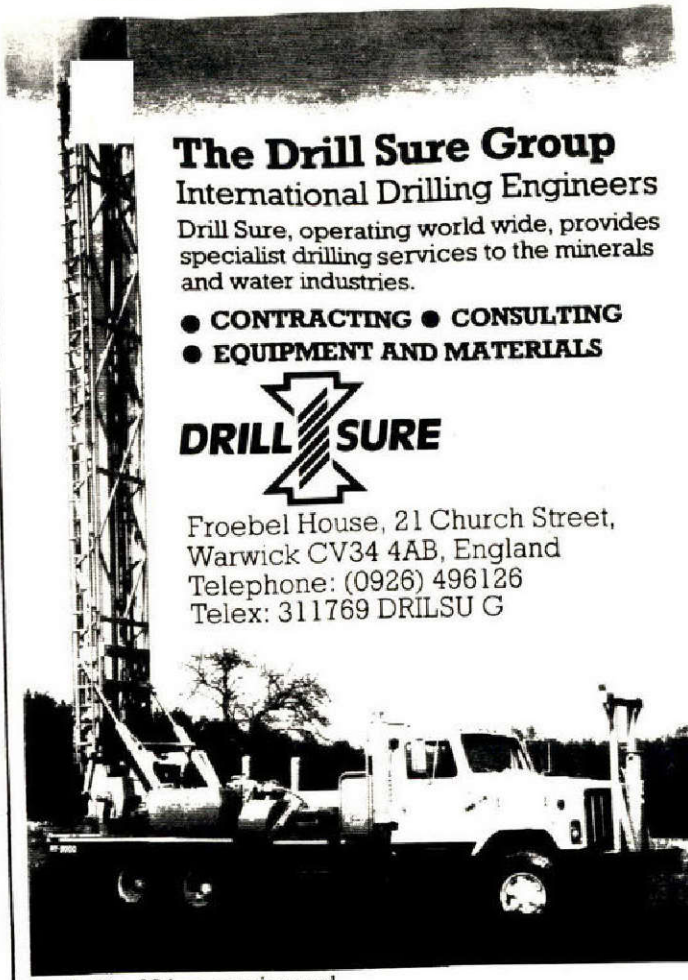
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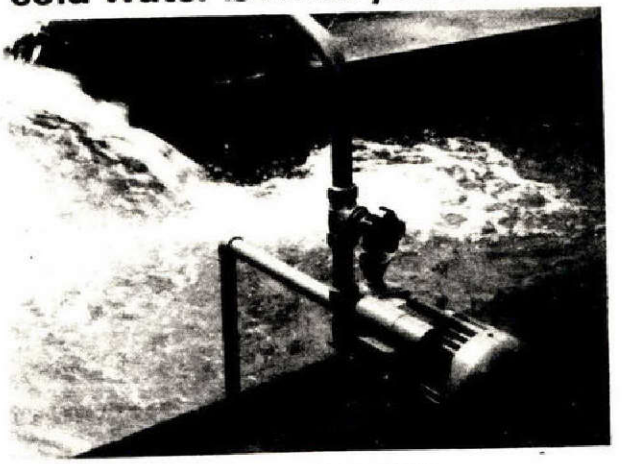
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Planning a dam

Where a material is unavailable locally, geographical and technical demands can force engineers to pioneer new techniques. This is what happened when a drainage filter had to be selected for the foot of the Goronyo dam, Nigeria.

WHEN BUILDING MAJOR civil engineering projects in large countries such as Nigeria, the great distances and the frequently large scale of the construction tasks require careful selection of building materials. Where a certain material is not available locally in sufficient quantities, both geography and technical requirements often compel engineers to pioneer new techniques. However, when doing this, they have to be absolutely certain that the methods and materials they recommend will guarantee long-term reliable service and do indeed represent the optimal solution to the problem involved.

Such were the premises that led to the use of a horizontal filter layer of Du Pont's "Typer" spunbounded polypropylene in connection with the drainage of the downstream toe of Nigeria's 7,000 m long Goronyo earthfill dam.

Modest draught

The Sokoto-Rima Basin irrigation dam, which will be completed in 1984, will store up to one billion cubic metres of water from a 200,000 km² water-shed area in a 190 sq.km reservoir with a maximum storage level of slightly over 10 metres. Because of its modest draught the Nigerian Ministry of Water Resources, contractors Impresit Bakolori (Nigeria) Ltd. and their engineering consultants, C. Lotti & Associati of Rome (Italy), opted for a dam built of homogeneous silty sand with good mechanical properties and a high degree of impermeability. The earthfill construction is founded on a layer of impervious alluvial clay and sheathed with a protective bituminous coating on its upstream flank to prevent erosion by surface waves.

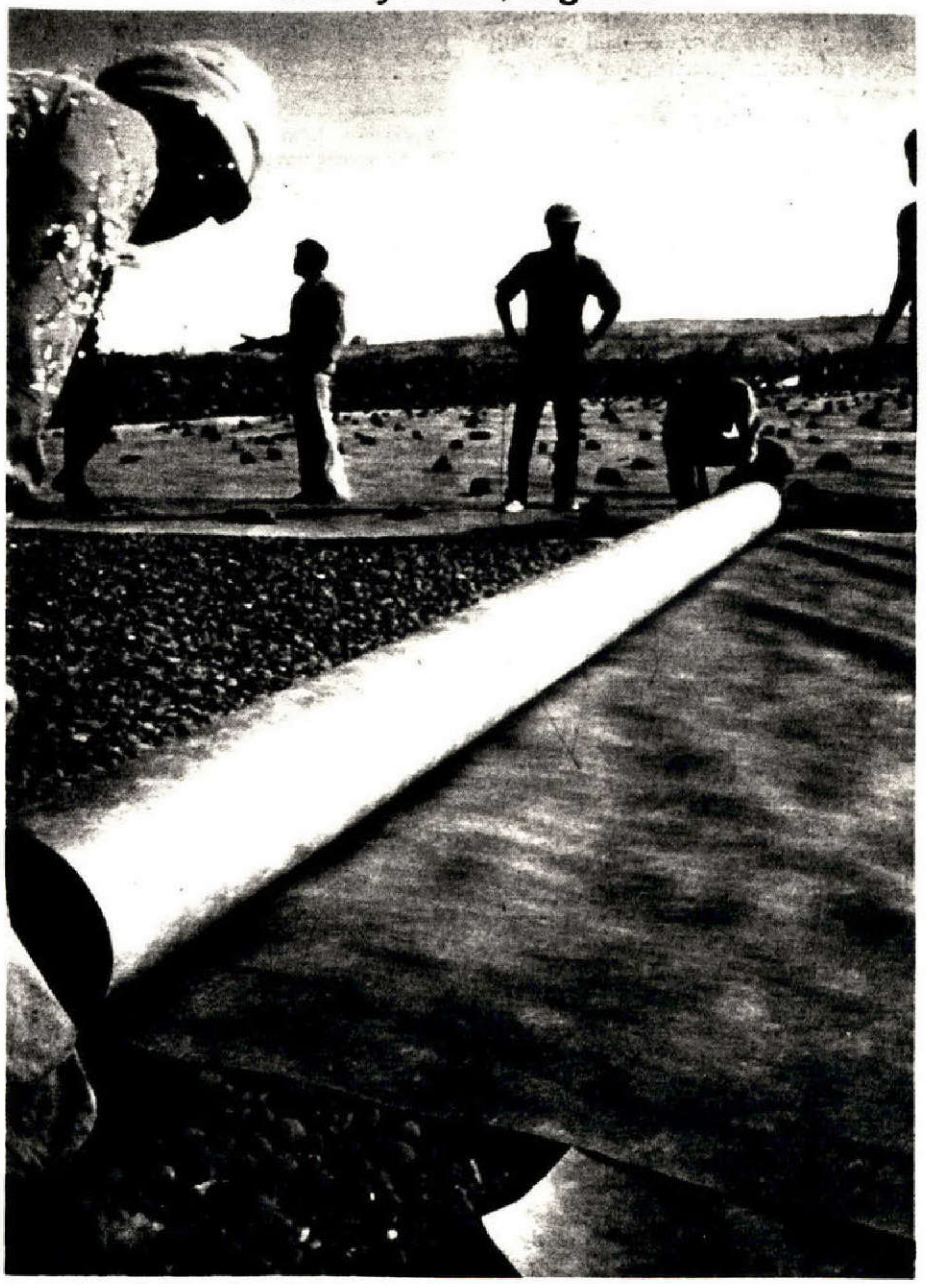
A horizontal blanket filter-drain was recommended at foundation level along the downstream toe of the earthfill dam to regulate filtration across the dam and lower the saturation level. It had originally been planned as a dualstrata construction consisting of a filter material, because its proper functioning would be crucial to the dam's long-term reliability.

Soil variations

In the course of these scientific tests, it was ascertained that whereas the six million cubic metres of sand, silt and clay constituting the dam fill did comply with the builders' mechanical standards as well as those relating to imperviousness, they did present variations in their granulometric characteristics – which is avoidable in such a large mass of material – and in particular, could at places contain a large amount (some 30 per cent) of fines smaller than the ASTM 200 sieve grading (0.074 mm).

It was therefore essential to specify a filter material for the Goronyo dam's downstream blanket-drain that would permit water to flow freely from the adjacent soil while at the same time preventing soil migration into the drain-fill aggregate, because piping would ultimately block the drain and build up hydrostatic pressure. The impossibility to obtain locally the required 70,000 m³ of such high-quality sand led the consultants to discard the original sand-filter concept; instead they recommend using a synthetic filter, arguing that it would not be possible to find any natural substance capable of coping with the large dam granulometric variations

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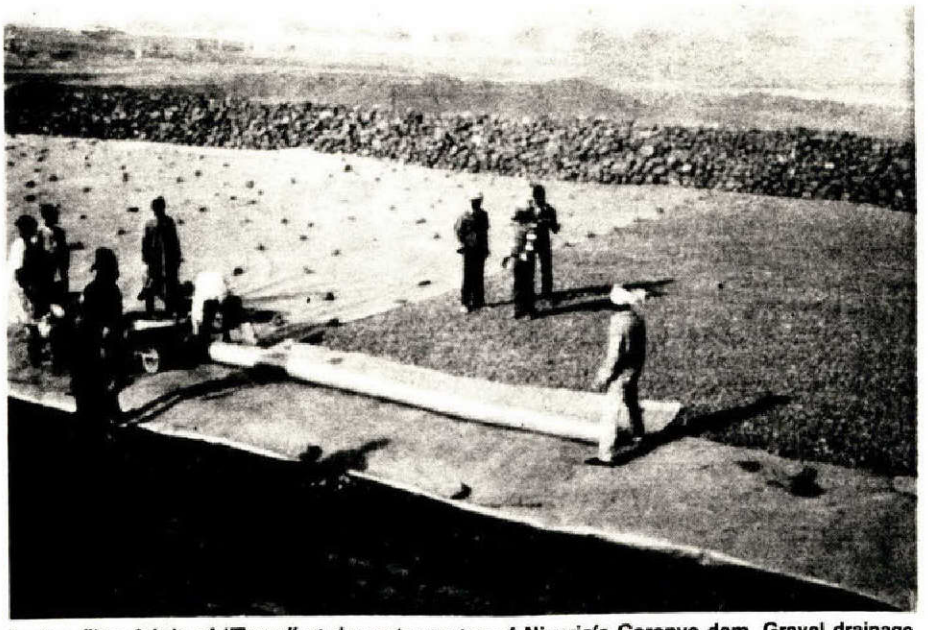
Laying "Typar" was facilitated by the light-weight and handy roll size of the material.

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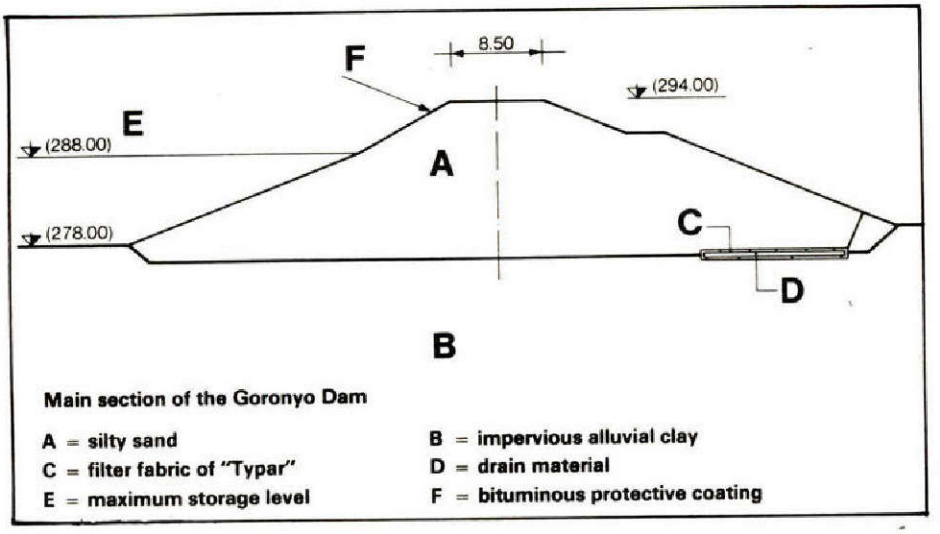
encountered along the dam.

Just as the sand originally foreseen as filter-material, the required synthetic material has to be highly permeable to water and just as reliably prevent clogging of the drainfill. But because of the large amount of fines, it also has to effectively resist being silted up. In addition, its original permeability should be retained, even when compressed by up to 13 metres of construction material averaging 1.9 t/m^3. These were major considerations in the comparative tests conducted on various geotextiles by the Lotti company's engineers together with leading Italian experts. They not only conducted the usual tests for measuring the physical, rheologic and permeability characteristics of the fabrics, but undertook direct performance tests using the type of soil actually employed for the construction of the embankment.

The tests are described in detail in a report by Ing. Vittorio Castagnetta, Development and Quality Control Manager for Bituminous Products at Industria Italiana Petroli (which belongs to the ENI group), and member of the Material's Sub-Committee on the Italian Large Dams Committee as well as member of the Italian National Research Council's work-group on geotextiles. The co-authors of the report are Ing. Giorgio Cesari of the Lotti company and Ing. Mario Puccio, manager of the Special Materials Division of the Hydraulic and Structural Research Centre of the ENEL, and also a member of the Large Dams Committee's expert group on Materials and consultant to the National Research Council's goetextiles work-group.



Laying filter fabric of "Typar" at downstream toe of Nigeria's Goronyo dam. Gravel drainage layer is visible underneath filter.



Main section of the Goronyo Dam

A = silty sand
B = impervious alluvial clay
C = filter fabric of "Typar"
D = drain material
E = maximum storage level
F = bituminous protective coating

Fabrics tested

The four fabrics tested were a 270g/m^2 continuous-filament polyester needled fabric, two needled polyester fabrics – one continuous-filament and one staple-fibre type – weighing 300g/m^2 and a 270g/m^2 fabric of "Typar" spunbound polypropylene.

"Typar" is a non-woven fabric of 100 per cent polypropylene manufactured by a special process in which continuous filaments are spun and heat-bonded in an integrated operation without any extraneous binders. Unlike woven fabrics which have few openings of a fixed size, it features a large number of openings with a whole range of sizes. In addition, its bonded structure creates a tortuous pathway that resembles a well graded aggregate filter. This fibre configuration ensures high permeability to water and the ability to restrain soils, while initially allowing the very fine silts to flow in and out of the fabric without it getting clogged. As a result, the larger particles form a graded soil filter outside the fabric of "Typar", restricting further migration of fines. Because the fabric is more permeable than the naturally formed soil filter, it does not restrain water flow and thus prevents long-term hydrostatic pressure build-up. Its high tensile strength, tear, and puncture resistance hinder contamination of the aggregate.

The effectiveness of "Typar" as a filter fabric had been confirmed previously by extensive laboratory tests at the Colorado State University Engineering Research Center, using systems containing the Du Pont spunbound material with soil mixtures of fine sand, silts and clays to stimulate actual drainage constructions. Under these conditions, the tests confirmed that, after the initial passage of fine silts through the fabric, there was no measurable migration of soil fines within the soil or into the fabric. Also there was no measurable pressure drop across the fabric of "Typar", which means that there was no reduction of water flow through the fabric. Scanning electron microscopy confirmed that there was no clogging of the fabric.

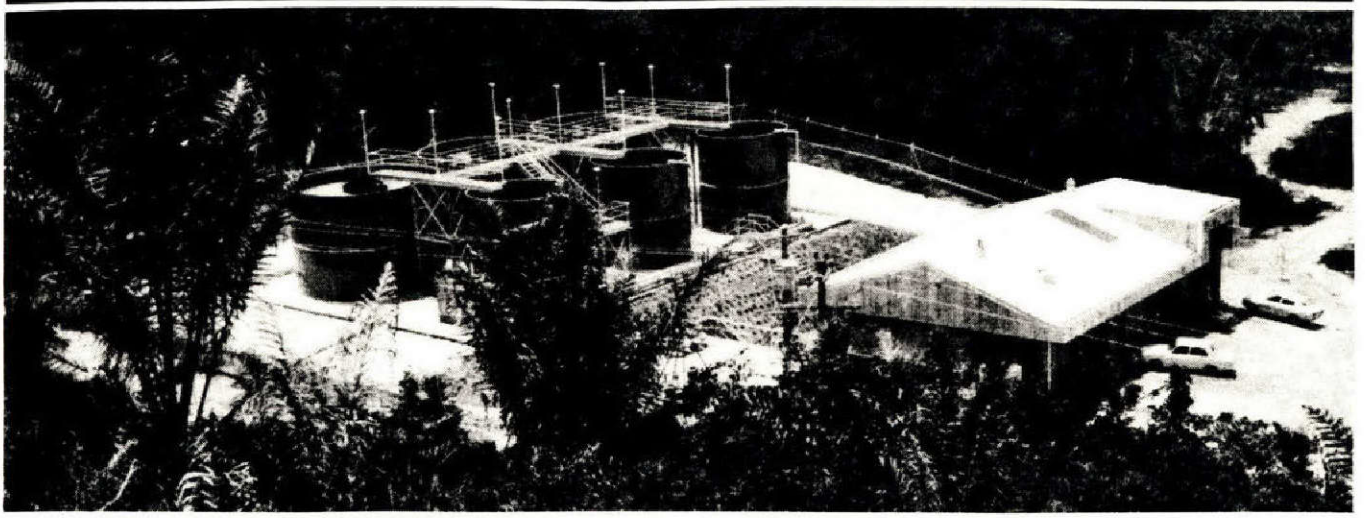
Successful solution

These advantages of the spunbound polypropylene fabric were confirmed by the tests undertaken in Italy. As a result, some 310,000m^2 of Du Pont's "Typar" spunbound polypropylene were specified to form an envelope completely surrounding the 30 cm thick Goronyo dam foundation drain, which has a total surface of 110,000 md^2. A first layer of 270 g/m^2 polypropylene fabric was laid directly on the dam's impervious clay foundation and temporarily held down by large stones. After the six to 50 mm quartz drainage gravel was put into place, the drain was wrapped up in "Typar" on its sides and top and finally covered by the dam's earthfill. "Typar" is resistant to rot, mildew, insects and naturally occurring acids and alkalis.

According to the contractors, Impresit Bakolori (Nigeria) Ltd., the sheets of "Typar" were laid at the rate of 1500 sq.m a day from the inside of the dam outward with a 50 cm overlap.

The Lotti company's engineers could further base their decision to use a filter of "Typar" on the success achieved with spunbound polypropylene under similar conditions at the Pitsanulok Dam on the River Nan in Thailand. There, the horizontal filter layer laid at the foot of a dam built with a silty and clay-rich earth was functioning satisfactorily a year after the reservoir had been filled and no problems had shown up.

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Priorities for investment

Assessing priorities for investment in water supply and sanitation is a problem regularly faced by the governments of developing countries. In a speech at World Water '83, The International Water and Sanitation congress, Conference and Exhibition, M. B. Grieveson of the Overseas Development Administration (UK) outlined the various options. We publish here the second half of his speech.

WATER, LIKE FOOD, is a basic human need – life cannot be sustained without it. Beyond this fundamental requirement the quantity and quality of the water, and the convenience with which it is provided, increase with the improvement desired in the quality of life. Convenience and utilisation will increase as the distance water has to be carried between the tap and the point of use decreases. Increases in quantity and quality available will improve hygiene and reduce disease. As more water is used then more has to be disposed of until a point is reached when disposal as well as supply services need to be provided if health hazards are to be avoided. The disposal of human body wastes is a similar problem and as gregarious man congregates in ever enlarging communities it becomes more difficult to get rid of waste material. In the urban situation in particular, with increasing quantities of water being used and large numbers of people living in close proximity often water borne disposal methods become the only practical options. Those therefore making the investment decisions must settle upon the standard of service they wish to provide in terms of quality and quantity, bearing in mind that as these increase the need for more complex and hence more expensive waste disposal systems will also increase and they must strike a balance between the two.

Complex issues

It is also often argued that the provision of improved water supply and sanitation facilities alone will not achieve much unless people are persuaded and taught to make better use of them. This is no simple task, involving as it does the need to change traditions, social and religious customs, simple fears, habits and preferences. The will and resources to undertake this work must also be marshalled in parallel with the execution of the technical operations if a lasting benefit is to be obtained from the improved infrastructure which is to be provided. The relationship between improved water supply, or sanitation, and disease is complex. In theory it ought to be possible to assess the need and set priorities by examination of the statistics of morbidity and mortality in different areas. In practice, meaningful statistics which can be used for this purpose are rarely available and subjective judgements have to be made.

One of the major decisions to be taken by governments in the so called Third World is the apportionment of development resources between the urban and the rural areas. The drift towards the towns continues bringing with it, amongst other problems, critical shortages of water and greatly increased health hazards in squatter and slum areas with inadequate sanitation facilities. The needs here are patently obvious for all to see, often at their most pressing in capital cities with their greatest political pressures tending to weight their priorities. An additional issue in urban areas is sometimes the fact that industrial demand and middle class residential areas with house connections rather than a public standpipe system can, if tariffs are properly structured, be geared to subsidise the services provided for those less able to pay for them or prepared to accept them at a lower standard.

In the rural situation however, things are very different. The poorest of the poor tend to remain in these areas often scattered over great distances making distribution costs high, but there is the need to improve the quality of rural life to cut down on the urban drift. To what extent then should the planners favour the rural schemes which can rarely produce a satisfactory financial or economic rate of return but where people, usually women, spend a considerable portion of their time carrying poor quality water over great distances to serve their families.

Economic benefits

It is sometimes argued, in favour of the rural systems, that time savings are an economic benefit but is this really true unless the time saved is devoted to some other economic activity? Rarely is it possible in a rural water supply to levy charges which are sufficient to cover even operation and maintenance costs. This is not just because the ability to pay is less in rural areas but also because, using conventional technology, unit costs tend to be higher with the greater problems of distribution and the smaller populations being served. Most towns do have a potable water supply of some sort – that is often why they become places of settlement in the first instance, but in many rural areas where the reasons for settlement were guided by different factors, what water there is often of poor quality and at a distance. There are no easy rules for settling the priorities between the two areas.

Appropriateness

The next factor to be considered is the appropriate technology to apply, which, in turn, is mainly governed by the standard of service which will be considered satisfactory and, also, by what can be afforded. The quantity and quality of the water resources in relation to the per capita demand and the health hazards are major issues here. Is the incremental cost of extra capacity or higher quality justified when weighed against the basic need of another location which would settle for lower standards if it could obtain a share of the limited development cake? What per

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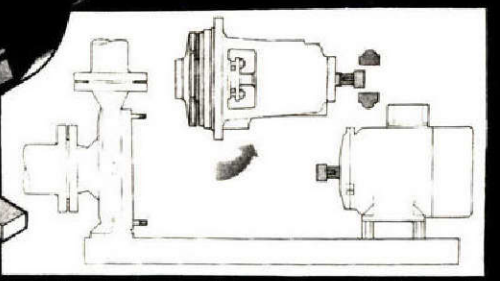
The Bakolori Dam, Nigeria, is an excellent example of multi-purpose investment: it's not only providing water for irrigation but also generating electricity.



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capita consumption figures should be planned for from standpipes or house connections? What quality of water should we be seeking bearing in mind that, as we set higher standards, then the more likely it is that we may be depriving others elsewhere of even the most rudimentary system?

Recent changes in thinking in relation to WHO water quality standards and development work carried out by a number of organisations in connection with lower cost systems for rural supplies are of considerable importance in this respect. The development of low cost boreholes, improved hand pumps and village level maintenance systems are going a long way to stretch limited resources so that they can cover more rural areas but is the same effort being put into trying to reduce development costs in the urban sector? In township supplies we still tend towards high cost storage, sophisticated treatment and extensive distribution networks. Is there room here for more innovative thinking?

Shortage of funds

The shortage of funds to meet recurrent costs and the lack of foreign exchange to buy spare parts are ever increasing problems for water undertakings in developing countries. Their revenue collection systems are often inefficient and their room for manoeuvre in increasing tariffs is frequently restricted. Sometimes they are overstaffed and a disproportionate amount of their limited money is devoted to the wage bill rather than maintenance and operational needs.

Governments and Treasuries restrict their ability to dispose of surplus (often unskilled) labour and at the same time set higher priorities on other sectors for the allocation of limited local financial resources. As a result an ever increasing number of water supply and sanitation systems are suffering from neglect of maintenance to the extent that many are now near the point of breakdown. Development funds are urgently needed for their rehabilitation, to carry out leak detection surveys and mains replacement programmes, to replace or repair worn out pumping and treatment plant, to re-equip and overhaul workshops and transport fleets. For this purpose they must compete with new works for the allocation of cash and thereby introduce one more factor into the priority assessment equations for the development decision-makers.

It frequently happens that the economic return from a rehabilitation scheme can be shown to be much higher than from a new system but the protection of past investment has to be balanced against the less easily quantified total benefit of providing a new service to people who have none. Aid agencies now more readily recognise the rehabilitation need and are prepared to give some priority to the allocation of resources for this purpose.

Management

The efficiency of operations in any water or sanitation undertaking is dependent upon the quality of its manpower and of its management environment. Whilst it is legitimate for outside authority to set down rules and guidelines for policy and objectives, unless management is allowed to manage without interference in day to day affairs little success can be expected.

High priority should therefore be given to setting the right environment with clear policies and objectives in which the management of the undertaking can operate. The need is then to ensure that the right manpower is available to undertake the task. This inevitably means that financial resources have to be allocated towards the development of the human resources within the institution, to train and improve the skills of those responsible for running the system.

Such training may take place outside of the organisation itself, some of it may be institutionalised within the organisation and a great deal of it needs to be on-the-job training particularly geared to middle management, technicians and tradesmen. The best development schemes are those which contain a training element and the training of trainers is particularly important for its multiplication effect. In the implementation of rural schemes there is a growing use of the self help principle and aid donors in particular are tending to favour projects with varying degrees of community participation. This does not decrease the dependence upon effective water organisations. If anything it calls for even greater degrees of organisational ability to get programmes moving, to motivate the local people and to run effective maintenance systems. This in turn increases the training needs within the executing agency and also for the training of the village workers themselves.

Assessing priorities

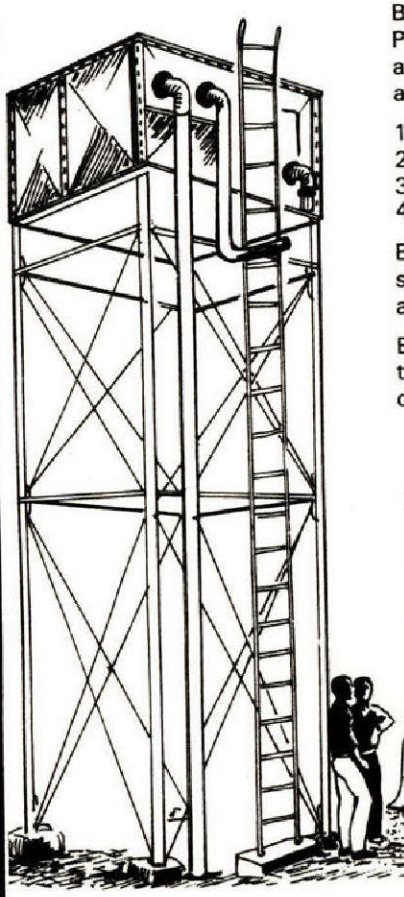
How then can priorities be assessed for investment in water supply and sanitation in developing countries? It must generally be concluded that a traditional economic cost benefit analysis cannot be appropriate in deciding between the water supply and any other sectors. Too many unquantifiable factors of a social and political nature are involved to which only subjective judgements can be applied. The UN Water Supply and Sanitation Decade has so far been effective in publicising the problems which stem from inadequate facilities in these fields and has demonstrated most dramatically the costs in terms of human suffering which result from neglecting to improve matters. It has also done a great deal in encouraging institutions to catalogue the needs and identify the problems. It has, however, yet to make a breakthrough in getting governments generally to accord a higher priority to project implementation in this area than they have done in the past, and when sharing out limited development resources. Professionals of varying disciplines in this area must try to increase pressures by the 'water lobby' to change this situation to the general benefit of the water and sanitation sector. □

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Development is such that limited resources can cover more rural areas.



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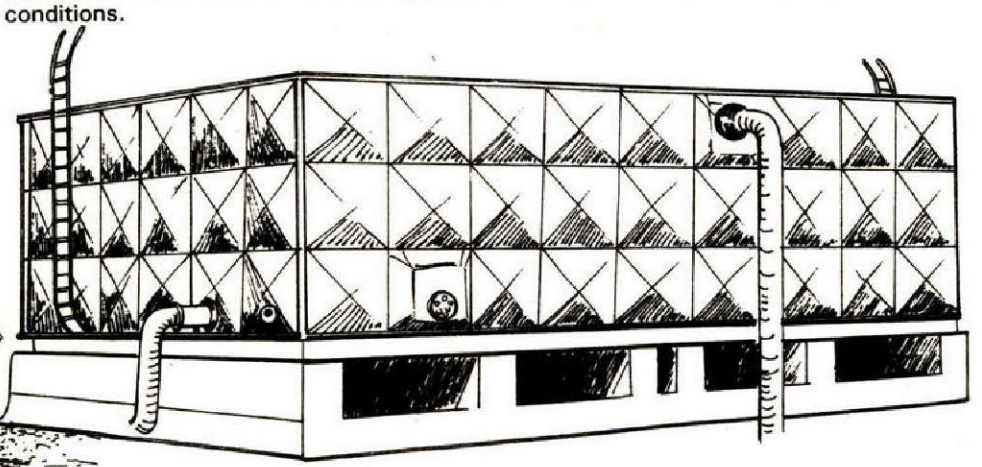


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Alternative Water System

During a session of the recent International Water and Sanitation Congress and Conference held in London, the subject of long term maintenance for plant and equipment supplied to remote areas was raised. Here, one company's efforts in overcoming this are illustrated.

MAINTENANCE IS BUT ONE factor considered in the design of the Sunbridge storage tank system. This system, developed and installed over many years, is built around the principle of an outer structural shell of high grade aluminium incorporating an inner Butyl rubber, tailored lining. Both cylindrical and rectangular forms are produced offering a high degree of flexibility and versatility in sizing.

The cylindrical Sunbridge Liquistore tanks are available in a standard range of capacities from only 1,000 gallons to 500,000 gallons. The tanks are site erected, using components pre-fabricated at the factory, by either one of the locally based erection crews, or a site supervisor with locally provided labour. The tank, being of a bolted nature, requires only a basic set of tools for erection purposes.

The outer cylindrical shell is constructed using N8 grade aluminium alloy panels which require little or no future maintenance (except in particularly severe climatic/industrial environments). This, in turn, is fitted with a heavy duty Butyl rubber lining, aluminium cover, access ladder, and other ancillaries as required. This range of tanks is available in diameters from 2 m to 25 m, and in heights up to 10 m. In addition, the tanks can be installed on steel support towers which in turn can be finished in a wide range of coatings to give long term minimal maintenance requirements.

Applications in Africa

This range of tanks have been in operation on the continent for many years now, both at ground level and elevated on steel support towers, and in capacities ranging from 5,000 gallons to 350,000 gallons. A substantial number of these tanks are being utilised as the sole water source for villages, camps and industrial complexes. The Sunbridge Liquistore is now being seriously considered on several major water supply schemes.

The rectangular sectional Sunbridge Liquistore tank is available in a wide range of sizes and in heights up to 7.5 m. The capacity range is from only 50 gallons (for an individual house supply) right up to 50,000,000 gallons (for a major township or area supply scheme).

Again, the tanks are site bolted in a similar fashion to the Sunbridge Liquistore and the tank construction and materials are very similar to that of the Sunbridge Liquistore, except galvanised mild steel stanchions are used in the tank shell construction. Steel support towers can be provided where elevated tanks are required.

As with the Sunbridge Liquistore this range of tanks has a proven record throughout the world and is also being considered on water supply schemes within Africa.

As stated above, this new system of storage tank is now under very serious consideration on future water supply scheme projects, and is recognised as a proven alternative to the more established storage tank systems.

In the near future the product availability on the continent will be increased by a system of local agents and joint venture schemes where applicable. This range of tanks will lend itself to part-fabrication locally, backed by assistance from the company's head office in the UK.

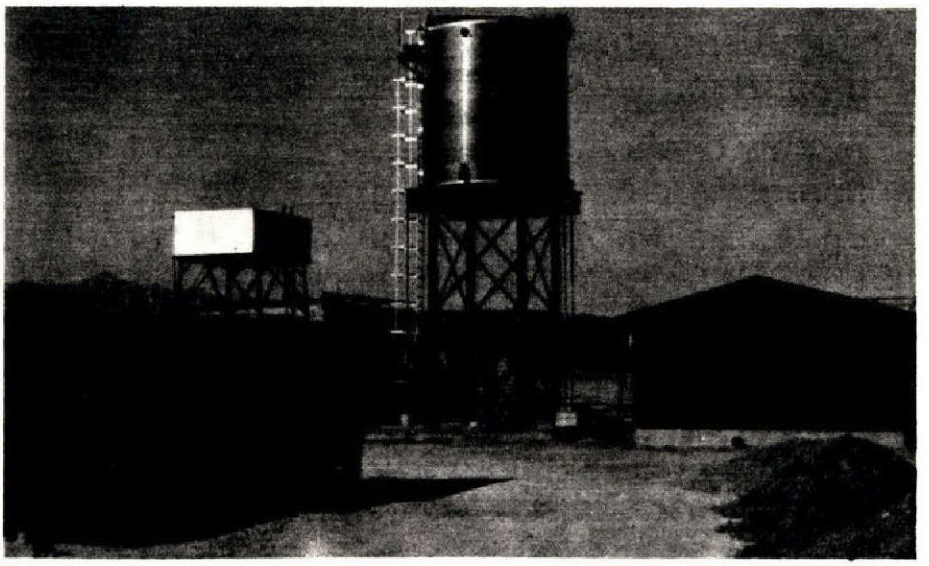
Other advantages

At the beginning of this article it was stated the importance of long term maintenance, and this factor was given a high priority in the tanks initial design and subsequent development. However, many other factors can be highlighted, in particular the following:-

1. The tank system, although manufactured from high grade materials, is proving extremely cost-effective both from a capital cost point of view and also from the long term service and maintenance aspects.
2. Being largely of aluminium in construction and of modular design througout, shipping and erection costs are kept to a minimum, further increasing the overall viability of the system.
3. The tanks have been designed for simplicity, right through from concrete foundation level to finished installation. In particular, the concrete base requirement is of a simple nature, reducing the amount of on-site materials, which can be applicable in remote locations.
4. The tanks, being of a modular bolted nature, can be dismantled and moved to a new location, if required, at a later stage. In addition, tanks can be extended provided certain modifications are made at the time of the initial installation.
5. The Sunbridge storage tank system in its standard specification and finish, offers a degree of heat reflection qualities. This will often enable such items as sun covers and insulation to be omitted.
6. The flexibility of the system also enables alternative tank structure and lining materials to be used, thereby offering a wide range of solutions for many water, sewage and effluent storage problems.

In conclusion, this alternative storage tank system offers many advantages over more established tank systems, and has a viable part to play in future water supply schemes in the continent. □

This range of tanks have been in operation for many years now at ground level and on steel support towers — and availability is increasing.



THE NEW YORK TIMES OCTOBER 19, 1983 FRONT PAGE

18

22 African Nations Said to Face A Catastrophic Shortage of Food

By HENRY KAMM
Special to The New York Times

ROME, Oct. 18 — The United Nations Food and Agriculture Organization warns that 22 African countries are facing catastrophic food shortages. The agency is convening a 57-nation conference here on Wednesday to deal with the crisis.

Edouard Saouma, director general of the organization, said he would ask the participants for increased food aid for the 22 African lands because "the situation is dangerous in Africa." The crisis, he said in an interview, is caused not only by weather but also by such human factors as extreme population growth, nomadic farming, the weakness of many administrative systems and a scarcity of trained people and research services.

Comparing the present situation with the famine of 1973-74, which took the lives of hundreds of thousands and left many more with lasting damage from malnutrition, Mr. Saouma said the current crisis was threatening a much wider area.

The 1973 famine in Africa struck along a belt that stretched below the Sahara from Cape Verde, off the coast of Senegal in the west, across the continent to Ethiopia.

This year, the United Nations agency warned in a report to be presented at the conference here, the same countries are affected. But at the same time, it said, "the worst drought for a century" is parching most of southern Africa.

The 1982-83 crop year was marked by failures and shortages in many African countries, the organization said, and "the prospects for 1983-84 are even more alarming."

Mr. Saouma said the meeting on Wednesday had been called "because there has been drought in Lesotho, Botswana, Swaziland and Zambia, which are supposed to be wet countries, tropical countries."

United Nations food experts had said in June that 18 African countries were most affected by drought, among them South Africa, Morocco, Djibouti and Cameroon. These four countries, however, are not included in the list of 22 that the Food and Agriculture Organization's report described as threatened with food shortages of crisis proportions.

At the same time, the report has added eight other nations that were not on the food experts' list in June. They are Angola, Benin, the Central African Republic, Gambia, Guinea, São Tomé, Senegal and Somalia.

The report said acute food shortages were already affecting "a significant proportion of the population" in Chad, Ethiopia, Ghana, Mozambique and São Tomé.

On Wednesday, Mr. Saouma said, he will plead with traditional donors, mainly the United States and the countries of Western Europe, to send anything they can and as quickly as they can to the 5 countries in the greatest need — Chad, Ethiopia, Ghana, São Tomé and Mozambique — as well as to the 17 others.

'Widespread Human Suffering'

He said people in the 17 other countries would starve if sufficient aid did not reach them before the 1984 harvest. He warned, however, that a harvest in 1984 depended on the availability of seeds and of sufficiently favorable weather. If no food gets to them, he said, the people will eat the seeds.

"In the absence of urgent and concerted action by the international community, many of the 22 countries reviewed face the prospect of starvation and widespread human suffering," the report declared.

"In all of these countries," the report said, "the stocks held by the Government, private traders and farmers have been exhausted or are expected to be exhausted before the new harvest becomes available."

Mr. Saouma said he would ask for emergency assistance totaling 700,000 tons above regular aid to the affected countries, as well as $71 million for such materials as fertilizers and pesticides.

Discussing the causes of the crisis, Mr. Saouma, a Lebanese civil servant who has been with the United Nations agency for two decades, said:

'We Don't See Progress'

"In Africa we don't see progress. They go backward. Production per capita, consumption per capita are less than they were 10 years ago."

Citing extreme population growth as one reason, he said a related problem was that population totals are not known in many of the affected countries, although statistics are published.

He said, for example, that on a recent trip to Ethiopia he was given official population estimates that varied between 26 million and 40 million. But in general terms, he said he accepted an estimate that the total population of the continent had doubled in 20 years.

"The land did not expand," the director general continued. "The African countries became independent 20 years ago, and what did they inherit? They inherited trees. Trees are coffee, tea, cocoa, palm oil, rubber — for export, for foreign-exchange earnings by the colonial power. The food crops were produced by the small farmers."

"And for the independent governments it was the only source of revenues, and they kept this priority," Mr. Saouma continued. "It was very difficult for them to shift resources devoted to encouraging production of cash crops for food because the governments are so poor. They have no other resources."

'Shifting Culture'

He said one-third of African agriculture could be called "shifting culture."

"You work the land for two, three years and leave it to move to other land," he explained. "You come back after 9 years, 10 years, and it is not yet rebuilt. It used to be in the past that you came back to the land after nine years, after its fertility was rebuilt."

But he said population pressures had forced a change, because even in so thinly populated a continent human fertility has made land increasingly scarce.

"Now you cannot afford to wait 9 years, 10 years," Mr. Saouma said. "You come back after 4 years, and the fertility is low, it hasn't yet been rebuilt."

This, however, he said, is not the system in use in South Africa and Zimbabwe, where agriculture is organized as it is in the United States and Western Europe and physical conditions are more favorable.

Mr. Saouma said nomadic farming also posed problems unknown in prosperous agricultural lands. The reason, he said, is that the population in lands where nomadic farming is practiced is not sufficiently concentrated to allow for government services that bring modern technology, not to mention roads to take crops to market, or storage areas and credit systems.

Locusts and Birds

"And then you have to add that nature is not favorable," Mr. Saouma said. He said there were nearly four million square miles of land infested by tsetse flies, the carriers of sleeping sickness, "where you cannot have human beings living or animal production."

In Africa's tropical regions, the director general said, soil is fragile, and almost everywhere else dry, desert-like and subject to frequent drought. Africa suffers from locusts and birds that destroy crops in addition to the rats and other rodents that all agriculture is heir to.

"And now in the south you start to have drought," he added.

Turning to man-made causes for Africa's increasing food gap, Mr. Saouma cited the absence in most countries of incentive price policies for food crops.

"The governments are so poor they cannot afford to pay the producer a remunerative price that will stimulate him to produce more," he said.

But he said governments also felt they had to set prices "that are not too costly to the consumer." He said consumers "live in cities and they can make coups and change the government, whereas the farmers live very far away."

No Lobbies for Farmers

The director general also said the affected countries did not have farmers' lobbies and that agriculture ministers tended to have a low status within the governments. He listed as aggravating factors the frequency of war and insurrection and the large refugee movements they provoke.

Mr. Saouma said most African countries "will not be self-sufficient by the year 2000." "And there are some countries in Africa," he added, "that will never be self-sufficient."

The director general alluded to the attitudes of many who govern in Africa as one factor in the failure to attain self-sufficiency.

"No doubt there is an elite in Africa and no doubt that the overwhelming majority of the people have been exploited since hundreds of years by the chiefs," he said. "This society still exists."

Mr. Saouma said chronic food shortages and reliance on aid had created an additional problem — a growing dependence on a staple that Africa can never produce. He explained that aid came largely in the form of wheat, which has achieved great popularity but also created a demand that for climatic reasons African countries are incapable of meeting. In increasingly urbanized societies, wheat is popular because in the form of bread it is instantly usable, whereas traditional African food grains have to be cooked.

The report's country-by-country listing of threatened peoples said of the small island republic of São Tomé and Príncipe, "There are severe food shortages in all areas."

In Senegal, it said, "agricultural production has been destroyed in all the country except the southern part."

Speaking of Mali, the report said, "The already difficult life conditions aggravated by prolonged drought have resulted in important migratory movements of people and animals to the southern regions of the country."

The other countries in danger of famine were listed as Angola, Benin, Cape Verde, the Central African Republic, Gambia, Guinea, Mauritania, Somalia, Tanzania, Togo and Zimbabwe.

OFFICE MEMORANDUM

TO: Messrs. Knox and Wapenhans

DATE: July 20, 1983

OM: Stanley Please, SVPOP

UBJECT: Economic Commission for Africa

Introduction

I visited ECA on July 14, 1983, accompanied by Robert Maubouche. The morning session focussed on the World Bank's comments which had been requested by ECA on its document, issued in March 1983 on the occasion of its Silver Jubilee and entitled "ECA and Africa's Development 1983-2008: A Preliminary Perspective Study." The afternoon session was focussed on ECA's comments on the draft Bank "Progress Report." ECA staff had prepared written comments on the draft Progress Report (copy attached). The afternoon session had been planned as a joint session with both ECA and OAU. In the event the OAU secretariat was fully occupied with an emergency meeting on Chad and was represented only by Mr. Aseto, Chief, Planning and Research Office, who stated that OAU had only a few days earlier received the Progress Report and would submit comments in due course (it is not clear why OAU stated that it had not received the Report until so late when Robert Maubouche had made special efforts, with the assistance of David Loos in Nairobi, to deliver the Report to both ECA and OAU about two weeks prior to my arrival).

In the absence out of Addis Ababa of Professor Adedeji, Mr. Aiyegbusi, the Acting Secretary General, chaired both meetings and was present during the whole five hours or more of discussions. About twelve officials attended the meetings, including the senior directors.

The quality of the discussions was very good and the tone of the meetings was far less hostile than might be suggested by ECA's written comments on the Progress Report. Furthermore Robert Maubouche subsequently commented to me that he felt the meetings had generated a far more positive and constructive attitude towards the Bank both by ECA in general and by particular individuals (including the Acting Secretary General) who were known to be somewhat hostile towards the Bank.

Review of ECA Analysis of African Development Problems

I began by congratulating ECA on producing an outstanding analytical document which pulled no punches in emphasizing the "nightmare" which Africa faced if the "historical trend scenario" was not modified in major respects to achieve the "normative willed future." The broad concerns expressed by ECA were, I emphasized, shared by the Bank -- the deteriorated global environment and prospects in which African development must take place and the failures of past development programs and strategies of African governments.

Furthermore the problems to be addressed under programs to achieve the "willed future" were entirely in accordance with the way in which the Bank saw the priorities. Most importantly ECA's call for programs to reduce the rate of population growth in advance of the "natural" demographic

transition was extremely important. Furthermore its emphasis on the inability of governments to continue providing most of the employment opportunities and the consequent need to stimulate employment in the private sector, in commercial agriculture and in mining, was completely consistent with Bank thinking, including the consequent implication that education programs must focus less on producing educated elites and more on producing trained workers for the productive sectors of agriculture and industry.

The section of the ECA Report on energy seemed to me to be excellent with its emphasis on the need to keep the energy intensity of GNP growth low and to use pricing policy to induce an efficient substitution of imported oil to the domestic potentials of hydro, coal, geothermal and other energy sources. Moreover the Bank had always attempted to encourage greater regional integration in energy and welcomed ECA's emphasis on this avenue of increased African economic integration.

As regards industrial development, the Bank had always argued that this sector should grow more rapidly than agriculture and that it should be based on efficient import-substitution, a considerable reliance on the small-scale and informal sectors and the avoidance of the import intensity associated with "mimicking" consumption patterns of the developed world. The Bank was probably less persuaded than ECA of the speed with which major industrial projects in steel, fertilizer, etc., could be economically established but this certainly did not represent a "no-no" attitude by the Bank. In particular, whenever countries could agree on the development of regional markets to utilize capacity more fully, the date would be advanced at which such projects would be justified. The Bank would, however, hope that ECA would not encourage countries to allocate scarce domestic and foreign resources to such capital-intensive industrial projects at the expense of industrial investment which would create more employment and provide a better training environment for workers. Moreover the ECA should examine more closely the likely balance of payments impact of large capital-intensive projects which were typically exaggerated particularly as compared with alternative forms of investment.

As regards food self-sufficiency, while this is reiterated as an objective, recognition is given in the ECA Report to the need for trade based on comparative advantage as "the cornerstone of African integration." Furthermore the projection exercise shows a grain deficit for the year 2008 which is at least consistent with the Bank's view that food self-sufficiency should not be interpreted literally but should be focussed on supply of basic grains and tubers, and should exclude excessive and costly investment in "imperial grains" to meet the frequently subsidized demand of a limited class of consumers. The limited importance which the Bank believes should be given to irrigation and particularly to large schemes is also reflected in the ECA projection that by 2008 only 3 percent of available land would be irrigated as compared with 2 percent today.

Comments on ECA Analysis

Despite the wide-ranging areas of agreement between the ECA and the World Bank there were clearly important issues upon which we seemed to disagree and where discussion and further work by both institutions were required to determine whether these were issues of real difference or of perceived difference.

Phased Implementation of Lagos Plan of Action to Achieve the Willed Future

The President of the Bank, in the Foreword to the Agenda for Action, had declared in unequivocal terms that we accepted the Lagos Plan of Action objectives. However, it was still not clear from the ECA perspective study what constituted a phased approach to these objectives. In particular, what were the priorities for action in the immediate future? The Bank's Report had presented these immediate priorities for the 1980s and had emphasized especially the need to give priority to revitalizing the agricultural sector -- both food and export production. In particular, in rejecting primary product exports as constituting a credible engine of growth, ECA had failed to ask whether, nevertheless, these products were not important in the short and medium run until such time as agricultural processing, industrial development, technological change, etc., had been introduced. Did ECA have in mind how the present crisis in production and in the balance of payments could be addressed over the next few years other than by African countries ensuring that their present comparative advantage in primary production were more fully realized?

Pricing Policy including Exchange Rate Policy

The Bank has consistently emphasized that fundamental changes in internal terms of trade and, therefore, in sector income-earning opportunities were required if agreed objectives were to be achieved. The ECA Report refers to these changes particularly in the sections on energy and agriculture but is never sufficiently clear and forceful. What is most surprising is that the implications of ECA's agricultural and industrial analysis and conclusions for exchange rate policy are never mentioned. It is particularly regrettable that ECA did not take the opportunity to indicate to its member governments that they must cease to think of exchange rate policy as a "hang-up" of the IMF and of the World Bank and instead to think of it as an important element in policy packages required to achieve developmental objectives.

Institutional Change

While increasing attention to education and training was important, it was equally important that the growing cadres of educated and trained people be used more efficiently. This was particularly relevant to public sector employment where over-staffing, lack of long-term professional commitment to an institution, inadequate training and career development

were widespread. The approach to the use of expatriate technical assistance required to be modified so that it became less of a gap-filling exercise and more of an institutional and manpower development exercise. It was a pity that the ECA had not used the opportunity of its Perspective Study to examine and highlight some of these important institutional issues.

Bank's Progress Report

The afternoon session which was devoted to a review of the Bank's Progress Report in fact continued the discussion of the issues raised in the morning session. However, concern was expressed over the weight given in the Bank Report to changes in Bank activities in Africa at the expense of a more policy-oriented discussion of some of the global problems impeding African development -- particularly primary product markets. ECA officials also took advantage of the opportunity to raise their pet criticisms about the Bank -- both its style (arrogant, etc.) and substance (who "makes policy" in the Bank, ignorance of political-social problems of Africa, etc.).

The issue which caused most concern was the continuing manner in which the Bank approached the economic-integration objective of the Lagos Plan. Although I could point to occasions on which the Bank had actively supported integration projects and, in the case of energy, was ahead of African governments, and although I emphasized that integration was an unlikely prospect without national growth having been generated (e.g., EAC and EEC), these arguments were not persuasive. ECA clearly sees its major raison d'etre in policymaking as the encouragement of regional and sub-regional economic integration. It is not, therefore, ever likely to be satisfied with a Bank attitude which accords overwhelming emphasis to national programs and policies for stimulating growth and accords subsequent and secondary priority to the direct stimulation of economic integration.

Final Comment on Visit and Recommendation

In my opening remarks to ECA, before proceeding to substance, I had emphasized that the economic crisis in Africa was too deep and too difficult to resolve, to permit UN multinational agencies to engage in debate for debate's sake; this was the luxury of academics. It was particularly worrying when the world in general and African countries in particular believed the debate was demonstrating irreconcilable differences of position on a range of fundamental policy issues. In fact, such differences did not, I believe, exist and the ECA Perspective Study demonstrated this fact.

In his final comments the Acting Secretary General (one of the most hawkish of those present) echoed these sentiments. In particular he hoped that the dialogue with the Bank could be continued and developed.

I recommend that this concluding comment be taken seriously. No discussion took place about specific collaborative activities between the ECA and the Bank. At this stage it is probably more important that we work

to do away with the perception that we have fundamental differences of approach on major policy issues, than that we work collaboratively on particular pieces of analysis. To continue the dialogue in this way, I suggest that regional staff, including senior staff, attempt to spend a day in Addis with ECA whenever (a) this is easily consistent with an existing itinerary, and (b) the discussion can be focussed around a Bank study of wide policy interest -- e.g., the energy problem in Africa, industrialization policy, agricultural marketing and pricing policy, etc. In addition, EDI should be encouraged to continue to invite ECA to its high-level seminars for African officials.

SPlease/lo

cc: Messrs. Stern, Thahane and Husain
Gulhati, O'Brien, Maubouche (Addis)
Benjenk, Burki, Clarke



ECONOMIC COMMISSION FOR AFRICA

ECA AND AFRICA'S DEVELOPMENT 1983-2008

A preliminary perspective study



Addis Ababa

April 1983

ECONOMIC COMMISSION FOR AFRICA

ECA AND AFRICA'S DEVELOPMENT 1983 - 2008

A preliminary perspective study

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INTRODUCTION

1. In commemorating its 25 years of service to the African region, the Economic Commission for Africa is convinced that it is not sufficient to outline the successes and failures of the past. The history that mankind makes can and must be used to avoid pitfalls and to map out a better future. Consequently the present study was undertaken as a preliminary prospective view of the future of the African region 25 years from now. But since the African Heads of State and Government have already laid down the philosophy for Africa's future in the Lagos Plan of Action for the Implementation of the Monrovia Strategy and the Final Act of Lagos, the present preliminary perspective study aims not at repeating the goals, objectives and means of the Lagos Plan of Action, but rather at (a) highlighting some of the problems which led to and continue to validate the proposals for a regional strategy; (b) illustrating the orders of magnitude of the efforts that are required if the Lagos Plan of Action is to be implemented faithfully and successfully and; (c) anticipating the role and evolution of the Economic Commission for Africa in the next crucial 25 years.

2. It will of course, be understood that the preliminary estimates of the study cannot be taken either as forecasts or predictions of Africa's future by the year 2008. The nature of development is too complex to conform to clear-cut mathematical or even economic laws. But in making a preliminary and tentative exploration of an unknown and uncertain future, it is believed that the study will contribute to the thinking of all the people of the region and to decision-making among Africa's leaders at the national, subregional and regional levels.

3. The time horizon of 2008 was based on the necessity of having a period long enough to highlight the importance and implications of structural changes in the production patterns and the lifestyle of a people. Indeed, 25 years is a period in which one can reasonably assume a total transformation of a society. At another level, it was felt useful for the Economic Commission for Africa at its Silver Jubilee to contemplate its Golden Jubilee in the year 2008.

4. Since development - genuine development - cuts across all spheres of life, the scope of a study on the future of Africa would have to cover the social, political, cultural, technological, ecological and economic aspects of the African region. However, in the present preliminary and very exploratory study, the approach has been predominantly socio-economic although every effort has been made not to lose sight of the other equally important aspects of a future of a region like Africa. Nevertheless, even in the socio-economic framework, the future of Africa by the year 2008 has been analysed by probing into a few but critical areas namely demography, human resources, food, energy, industry, transport and communications and trade, money and finance. Since a prospective study would have to bring out the interdependence of variables among themselves and with the actors-leaders, consumers, traders, etc., - the present study has combined the analysis of specific areas with some interrelationships in a development process. The study also covers the major macro-economic aggregates which form the background to the orders of magnitude of the variables in the selected critical areas.

5. While the problems of any development process are complex and vast, the methods and analytical tools available for depicting and projecting development are still frail. The availability of relevant and reliable data also constrains the use and undermines the credibility of many of

the statistical quantitative relationships. Thus, the present study's methodology is limited to a combination of econometric approaches and other simple socio-economic or technical relationships based on solid sectoral or macro-research and studies. Further, extensive use has been made of the available studies or projections in the fields analysed in the study. The ECA secretariat will, hopefully, continue to sharpen the tools of analysing the region's development process so that the present very preliminary prospective study will be improved and expanded.

6. The study is divided in four parts. Part I tries to give a snap-shot of the African condition today, which forms the platform for analysing the future of Africa. Part II analyses the future of Africa by the year 2008 under the continuation of present socio-economic trends and patterns at the national, regional and international levels. Part III assesses the nature and content of a normative development scenario by the year 2008 while part IV synthesises the implications and choices for a new future for Africa.

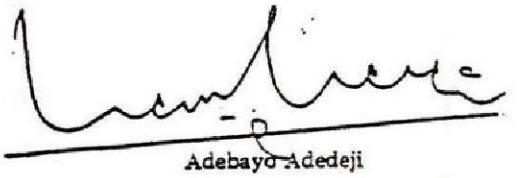
7. The picture that emerges from the brief analysis of Africa's present condition is already well known. But, the future that emerges from the historical trends scenario of part II is horrendous. To imagine that the African region will be more dependent on other regions in all critical areas is a cause for alarm. To take but a few examples: The region as a whole would require more food imports and perhaps would have to depend on more food aid. Over 90 per cent of all the capital goods required for development would still have to be imported from outside the region after nearly half a century of independence. Critical intermediate goods like fertilizers and cement would still have to be bought from outside Africa. On the social side, all services would deteriorate in terms of quantity and quality. A smaller portion of the population would be able to have access to education, health or water. Cities would become overpopulated shantytowns as housing would become less available. As a result of such socio-economic difficulties, the political situation would worsen. Then, riots, crimes and misery would be the order of 2008 if present trends continue without conscious change. With the weak and fragile socio-political systems, the sovereignty of African States will, then, be at stake. As such, self-reliance and independence will, to the generation of 2008, sound slogans of the past.

8. It therefore becomes clear that another future must be designed. Hence, the normative development scenario tries to outline a possible alternative - an alternative that will ensure the future of a brand new generation of free and happy children and adults, of prosperity and modernity, of full political, social and economic independence, of self-determination, self-confidence, collective self-reliance and self-sustainment. This "willed future" is seen as what we can proudly and triumphantly bequeath to our children and grand children by the year 2008. Indeed, it is their inalienable right to find Africa a better place and it is our fundamental duty to set out to build that place. Given the limits to any expansion the normative scenario of 2008 does not pretend to create a new Eden in Africa. There are heights that the African region will not be able to reach in the next 25 years. But while the region as a whole will have to import some capital goods, it should have reached a level of self-sufficiency in the basic intermediate goods. The energy balance will have improved with more utilization of coal, hydropower and other renewable sources of energy. The transport network will be more integrated with faster and freer movement. Monetary constraints which bedevil the capacity of the African countries to trade with each other will have been overcome. Such are the promises of a will to establish, today, a genuine development process.

9. What then are the lessons to be drawn from the two scenarios? The first lesson to emerge is that Africa has to tighten its belt and fight valiantly against hunger, against inappropriate education systems, against all inhibitions and complexes in society that retard the growth of the region. The historical trend scenario demonstrates that present development concepts and approaches cannot bring about any improvement in the quality of life of the African people. A second major lesson that emerges from the analysis is that the development scenario can be

achieved if, and only if, (a) the region succeeds in internalizing the development process, in the spirit of collective self-reliance and self-sustainment; (b) the development process is democratized at all levels so that the factors of development - human, capital and natural resources - can effectively and productively interact; and (c) subregional and regional co-operation is strengthened *inter alia*, to overcome the present balkanization of the region and to permit a proper and co-ordinated exploitation and utilization of Africa's vast human, mineral and energy resources. Lastly, the study draws attention to the link between Africa's development and the international environment. The continent has to strengthen its role in influencing the international scene so that peace prevails and a new international economic order emerges.

10. In addition, it is important to draw attention to other non-quantitative factors that are perhaps implicitly covered in the study. Since, to achieve the normative scenario, the population would have to play a prominent role, there is an essential need to evolve development-oriented leadership. The organization of all social, cultural or economic activities will have to be development-centred so that every activity, every thought, every step of the people contributes to the consolidation of the region's development. Finally, the analysis of the normative scenario cannot be taken in isolation of the required degree and efficiency of management of all the region's resources - human, natural and financial. If policy and management organs do not function properly, then the path to the normative scenario will not be on solid ground.



Adebayo Adedeji
Executive Secretary of the Economic
Commission for Africa

PART I

OVERVIEW OF AFRICA'S PRESENT CONDITIONS

A. DEMOGRAPHIC SITUATION

1. The estimated population of the African region 1/ (medium variant) was 439 million by mid-1980. Relative to the 257 million estimated for mid-1960, The regional annual growth population rate during that period was 2.9 per cent as against 2.3 per cent for all of the developing world, 2.6 per cent for Latin America and 2.1 for all Asia during the same period. The major factors accounting for the rapid population growth rate as observed around 1980 in the African region were the high and fairly constant fertility level and a declining infant mortality rate. Both of these factors combined to produce a young population and a concomittantly high dependency ratio for the region. By 1980, 44 per cent of the estimated total population comprised children under 15 years of age. For every 100 active persons, there were 92 non-active dependents. Over all, as at 1980, the estimated life expectancy at birth was 47 (males) and 50 (females) and the completed average family size was in the range of 6 or 7 children. However, although Africa covers a quarter of the earth's land mass, it is sparsely populated; its 1980 population density was only 16 persons per square kilometre of land.

2. By 1980, about 72 per cent of the total estimated population in the region lived in rural areas. Nevertheless the region recorded the world's highest rural-urban migration rate during the 1960/1980 period. From a level of less than 20 per cent in 1960, the African region was nearly 30 per cent urbanized in 1980 implying an annual growth rate of about 5 per cent or almost double the growth rate of the total population. But even at this rate of urbanization, Africa was in 1980 the world's least urbanized continent. Less than 20 cities in the region were estimated to have at least a million inhabitants around 1980. Furthermore, the region's pattern of population distribution (1980) was characterized by (i) disproportionally large size and rate of growth of the metropolitan centres; and (ii) diminutive size and rate of growth of population within the remaining components of the urban system. The major problems associated with the observed population distribution patterns around 1980 which caused concern to African Governments included the high urban growth rates, imbalances between population and resource distribution, areas where density was too low to support development infrastructure and international migration. Besides rapid population growth rates, urbanization/migration and population distribution, other identified population problems in the region around 1980 included low fertility in the Central African subregion, housing/education/employment bottlenecks, refugees and the brain drain.

B. SOCIAL CONDITIONS

3. In 1980, the average *per capita* income of the African region was only $US 741 as compared with a *per capita* GNP of $9,684 in the industrialized countries. But this crude measure says little about the sad realities of life in Africa. One such reality is that even the low *per capita* income is not evenly distributed. The low-income sub-Saharan African countries had, in 1980, a *per capita* income of only $239. Another reality is that in Africa there is a high incidence of un-

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1/ All references to the African region in this study refer to the present 50 ECA member States unless otherwise stated.

employment, underemployment and increasing mass poverty. For example, out of a total of 33 million people that were added to the African labour force during the 1970s as much as 15 million found no access to renumerative employment. The high level of unemployment is further compounded by an unequal distribution 2/ of already low income and by a high dependence ratio of nearly three persons per employed person. The result is that about 70 people out of every 100 African persons were, in 1980, either "destitute" or on the verge of poverty. 3/

4. Another sad reality is that, while a lot of investments have been made in education such that the region achieved by 1980 enrolment levels of over 70 per cent of Africa's primary school age children, 14 per cent of the secondary school age population and 1.8 per cent for universities and higher institutions, the orientation of education and the trained manpower mix have failed to respond to Africa's needs and aspirations. Besides, while millions of dollars are spent on "experts", a large portion of the trained sons and daughters of the continent are serving outside the region. At home, as Africa turns out more primary and secondary school leavers, it is, at the same time, increasing the mass of the educated unemployed.

5. Health conditions have happily improved. The number of persons per doctor dropped from 10,000 in 1970 to less than 6,500 in 1980. But, again, health facilities are concentrated in urban areas. The larger part of the rural population has only limited access to health care. Further, with policies emphasizing curative rather than preventive measures, diseases like malaria, trypanosomiasis, bilharzia, etc. still afflict a fairly large part of Africa. The availability of water also still remains critical. For the African region as a whole only one in four persons has access to clean water. Over all, however, the African family still maintains tremendous resilience with regard to social stability and security. Indeed, culture is still the glue of the African system despite the communication barriers that the region faces in terms of unintegrated transport networks, the multiplicity of languages and a high illiteracy rate of over 60 per cent.

C. FOOD CRISIS

6. Africa's food situation is by now the single most critical area of concern in the region. For the whole decade of the 1970s when the African population was expanding at an average annual rate of around 2.8 per cent, total food production in the region as a whole was rising by no more than 1.5 per cent. By 1980, food self-sufficiency ratios had dropped from 98 per cent in the 1960s to around 86 per cent implying that, on average, each African had around 12 per cent less home grown food in 1980 than 20 years earlier. Production of cereals increased by a mere 1.2 per cent annually over the two decades reaching only 58.4 million tons in 1980. The amount of roots, tubers and pulses produced in 1980 totalled only 88.2 million tons while production of meat averaged 4.7 million tons or only 11 kilogrammes for each person and per year during the 1978-1980 period. But, while Africa's overall food production trend stagnated for almost ten years, growth in food demand kept pace with population expansion. Demand for cereals, for example, increased steadily throughout the 1970s to reach about 72 million tons in 1980. To cover the widening food deficits, Africa has had to import increasing amounts of food or receive aid therefore. Between 1970 and 1980, the volume of total food imports increased by an average annual rate of 8.4 per cent. Food aid to Africa reached 1.5 million tons in 1980. Imports of food grains alone reached a total of about 20.4 million tons in 1980. In one year, 1980, such a volume of cereal imports cost the African region more than $3 billion excluding the heavy ocean

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2/ In Africa as a whole, the richest 20 per cent of the population have an income of four times the income of the poorest 40 per cent.

3/ The poverty line for the seriously poor in Africa was equivalent to a *per capita* income of $115 at 1972 prices while the "destitutes" are those with *per capita* income under $59.

freight costs. More seriously, the increasing reliance of the African region on food aid and imports threatens to create a new and dangerous structural dependence on cereals like wheat which cannot be easily grown in many parts of the African region. Stress should also be placed on the fact that massive food aid and large food imports often leave the majority of the African people still undernourished since such foods do not reach the urban and rural poor. Indeed, despite the recorded increases in food imports, the African region still remains calorie deficient with over 20 per cent of the present population having an energy intake below the critical minimum limit. 4/ Average *per capita* food consumption in Africa in terms of calories remained almost stagnant at about 2,197 calories in the mid-1970s as compared with 2,115 calories in the early 1960s.

7. The disappointing performance in agriculture and food production must be judged against the fact that Africa's potential arable land is estimated at about 1.7 hectares for each African person while only about 0.55 hectares per person is being utilized at present. 5/ Thus the causes of the food crisis, besides the exogeneous problems of drought and desertification are to be found in the fact that, Africa's agriculture has suffered from low productivity rates especially per unit of land, inadequate investment outlays in agriculture, poor incentives to farmers, fragmentation and subdivision of holdings, inadequate land tenure systems, limited agricultural research, rural-urban migration and institutional constraints. For example while the world average for the output of cereals is about 2,000kg per hectare, Africa's average is around only 1,090 kg per hectare. For all roots and tubers, average productivity per hectare has remained stagnant at around 7 tons compared to a world average output of over 11 tons per hectare. Africa's fertilizer consumption levels stand at only 3 kg per hectare of agricultural area while fertilizer consumption in Latin America and Asia is respectively over 8 kg and 26 kg per hectare of agricultural area.

D. ENERGY PROBLEMS

8. Africa's reserves of energy resources, both traditional and non-traditional, are quite substantial. The latest information available indicates that Africa has some 55 billion barrels of crude oil (8.5 per cent of world proven reserves), 208,470 billion ft 3 of natural gas (7.9 per cent of world proven reserves), 88.5 billion tons of coal reserves 6/ (between 1.16 and 3.05 per cent of world's estimated coal reserves), 1.7 million tons of uranium (some 25 per cent of world resources) and 200,000 MW of potential hydro-capacity (35.4 per cent of world's potential hydro-capacity. 7/ In addition, Africa has an appreciable potential in new and renewable sources of energy such as solar, wind, biogas, geothermal and ocean energy. However, these substantial energy reserves are not evenly distributed between subregions and countries. Petroleum deposits are mainly concentrated in North Africa, hydro-electric resources in Central Africa, geothermal potential along the Rift Valley in East Africa and coal deposits in the Southern and south-eastern regions of the continent.

9. African production of primary energy resources registered, in recent years, a steady growth, increasing by 12.3 per cent yearly in coal equivalent from 65 million tons in 1960 to 589.4 million tons in 1979. As a percentage of world energy production, Africa's share increased from

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4/ The critical minimum limit is estimated at 1.2 BMR (Basal metabolic rate).

5/ FAO, Agriculture: Toward 2000, 1979, table 4.5.

6/ For coal, South Africa accounts for about 81 per cent of Africa's reserves.

7/ Status of energy resources in Africa, ECA, December 1982.

1.4 per cent in 1960 to about 5.8 per cent in 1979. Hydrocarbon production expanded slowly between 1975 and 1979 at only 4.8 per cent, reaching an annual output level of 300.3 million tons. In 1980, the production of natural gas reached 25017.6 million m3 while that of hydropower was 56 641 GWE. It should, however, be noted that only a small fraction of the vast resources of hydropower in Africa is being exploited in spite of the substantial growth in recent years. Fuelwood production in Africa continued to increase being, in 1979, 22 per cent higher than at the beginning of the decade. The increase was, of course, to meet the growing consumption needs of households, especially in rural areas since their income as well as the low level of rural electrification prevent them from having access to the main commercial energy resources. This trend has very serious implications on the region's forest reserves. Data on the other sources of energy such as solar, wind, biomass and ocean energy are not readily available. However, many African Governments are becoming increasingly aware of the enormous possibilities of new and renewable sources of energy and are putting more and more efforts into harnessing such sources in view of their potential advantages, especially in urban areas. Over all, the present pattern of energy production in Africa especially since the mid-1970s shows a significant shift away from crude petroleum towards other forms of energy, mainly hydropower, a trend which may be related to high oil price increases. However, the increasing number of petroleum producers in Africa is likely to maintain crude oil as one of the region's main energy resource together with hydropower.

10. Africa's consumption of energy increased tremendously during the 1970s at a rate of 6.4 per cent per annum, in spite of higher energy prices. As a result the elasticity of energy consumption with respect to GDP rose from 1.0 in 1960s to 1.33 in the 1970s. In coal equivalent, the total consumption of commercial energy in Africa rose from 99.6 million tons in 1970 to 139.4 million tons in 1975 and 185.1 million tons in 1979. The main components of Africa's commercial energy consumption are crude petroleum and liquid gas which, in 1980, accounted for 44 per cent of the total energy consumption of developing African countries or 59.8 million tons. However, in 1979, only 21.1 per cent of Africa's total production of crude oil was consumed within the region. The consumption of coal and natural gas in Africa is generally low because of low industrial demand and lack of transport and storage facilities. Hydro-electricity consumption of 55 084 million kWh in 1979 closely follows the production levels. However, up to now the bulk of the population of the African region consumes mainly fuelwood in the form of charcoal and firewood. This pattern constitutes a serious threat to forest resources and environment especially in the Sahelian and drought-prone areas.

11. Africa's energy balance sheet shows that the region could largely meet its energy requirements. However, oil which is the major component in Africa's energy consumption is at present produced in only a few countries. As of now, only eight countries are net oil exporters. 8/ The largest part of the region depends on oil imports in the range of 26 and 86 per cent of the commercial energy requirements of the individual countries. As a result and especially since the oil crisis, Africa's oil import bill has posed severe constraints on the development of the region as a whole. Indeed, in many countries an increasing number of productive activities and services are almost at a complete halt because of energy shortages and balance-of-payments difficulties. It must, however, be emphasised that the African region has a total crude oil deficit because of the large proportion of production which is exported outside the region. In 1980 crude oil production in Africa amounted to 314.1 million tons, of which 267 million tons were exported. Hence, since crude oil consumption was 72.4 million tons, the region as a whole had a deficit of 25.3 million tons of crude oil which had to be imported from outside the region.

8/ Algeria, Angola, the Congo, Gabon, the Libyan Arab Jamahiriya, Nigeria, the United Republic of Cameroon and Zaire.

E. THE INDUSTRIALIZATION DILEMMA

12. As of now, the industrialization process in Africa has relatively speaking failed to provide the dynamic forces for the structural transformation of the African economy to attain self-sustainment. The sector remains small and enclaved accounting for only 9.8 per cent of the region's GDP. Relative to world manufacturing output, Africa had a share of manufacturing value added of only 0.9 in 1980 as compared to a share of 2.7 per cent and 6 per cent for South and East Asia and Latin America respectively. Thus, Africa was by 1980 still the least industriazed region in the world. The region's industrial sector is not only small but also characterized by an inflexible structure, concentrated in a small number of countries and limited to only a few lines of production. Except for the production of a narrow range of intermediate goods, the sector is characterized by light industries producing consumer goods and by a crude and relatively weak degree of processing and semi-processing of mineral and agricultural raw materials, mainly for export. Further, the existing production structure is based on small size plants with little in terms of economies of scale. Heavy industries are rudimentary and have been attempted coherently in only a few countries. Therefore, the production of capital goods is only marginal in the region as a whole and, as a result, Africa remains one of the world's major importer of capital goods with imported equipment and machinery accounting for over 35 per cent of the total annual investments of the region.

13. The overwhelming dependence on imports of capital goods has had serious repurcussions on Africa's cost structure, production efficiency, exploitation of natural resources, development of domestic technology and the comparative advantage of surplus labour relative to capital. The inappropriate acquisition of capital goods at high cost of account of the technology market imperfections has led to the emergence of high-cost enterprises, many of which are economically not viable. Most of the capital goods acquired are neither consistent with the factor endowments of the African region nor oriented to its basic needs. The situation has become worse since the development of the technology markets in advanced countries favours the production of technology for labour-saving machines and equipment. On the other hand, the development of domestic technology is constrained by lack of capital, appropriate skills and entrepreneurial capabilities.

14. Africa's industrial base is also hardly oriented to the production of intermediate goods because domestic production of intermediate inputs is characterized by weak forward and backward linkages between the industrial structure and the natural resource base. As a result, despite abundant reserves of phosphates, limestone, iron, bauxite, etc., the region continues to import fertilizers, cement and iron and steel, aluminium, etc. Even the import-substitution strategy which was adopted in the majority of African countries with a view to orienting industrial activities to the advantage of processing for a readily available domestic market and to ease balance-of-payment pressures seems to have been ineffective. While the strategy was successful in creating a sizeable consumer goods industry, it failed to stimulate the development of key industries with strong domestic linkages. The production of consumer goods, which constitutes about 68 per cent of Africa's total value added in manufacturing, was heavily oriented towards the production of food, beverages and tobacco. Basic consumer goods like clothing, pharmaceuticals, paper, etc. are still being imported. But the import-substitution strategy did not only fail to produce the desired developmental effects, it also raised a rang of economic and structural problems such as the installation of large production capacities in countries with small market sizes, the considerable drain on the scarce foreign exchange reserves owing to the excessive dependence on imported inputs, etc. Moreover, the tendency of creating capital-intensive import-substitution industries with a high unit cost of investment and with no relationship to Africa's factor mix has distorted the region's cost structure. Thus, in quite a number of instances, domestic production costs tend to be higher in terms of foreign exchange than the cost of the imported final product.

15. Export-oriented industrial production has also met with limited success in the region as a whole. The manufactured exports of the region have suffered from severe competition from other developing countries in terms of quality and prices, the high import content in producing the manufactured goods for exports, the low levels of capacity utilization, etc. Worse still, the recession in the developed countreis has resulted in a sluggish export market as more of these countries have adopted protectionist policies and quota restrictions on labour-intensive products from developing countries. Thus, Africa's exports in manufactures have grown more slowly relative to the growth in manufactured imports. Indeed, the share of manufacturing exports in total exports of Africa has declined over the whole period of the 1970s.

F. THE TRANSPORT AND COMMUNICATIONS BOTTLENECK

16. The inadequacy and poor conditions of Africa's transport and communications infrastructure coupled with the inefficiency of the services remain major obstacles to the general economic and social development of the region. With respect to road transport, earth roads account for a considerable proportion of the road network, but most of them are generally operable only during the dry season, in spite of the fact that they provide the only access to villages, agricultural and other productive areas and are the main traffic feeders to primary and secondary roads. Primary and secondary roads represent less than 50 per cent of the total African road network. Moreover, the average road density in developing Africa is only 0.05 km/km2 which is far below the average of developing countries as a whole. As for vehicles, there were, by 1981-1982, only 9.2 vehicles per 1,000 persons or about 109 persons per vehicle. In addition a large proportion of the fleet remains immobilized for long periods, a situation which adversely affects the overall economic performance of developing Africa.

17. With respect to railway transport, the total network of Africa was about 80, 706 km giving a very low average density of only 2.78 km per 1,000 km2. In addition, the African railway system is composed of several short independent national systems of different gauges, which makes it difficult to promote socio-economic integration at the national, subregional and regional levels. Also, because of the old age of the rails, the poor alignment and the low construction standards, the average operating speed of the African railways system is only about 40 km/h and the axle loads vary from only 5 to 28 tons per axle. The railway traffic is also very low, with only 1.8 per cent growth in passenger-kilometres in 1981 and a decrease of about 3 per cent in 1980 for ton-kilometres. In the area of air transport, while 40 foreign airlines and 51 African airlines serve the continent, only 20 per cent of the total air transport operations involve direct links among African countries. The trend in air traffic is also very slow with, in 1981, an increase of only 2.2 per cent in passengers traffic and 0.3 per cent in cargo freight. In maritime transport, the volume of Africa's seaborne trade has increased only marginally, being in 1980 560.5 million tons. The region's shipping capacity was 7.2 million dwt in 1981 (including 3.4 million dwt for tankers) which constitutes only 1 per cent of world tonnage as compared to 10 per cent for developing countries as a whole. The low level of the shipping capacity of Africa explains the very large share of Africa's seaborne trade handled by foreign vessels.

18. The development of the telecommunications system in Africa has been considerably extended and improved since 1977 as a direct result of the activities of the United Nations Transport and Communications Decade in Africa (UNTACDA) and the Pan-African Telecommunications Network (PANAFTEL). However, in spite of the recent rapid growth of 14 per cent per annum between 1977 and 1981, the overall average telephone density in Africa is only 76 phones per 1,000 persons, which is still below the target of 1 telephone per 100 inhabitants by the end of UNTACDA in 1988. Moreover, the telephone density is not evenly distributed. The North African density ranges from 13 to 637 per 1,000 persons while sub-Saharan Africa has a telephone density in the range of less than one to 29 telephones per 1,000 inhabitants. Finally, in addition to the PANAFTEL network, many African countries have developed transmissior

facilities with satellite communications mainly for international services directed towards Europe and America and most of the intra-African telephone calls are still made via developed countries.

G. AFRICA'S UNEXPLOITED NATURAL RESOURCES

19. Africa is known to possess vast reserves of natural resources in the form of minerals. For example, Africa's share of reserves in the total known reserves of the world is 8.5 per cent for oil, 25 per cent for uranium, 21 per cent for bauxime, 45.2 per cent for cobalt and 67 per cent for phosphorities. But even these figures might mask the actual potential of the region since Africa remains largely unexplored and, therefore, lacks concrete information on its total natural resources endowment. However, the exploitation of the known reserves has, thus far, not led to the integration of the natural raw material base in the region's economic structure. Hence, while the minerals currently exploited continue to play vital strategic roles in the industrialized countries, the African region itself remains unable not only to utilize but even to process the minerals. Further, the levels, rates or the range of mineral exploitation by the region itself are difficult to control since most of the ongoing exploitation remains, as of now, in the hands of foreign transnational corporations.

20. The trend of mineral production in Africa in the 1970s was disappointing and, as of 1980, the situation had reached alarming proportions. In 1980, production of iron ore, chromite, nickel, zinc and diamonds was below the level recorded in the mid 1970s. Poor demand resulting from the world recession and depressed prices have also adversely affected export prospects such that many promising projects in mineral exploitation have had to be abandoned. Further the industrialized countries that have been importing Africa's mineral output seem to be looking for other sources.

H. EXTERNAL TRADE AND FINANCE IMBALANCES

21. The early development of foreign trade in Africa was sporadic. Momentum was gained in the 1960s and thereafter trade expanded from $US 4.9 billion in 1960 to $89.6 billion in 1980. Nevertheless, Africa's share in world exports declined from 3.9 per cent in 1970 to 3.4 per cent in 1979 owing not only to the spectacular increases in world exports but also to the slow expansion of the region's exports. The exports of the African region are typified by an inflexible export structure with heavy concentration on only a few primary agricultural and mineral commodities. Such export dependency on primary raw materials has had negative effects on Africa's export earnings because of the high inelastic supply of primary products and the price instability in international markets. In addition, performance of the export sector has been sluggish with a growth rate of 0.6 per cent in real terms during 1970-1980 as compared to 6 per cent attained during 1965-1970. The causes behind such a deceleration include the fast growth in the technologies of synthethics and other substitutes, increasing trade barriers especially quota restrictions, declining agricultural productivity, and increases in prices of imported inputs.

22. While real imports of developing African countries continued to increase by 5.8 per cent yearly between 1970 and 1980, the structure of imports in terms of commodity composition has remained fairly constant. Imports of consumer goods continue to account for the largest share in Africa's total import bill being in the range of 35 per cent to 45 per cent. However, in many countries especially those which are drought-prone, the food import bill has become a major component in the total value of imports. The fast growth in imports, unmatched by corresponding increases in exports, has resulted in a huge accumulation of deficits on the visible trade balance amounting to $8.9 billion for the group of non-oil exporting African countries in 1980. Another important phenomenon is that of Africa's terms of trade which have significantly moved against the region throughout the 1970s. Not surprisingly, the balance-of-payments position worsened throughout the 1970s owing to such structural imbalances as the continuous

declining agricultural output, the low level of exploitation of mineral resources, escalating oil prices, galloping world inflation and high interest rates in the international capital markets. Consequently, Africa has suffered a continuous drain on foreign exchange reserves. The malaise was even further compounded in recent years by the insufficient growth in the capital flows and official transfers. The total outstanding debt in 1980 amounted to $77.5 billion and, given the increasingly worsening terms and conditions of loans especially at a time of bad export performance, repayment commitments have become a burden as the debt servicing ratio has reached around 12 per cent of total exports.

23. The direction of trade continued along the same patterns of exchange as in the colonial era. While developed market economies continued to be Africa's major trading patterns mainly as a result of the long-standing political and commercial links, the African region's trade with other developing countries stagnated. Africa's volume of trade with the countries of the centrally planned economies has actually declined. Most serious is the present stagnation or decline in the growth of recorded intra-African trade mainly because of the poor transport and communication system, inadequate financing and credit facilities and an increasing volume of unrecorded trade between African countries.

I. INSTITUTIONAL INADEQUACIES

24. Although developing African countries have made steady progress in building national, subregional and regional institutions for promoting and monitoring their economic development, most of these institutions have proved ineffective and, in some cases, even counter-productive. At the national level, the central Governments and the various financial institutions have, in many ways, failed to mobilize effectively domestic and national resources for development. In many countries the planning machinery still concentrates on merely collecting projects for submission to potential funding sources. Few planning agencies can adequately handle project identification, formulation, evaluation and implementation. In some cases even the formulation, follow-up and evaluation of development plans is not yet as strong as it should be. The reliance of African development plans on external resources detracts from the effectiveness of the planning exercise as a means of co-ordinating national medium- and long-term socio-economic activities and ensuring intersectoral linkages for the achievement of self-sustained and self-reliant development. National development support institutions have, in many cases, also been unable to provide the necessary incentives to increase production and promote local entrepreneurship in areas like agriculture and the informal sector. More generally, therefore, there remains a need to restructure and redesign much of Africa's institutional framework.

25. At the subregional and regional levels, the various institutions that have been established - all at the requrest of African Governments - in fields such as planning and economic development, natural resources, science and technology, trade, industry, training and human resources, transport and communications, have all suffered from, *inter alia*, a lack of political will on the part of African countries. The net result is that the growth of such institutions is stiffled and, as disillusionment sets in, the collective self-reliance of African countries is undermined. In subregional economic groupings which are steadily increasing as a result of the growing awareness of African countries of the necessity for closer economic co-operation, not enough focus is put on issues crucial to development such as joint and co-ordinated productive activities, financial and monetary arrangements, human resources and skill development in science and technology and exploitation and uses of natural resources. Political consideration and administrative procedures have also often hampered the development of some of these institutions.

26. It must be further recognized that one major reason for the present institutional inadequacy has been the failure of African countries to realize that multinational economic co-operation and integration is an absolute imperative, and this has, in turn, led to a lack of political will to sup-

port the creation and sustenance of regional and subregional co-operative institutions. Economic co-operation and integration, like political will or the will to develop, is a qualitative attribute of immense significance which cuts across all the development scenarios under discussion. It can, therefore, be said that its absence or ineffectiveness is an inherent part of the development problem that Africa faces today - a problem in which both ignorance and mental attitudes constitute powerful institutional barriers to the creation and sustenance of viable co-operative groupings. Indeed to a very large extent, practically all the problems discussed elsewhere in this section, including the food crisis, the energy problem, the low level of industrialization, poor transport and communications, the low level of exploitation of natural resources, the insignificant level of intra-African trade and the high burden of external indebtedness, are, in the ultimate analysis, the result of the failure by African countries to embrace a truly collective self-reliant strategy of multinational co-operation.

J. THE OVER-ALL MACRO-ECONOMIC SET-UP

27. From the above review of the critical areas in Africa today, it is clear that the African economy is still basically underdeveloped. At the macro-economic level, the structure of production is grossly dominated by agriculture, mainly peasant agriculture and services, which together account for 73 per cent of the total gross domestic product of the region as a whole. The industrial base is small, fractured and only minimally linked to the region's natural resources base. The share of manufacturing in total output for the entire region is less than 10 per cent. Mining output, mainly for export, is a mere 6.6 per cent of GDP while the generation of energy and construction contribute only 1.3 per cent and 2.3 per cent respectively to total output. In addition to such internal structural imbalances, the African economy remains the most exposed in the world. External trade constitutes the single major stimulus to Africa's internal socio-economic progress in spite of the narrowness of export commodities and the dramatic shifts in the prices and the inherent technological content of imports.

28. The expenditure of the region's total income is characterized by a high consumption rate of 82 per cent of GDP in 1980. The consumption of African Governments, which continue to be seriously strained in terms of providing services to the African population, is as high as 19 per cent of Africa's total income. At such consumption levels, Africa's saving rate stood at around only 18 per cent while the share of investments in total GDP was as high as 25 per cent. Thus Africa in 1980 had a resource gap of nearly 7 per cent of the region's total income. To fill the gap, the region has had to resort to massive borrowing and foreign aid. By 1980, the indebtedness of the region as a whole was as much as $77.5 billion. With such a level of debts, the region continues to suffocate under the burden of debt servicing. In 1980 alone, the region as a whole spent $11 billion to service its debt.

Table 1. Selected indicators on Africa and other country groupings

	Developing Africa	*Low income economies*	*Middle income economies*	*Developed market economies*
Population (millions) mid 1980	439	2 160.9	1 138.8	714.4
GDP growth 1970-1980 (per cent)	5.2	4.6	5.6	3.2
Per capita growth 1960-1980 (per cent)	2.9	1.2	3.8	3.6
Agricultural growth 1970-1980 (per cent)	1.3	2.2	2.9	1.4
Manufacturing growth 1970-1980 (per cent)	5.5	3.7	6.4	3.2
Investment growth 1970-1980 (per cent)	10.0	4.8	7.8	1.6
Export growth 1970-1980 (per cent)	2.1	-0.4	3.9	5.8
Import growth 1970-1980 (per cent)	5.9	3.1	4.2	4.4
Investment rate 1980 (per cent)	25.7	25.0	27.0	23.0
Saving rate, 1980 (per cent)	18.3	22.0	25.0	22.0
Government consumption rate, 1980 (per cent)	19.0	11.0	14.0	17.0
Per capita income (US dollars) 1980	741.0	260.0	1 400.0	10 320.0
Population per physician 1977	6 500	5 810	5 840	620.0
Adult literacy rate (per cent) 1977	38	50	65	99
Life expectancy at birth (years) 1980	49	57	60	78
Urbanization rate (per cent) 1980	27	17	45	77
Per capita energy consumption (kg of coal equivalent) 1979	361	421	965	7 293

Source: ECA secretariat and World Development Report, 1982.

K. BACKGROUND TO A FUTURE

29. Before moving into the perspective of the African region by the year 2008, it is pertinent to reflect on how Africa reached the present sombre situation and to identify certain areas which, given the nature of things, are likely not to change significantly in the next 25 years. Today, there is little doubt that the colonial heritage, the present world economic order and the region's difficult geographic and ecological characteristics have contributed, in many ways, to the present problems of the African region. However, one must not lose sight of the fact that Africa's domestic order involving unfavourable development perceptions and patterns, static taboos and traditions, political and economic mismanagement, etc., is one of the major contributory factors to the socio-economic malaise in the region.

30. Most African countries sufferd from the effects of colonial domination for decades and, in some cases, for centuries. Throughout these long periods, the economic activities of the African countries, by the design of the colonial Powers, concentrated on the exploitation of the region's natural resources for the development of the metropolitan centres. With such forced and un-

healthy integration of the African region in the mainstream of the coloniser's social and economic order, the African economy was derailed and disoriented into (a) overspecialization in raw material production: (b) overdependency on external markets in a South-North framework: and (c) development of enclaves in the economies of the individual African countries. In the social field, the development of human resources in terms of education, training and skill development, health and other basic services was entirely neglected, thus crippling the very foundation of the development of the region. More tragically, the colonial domination left undesirable scars on the psychology of the African people resulting, *inter alia*, in a deep-seated loss of self-confidence and pride. Finally, the parcelling of the region by the colonial Powers into a large number of small States has, up to today, implied that many African economies are weak and unviable, thus reducing the ability of the region to gather the necessary momentum for socio-economic take-off.

31. While, through strenuous efforts, political independence was attained by the present 50 States members of the Economic Commission for Africa, socio-economic disengagement from the post-war world economic order (the so called the Bretton Woods order) has remained illusory. This world order has implied for the African region such tenuous characteristics as (a) perverse international financial and monetary arrangements; (b) increasing domination of the developed countries through, *inter alia*, transnational corporations; (c) monopolistic technology markets; and (d) stagnant or declining prices of raw material exports from the developing countries while prices of manufactured imports from the developed countries are continually increasing. The cumulative effects of such an order on the African region has been that Africa can hardly get the equity it deserves. The African economy remains, overly dependent on foreign trade, foreign capital, foreign technology, foreign expertise, etc.

32. Nature's designs on the African region in terms of geographic conditions and climatic changes have also often been calamitous. Floods, drought, desertification, tropical diseases and intense heat, etc. afflict a fairly large part of the African continent. More generally, the geographic location, the topography and the ecology of the region impose severe physical limits on the efficient exploitation of the region's natural resources. Furthermore, the African region has had to use machinery, equipment and basic materials - developed and produced in the temperate regions - which are not suited or adapted to the African tropical climatic conditions. As a result, the region's capital stock cannot easily be maintained within its normal economic life, implying chronic breakdowns and high obsolescence rates.

33. No doubt, the proper development of any region is also dependent on the domestic order which sets the preconditions for progress and acts as the catalyst to further advancement. The Herculean task of moving a people from the depths of poverty, backwardness, ignorance and disease to the heights of prosperity and modernity has never been achieved except through domestic efforts in a conducive domestic and international environment. In this context, it is disheartening to note that the development perceptions, concepts, attitudes and habits in Africa have tended merely to mimic other foreign patterns. Thus, the production structure and lifestyles in Africa have both contributed to the retardation of the region's growth. Over-all, production in Africa is dominated by services designed to promote mass consumption of foreign goods as is illustrated by the luxurious and conspicuous consumption of the African people as well as the many non-productive prestigious projects undertaken by Governments at the expense of productive sectors like agriculture. Indeed, most of the region's domestic resources - financial and human - continue to be diverted into speculative activities while areas that constitute the very bases for development and progress receive only slogans and promises. Within such an environment, the thinkers, planners and policy-makers in the African region have persistently marginalized the potential of and interplay between culture, traditions and development. Simple examples include the very large part of the population left our of the mainstream of Africa's development and the ignored potential of the region in areas like traditional medicines, technology, etc.

34. At the management level, Africa has so far been unable to achieve a social, political and economic environment conducive to the socio-economic welfare of the African population. Given the psychological distortions inherited from the colonial era, the present political structures still have problems in ensuring freedom and social justice commensurate with the needs of the region. The failure to democratize the overall development process has, therefore, grossly undermined the mass participation of the region's most important resource - its people. The development of enterpreneurial capacities and operational planning and implementation machinery is also jeopardised. Often, nepotism and corruption, coupled with a lack of trained manpower, have led to rampant mismanagement of crucial and key activities and services. Finally, the political tensions in the region have generally brought about misallocation of resources involving, in particular, massive defence expenditures.

35. In the assessment of Africa's perspectives as described in the scenarios in the following two parts, efforts have been made to contemplate the likely changes in Africa's future. However, it has to be emphasized that there are certain areas beyond the control of the African region alone. Thus, in assessing the two scenarios, one has to keep in mind that certain limits are imposed on the region by factors like the international economic order, natural phenomena, etc. But, whatever the case, the future evolution of the external and domestic conditions outlined in this part will necessarily have important implications on the evolution of the African region in the next 25 years.

PART II

THE AFRICAN REGION BY THE YEAR 2008 UNDER A HISTORICAL TRENDS SCENARIO

A. BACKGROUND

36. The preliminary projections presented in this part are intended to highlight the situation that the African region could find itself in by the year 2008 if most of the external and domestic elements outlined were to remain unchanged. The scenario is, therefore, presented under the assumption of a continuation of historical trends in some selected critical areas like demography, human resources, food, energy, industrial products transport and trade. 9/ Efforts have, however, been made not merely to extrapolate past growth rates up to the year 2008. To a large extend and whenever historical data were available and reliable, the variables treated in the scenario have been projected on the basis of simple but well established economic and technical relationships. In addition, to ensure that the scenario has an internal coherence and consistence, all the critical variables have been projected and integrated within an overall macro-economic framework summarized at the end of this part.

37. It is normal that some variables have to take into account other variables which might constitute physical or other limits to expansion. Thus, even in the historical trends scenario, physical limits to certain viables such as land and reserves of natural resources have been taken into account. But, disasters such as wars, floods and drought have not been envisaged in the scenario as these, naturally, lie beyond the realm of the present perspective analysis which deals mainly with seeing how Africa could manage the possible. The population variables have been treated as exogeneous to all the variables of the scenario. The population projections have, however, been derived from an independent population model established by the ECA secretariat. For the historical trends scenario, the high variant of the population projections was used.

B. DEMOGRAPHIC SITUATION IN 2008

38. The estimates of the mid-1980 demographic indicators presented in the first part of this analysis were based on the medium variant which allowed for declines in fertility and mortality with a nil or negligible net flow of migration outside the region during the 1960/1980 period. The corresponding indicators presented in this second part of the analysis for the year 2008 are based on the high variant assumptions which allow for higher fertility and lower mortality levels than were assumed for the medium variant again with a nil or negligible net flow of migration. The high variant projections of the demographic indicators are summarized in table 2. The data indicate that, on the basis of the observed levels in fertility and mortality around 1980, the total African population will be about 1.1 billion by the year 2008, implying an annual growth of 3.2 per cent during the next 25 years (1983-2008). The associated numbers of urban dwellers will be 472 million; children (0-14), 479 million; active population (15-64), 564 million; the aged (65+), 34 million; and school age, 1978 million (primary), 152 million (secondary), and 124 million (higher).

9/ While it is appreciated that the scope of Africa's development is very wide, the perspectives presented in this study have been limited to only a few critical areas believed to be of paramount importance to and having the major developmental and growth effects on Africa's future. In addition, owing to the heterogensity of some components in each of the critical areas, only some representative variables have been analysed and/or projected.

Table 2. Selected demographic indicators for Africa, 2008 (high variant scenario)
(in millions unless otherwise indicated)

Demographic indicators	*1980*	*2008*	*Annual growth rate*
Total population	440	1077	3.2
Urban population	120	472	4.9
Rural population	320	605	2.3
Population aged 0-14	199	479	3.1
Population aged 15-64	228	564	3.2
Population aged 65+	13	34	3.4
Population aged 6-11 (primary education)	80	178	2.9
Population aged 12-17 (secondary education)	65	152	3.0
Population aged 18-23 (higher education)	58	124	2.7
Life expectancy at birth - males	50.1	60.5	-
Life expectancy at birth - females	53.4	64.1	-
Average completed family size	5.1	4.8	-
Dependency ratio	94	91	-
Net migration (in thousands)	22	0	-

Source: ECA projections, 1983.

39. In appraising the demographic indicators presented in table 2 under the historical scenario, this analysis calls attention to the fact that rapid population growth rates have serious implications on the economic growth of any region because they slow down efforts to achieve rapid socio-economic development. Increased demand for food supplies and agricultural production tends to constrain the allocation of resources to other economic and social sectors. Unemployment and underemployment also become serious problems because the number of people seeking employment is larger than the number of available jobs. Because an ever increasing number of workers cannot be absorbed in the modern sector, they are either forced into unproductive service occupations or back into the traditional sector with its low productivity and bare subsistance wage levels. This large supply of cheap labour tends to hold back technological change; industrialization is slowed down by mass poverty, which in turn reduces the demand for manufactured goods. Thus widespread poverty, low productivity of labour, the growing demand for food and slow industrialization distort and degrade the international trade of the countries with rapidly growing populations. Worse still, essential services such as education, health and housing fail to keep pace with the population's requirements, resulting in social unrest. The projections presented in table 3 summarize the orders of magnitude of the employment and education problems that Africa could face by the year 2008 if present trends of very rapid population expansion continue.

C. THE DIFFICULT HUMAN RESOURCES SITUATION IN 2008

40. The labour force projections were made by applying cut-off points at ages 15 and 65 years and adjusting the population within this age group to exclude those not in the labour force, i.e. those in penal, medical and educational institutions as well as those in the armed forces. These number approximately 5 per cent of the total population within the age group 15 - 65 years. The total labour force is then distributed between rural and urban areas using the same ratio of labour

force to population in both areas. Since the age composition of the projected population and the school enrolment ratios are shown to be virtually constant over time, no significant changes in the ratio of the labour force to population is anticipated. In other words, labour force growth rates are projected to remain constant over time. Over all, the present projections show that by the year 2008 the African region will have a total labour force of 510.3 million with 286.8 million in the rural areas and 223.5 million in the urban centres.

41. To arrive at the magnitude of open unemployment, it was assumed that the phenomenon would continue to be negligible or non-existent in rural subsistence agriculture where the problem would be more one of underemployment. Open unemployment would therefore be confined to the formal wage economic sector. The average ratio of unemployed to the formal wage labour force in Africa is approximately 20 per cent (high variant). These ratios are applied to project the size of unemployment. A further adjustment is made to reflect the impact on employment of aggregate employment demand brough about by the projected growth in GDP. For Africa, an average incremental output to employment ratio (IOER) of 2:1 10/ was used to adjust for employment elasticities with respect to projected GDP growth rates. It is assumed that unemployment in the informal sector is non-existent and that labour force participation in that sector is exclusively in the form of employment. On the other hand, underemployment is taken to affect mainly the rural subsistance sector because of the seasonal factor in agricultural production and low productivity of factor inputs. It is currently estimated to affect 40 per cent of the rural African labour force and to be growing at an average annual rate of 4.2 per cent per annum. In the wage economy, it is more difficult to identify underemployment. The study has, therefore, used a proxy rate of 20 per cent (Chile, 1968) for the historical scenario to estimate and project the magnitude of underemployment in the African formal wage sector.

1. Open unemployment

42. Open unemployment has been plaguing the formal wage sector of African economies for quite some years now. It has been aggravated by worsening climatic, agricultural and overall socio-economic conditions in the rural/subsistence sector, which have propelled the drift of workers from rural to urban/formal sector wage employment markets. In addition, the declining growth of African economies has made it impossible for a large proportion of the labour force to be fully employed in wage-earning activities, the rapid expansion of the labour force resulting from high population growth rates having overtaken the economy's demand for labour. Another cause of open unemployment is the growing number of new entrants to the formal wage employment market from African educational systems. These young school leavers, aged between 15 and 24 years, come mainly from the first level of education (primary school) with very little by way of skills that could be utilized in economic activities. They are currently estimated to represent 22 per cent of all new entrants in the labour force. By the year 2008, this share is projected to rise to as high as 41 per cent.

43. The problem of open unemployment is confined more to formal wage labour markets. It is negligible in the rural/subsistence sector. However, since African formal wage labour markets are relatively small, the openly unemployed are very conspicuous. They number 13.3 million persons today, but will grow to 44.7 million workers by 2008. The unemployed in 2008 will amount in effect to a very large number of socially and economically unproductive persons. As a result, the dependency ratio will increase, thereby depressing the level of real earnings and incomes, exacerbating poverty and increasing crime and lawlessness. The strain on social services will also be immense. Hospitals, mental institutions, prisons etc. will have to grow in capa-

10/ The incremental output to employment ratio in Africa varies between 1.4: for Ghana and 1.6:1 for Zambia, to as low as 4:1 for Egypt.

city to meet this undesirable, and perfectly avoidable, psycho-social situation that unemployment will bring about. Political stability will also be undermined, as will democracy and human rights.

2. Underemployment

44. Underemployment falls into three broad categories:

(a) Visible underemployment, which includes a large number of workers in subsistence agriculture activities, where, especially in monoculture economies, the seasonal nature of production is such that more time than is desirable is given to leisure or non-economically productive activities. Most of the underemployed represent those whose production activities require less than 40 hours of labour per week;

(b) Disguised underemployment, which includes the employed but whose labour can be released without affecting production levels if there are simple changes in methods of production without any additional increase in capital and other inputs;

(c) Hidden underemployment, which applies to workers engaged in second-choice employment activities because jobs of their preference are not available at their level of skills or their desired wage rate.

45. Visible and disguised underemployment are prevalent in the rural/subsistence agricultural sector. Hidden underemployment is more concentrated in the urban informal sector as well as in public services in the formal sector. Disguised underemployment is increasingly becoming a problem in government and the public sector of African economies. Rural underemployment is at present estimated to affect 40 per cent of the labour force or 63.6 million workers. And if present trends continue, population pressure on the arable land will depress *per capita* agricultural output which, coupled with the probability of increased mechanization in agriculture, will adversely affect worker productivity in subsistence agricultural activities. Underemployment will therefore increase at approximately 4.2 per cent per annum to reach 70.8 per cent of the rural labour force, or 203 million workers by 2008.

46. Much of the cause of open unemployment and underemployment can be corrected through education and training. A good number of the unemployed fall into this category because they lack the necessary relevant skills as illustrated by the fact that, while industries and services in African economies continue to rely heavily on imported skilled manpower, there exist within these same economies large and growing numbers of "educated" unemployed persons. Through curriculum development, reorientation of subject structures and course offerings in formal educational institutions, it should be possible to redress the skills shortages and respond more directly to the needs of the employment market.

47. At the sectoral levels, extrapolations of the present trends indicate that there will be critical shortages of manpower in the key production sectors of the economy. Iron and steel projects will suffer from a shortage of engineers and high-level technicians. The need for metallurgists, mechanical, civil, electrical design instrumentation and other key engineering categories will grow substantially. A similar situation will apply to fertilizer, food and agro-industries, cement, all engineering industries, chemicals and pharmaceuticals industries. Thus, there is a need for education and training systems to grow both quantitatively and qualitatively in order to preempt the disaster facing Africa's human resources.

3. Education

48. In the education field, the projected rapid increase in the school-age population implies that there will be increased pressure on the education services. The projected gross enrolment levels for the first, second and third levels are fairly high and consequently the implied burden would be almost impossible to sustain. By the year 2008 total gross enrolment for primary school is estimated to reach around 176 million children while secondary school enrolment would amount to 70 million pupils. For higher institutions gross enrolment would be nearly 9 million students. In terms of teachers that have to be produced, the number of new schools that have to be built and the education materials that have to be provided, the education services would be strained and, most likely, educational standards would fall.

Table 3. Human resources: Education and employment in 2008 (in millions)

	2000	*2008*
Education enrolment	190.5	243.6
First level	136.9	175.9
Second level	49.0	70.0
Third level	5.6	8.7
Labour force a/	383.8	510.3
Rural	219.5	286.8
Urban	164.2	223.5
Wage employment b/	131.6	178.8
Open unemployment c/	32.7	44.7
Underemployment d/	166.3	238.8
Rural	140.0	203.0
Urban	26.3	35.8

Source: ECA projections, 1983.

a/ Excluding those in full-time education, medical and penal institutions as well as those in the armed forces (approximately 5 per cent of the age group 15-65).

b/ Representing workers engaged in the formal wage sector of the economy for no less than 15 hours a week for pay.

c/ Representing all those looking for work in the formal, informal or subsistence sector of the economy without success.

d/ All those in employment whose productivity because of health, personality or technical reasons, is lower than what is possible given the existing production conditions.

D. DETERIORATING SOCIAL CONDITIONS

49. If the present rates of rural-urban migration are assumed to continue over the next 25 years, the African region would, by the year 2008, be about 44 per cent urbanized. However, unless this urban rate is to be accompanied by a very fast expansion in urban services like water and sewerage, transport, health, housing and marketing, the largest part of the projected urban population of 472.1 million persons would be living in conditions of squalor. Housing requirements would reach unprecedented levels of over 220 million units by the year 2008 assuming that the average family would consist of around five persons. In the urban areas, where the tendency for single occupancy is higher, the housing problem will be even worse. For the region as a whole a total of over 115 million housing units would be required to house the urban population. By the year 2008 the major cities in Africa today would all be congested, with some of them like Cairo having a projected average population of over 10 million persons. Indeed, the projections show that, to absorb the projected urban population by the year 2008, a total of 72 African cities will each have to plan for an average population of 1 million or more.

50. But the conditions will not be hard only in the urban areas. The rural population will also face, in addition to a low income level and the deficient services, gigantic problems with respect to the land available for carrying the subsistence farming and the cash-crop production that generates rural income. Bearing in mind that as of now 44 per cent of the land in Africa is subject to drought and that the deserts in Africa are encroaching on useful agricultural lands at the rate of 60,000 to 70,000 km2 a year, it is projected that the pressure on the arable land of the continent will be of the order of magnitude of about 400 persons per km2 on the average. This would imply that, unless more land is urgently brought into use, an average family of four persons will have on average only 1 hectare of arable land on which to subsist.

51. The above problems will be further compounded by a low and more unevenly distributed total income by the year 2008. The total domestic income of the African region is projected to grow by an average annual rate of 5 per cent, reaching a level of $1,386.3 billion at 1980 constant prices by the year 2008. At this level the average *per capita* income for the region as a whole would be only $1,287.7 at 1980 constant prices. However, even this relatively low level of domestic income would exaggerate the real *per capita* level of the region given that, if historical trends continue, the region as a whole will have a net outflow of income transfers implying that the gross national product of the region as a whole would be less than the projected gross domestic product. Assuming that the present trends of increasing income disparities among the population of the African region will not worsen further during the 25 years between now and the year 2008, the poorest 40 per cent of the population will have a total gross domestic income of about $205.2 billion at 1980 constant prices or about 63 per cent of the total GDP in 1980, 25 years earlier. On the other hand, the richest 5 per cent of the population would have a total gross domestic income of around $332.7 billion at 1980 constant prices which is more than the total GDP of the whole of Africa in 1980. Further, if development activities which generate the wealth of countries continue to be biased against the rural areas and concentrated in urban centres, the African socio-economic structure will worsen in terms of the disparities between the rural and urban incomes. On basis of past and recent historical trends it is tentatively projected that by the year 2008 the rural-urban differentials on a *per capita* basis will be almost twice as bad as their present levels.

E. A CONTINUING FOOD CRISIS

52. In this study, the food situation by the year 2008 has been analysed and projected on the basis of three basic food commodity groups for the African region, namely cereals, roots, tubers

and pulses and meat. Each of these food groups plays a specific and particularly important role in the African food situation today. Cereals continue to be the most important food item in which the region as a whole has a large deficit and, therefore, it is important to see to what extent the region will be self-sufficient in this particular food component by the year 2008. Roots, tubers and pulses are in many parts of Africa important food crops especially in the rural areas, where many people subsist on food crops like cassava, yams, peas, beans, etc. Meat, on the other hand, is one of the major sources of proteins in the region as a whole. The projections of each food group are detailed below in table 4.

Table 4. African food balance: Some selected food commodities by 2008 under the historical trends scenario
(in millions of tons)

		1978-1980 a/	*2008*
A.	Cereals		
	Total cereal demand	74.8	203.1
	Food	59.9	159.0
	Industry	0.2	1.6
	Feed	5.3	17.9
	Seed	2.6	4.3
	Waste	6.8	20.3
	Total domestic production	58.4 b/	144.2
	Imports	20.9 b/	58.9
B.	Roots, tubers and pulses (in million tons)		
	Total demand	85.1	216.1
	Food	64.6	164.7
	Industry	0.1	0.4
	Feed	1.8	5.6
	Seed	4.8	9.7
	Waste	13.8	35.7
	Total domestic production	88.2 b/	216.5
	Imports		
C.	Meat		
	Total meat demand	4.7	13.6
	Total production	4.3	13.7
	Beef	2.3	5.0
	Mutton	1.0	3.7
	Pork	0.2	0.8
	Poultry	0.8	4.2

D. Self-sufficiency ratio (in percentage)		
SSR in cereals	75	71
SSR in roots, tubers and pulses	100	100
SSR in meat	93	100
E. *Per capita* food consumption levels (in kg)		
Cereals	142.1	147.8
Roots, tubers and pulses	153.3	153.3
Meat	11.1	12.6

Source: ECA projections, 1983, and FAO printouts, January 1983.

a/ The 1978-1980 figures are based on the FAO estimates of 40 African countries, except those figures with a symbol.

b/ Which apply to 50 countries for 1980 only. The 10 remaining African countries not included in the FAO study are Cape Verde, Guinea-Bissau, Sao Tome and Principe, Equatorial Guinea, Seychelles, Lesotho, Swaziland, the Comoros, Djibouti and Botswana.

1. Projected consumption and production of cereals in 2008

53. The projections of the total demand for cereals for the region as a whole were based on *per capita* consumption of cereals for food and levels of cereals post-harvest waste and demand for animal feed, for industrial use and for cereal seeds. In 1978-1980, the average *per capita* food consumption of cereals was about 142.1 kg per person. On the basis of the FAO historical trends projections 11/, which show a marginal increase in the *per capita* consumption of cereals, it was projected that by the year 2008 the *per capita* food consumption of cereals would be around 147.8 kg per person. With a projected population of around 1.1 billion in 2008, the projected *per capita* consumption of cereals would be 159 million tons. In addition to the projected food consumption of cereals, FAO projections for 2000 12/ were used to estimate the likely demand of cereals for industrial consumption, for animal food and waste by the year 2008. Thus the percentage of cereal wastage, industrial consumption and feed in total demand by 2008 would be about 10 per cent, 0.8 per cent and 8.8 per cent respectively. On this basis, the projections show that developing Africa as a whole would require a total of 203.1 million tones of cereals by the year 2008.

54. The projections of the production of cereals in developing Africa were based on the cereal self-sufficiency ratio of 71 per cent in 2008 estimated from FAO projections under scenario B. Consequently the total projected output of cereals by the year 2008 is 144.2 million tons, implying a relatively high average annual growth rate of about 3:3 per cent yearly in the next 25 years as compared to a mere 1.2 per cent recorded between 1970 and 1980. The implied cereal deficit of 58.9 million tons would have to be covered by imports, implying that cereal

11/ Based on FAO computer printouts, 11 January 1983.

12/ Scenario B, FAO computer printouts, 11 January 1983.

imports would increase at an average annual rate of 3.8 per cent yearly. However, this rate of growth in cereal imports is less than the rate of 10.8 per cent recorded in the 1970s. But even at this slower rate, the food import bill in 2008 would be shattering. Using the 1980 unit value of cereal imports of $229 per tons, the cereal import bill to cover the projected deficit in 2008 would amount to $14 billion at 1980 constant prices.

2. Projected consumption and production of roots, tubers and pulses in 2008

55. At present, the region is self-sufficient in roots, tubers and pulses. The projected consumption of roots, tubers and pulses is based on the *per capita* consumption levels which, according to FAO projections 13/, will remain stable up to the year 2000. Owing to the large deficit projected in cereals it is reasonable to assume that for the region as a whole, the rate of substitution resulting from an increase in income from the more traditional foods (roots and tubers) to cereals will be very limited. Thus, in the historical trend projections the *per capita* consumption level of about 153.3 kg was taken for the year 2008 resulting in a total requirement of 164.7 million tons of roots, tubers and pulses. Owing to the fact that, historically, the African region has had a very large percentage of food losses in the roots, tubers and pulses commodity group, total demand is very much higher than the consumption levels. For example, FAO projections show that waste in roots, tubers and pulses would be about 16.5 per cent of total demand in 2000. On the basis of the FAO projected shares of industrial consumption, feed and seed by the year 2000 a total of 51.4 million tons were projected to be part of the demand in 2008 for seeds, animal feed and waste. Therefore the total demand for roots, tubers and pulses. is projected to amount to 216.1 million tons by the year 2008. On the basis of the self-sufficiency ratio of 100 per cent in roots, tubers and pulses projected by FAO in 2000, the production of roots, tubers and pulses is projected to reach about 216.5 million tons.

3. Projected demand and output of meat and poultry in developing Africa in 2008

56. Under the historical trend scenario which assumes a slight improvement in the *per capita* consumption of meat by the year 2008, the projections show that developing Africa as a whole could maintain self-sufficiency in meat. The demand for meat was based on recent trends in the *per capita* consumption of beef, mutton and pork and poultry. From recent trends, the African region has shown a relative stagnation in terms of *per capita* consumption of non-poultry meat, while the *per capita* consumption of poultry has been growing very rapidly with an elasticity of nearly 3.0 with respect to *per capita* income. However in the present scenario it was projected that *per capita* poultry consumption would by 2008 reach to around 3.7 kg per person a year. *Per capita* consumption of meat (other than poultry but excluding camel meat) is projected to average about 9 kg per person in 2008 implying a total meat *per capita* consumption of 12.7 kg.

57. On the basis of historical trends the output of meat was projected using offtake ratios that take account of Africa's cultural patterns in the keeping of herds and chickens and applying a certain average carcass weight for each category of herd. The output pattern shows that in general beef production will increase by about 4.8 per cent between 1980 and 2008 while poultry meat will increase by over 6 per cent annually in the same period. At this rate, beef production is projected to amount to around 3.7 million tons and poultry meat would total 4.2 million tons representing 27 per cent and 30.7 per cent respectively of total meat supply in the year 2008.

13/ Ibid., p. 31.

F. INCREASING ENERGY SHORTAGE

58. In analysing the energy prospects of Africa under the present historical trends scenario, four categories of energy resources have been taken into account, namely crude oil, electricity (both thermal and hydro), coal and natural gas. In spite of the endowment of the African region in other forms of energy resources, particularly uranium and new and renewable energies, it is believed that the selected four categories will continue to be dominant in the coming 25 years. Also, though fuelwood now constitutes the most important share of consumption, the lack of accurate data and the probable shift to commercial energy resources as a normal and, indeed, necessary trend have made it impossible to make a long-term assessment of fuelwood consumption and supply.

59. For the projections of demand and supply of the four selected types of energy the years from 1978 to 1980 were used as base years depending on the availability of the relevant data. Generally, the two components of the projections (i.e. demand and supply) were treated separately and the balance used to determine the exports or the necessary imports net of stocks. In some cases and depending on the type and utilization pattern of a given energy resources, supply was derived from the demand projection.

1. Projections of crude oil in developing Africa by 2008

60. African crude oil consumption grew on the average by 8.7 per cent per annum during the period 1970-1979 with, however, a sharp deceleration to about 4.9 in the second half of the 1970s, as a consequence of the increasing energy prices and the shift, albeit slow, towards other forms of energy. In *per capita* terms, real consumption increased from 81.6 kg/person in 1970 to about 131.6 kg/person in 1979, an average annual growth rate of 5.4 per cent although the growth was only 2 per cent per annum during the period 1975-1979. Over all the elasticity of *per capita* consumption of crude oil to *per capita* income in the 1970s averaged between 2.2 to 2.3 but dropped substantially to about 1 in the second half of the decade.

61. However, the present oil glut resulting from oversupply of the oil market has led, since 1980, to a substantial reduction in oil prices which is believed to be a long-term trend according to various sources. Hence, the historical elasticity of Africa's *per capita* oil consumption in the 1970s was assumed to prevail for the next 25 years. Accordingly Africa's consumption of crude oil was projected to reach about 536.7 million tons in 2008 or an average annual increase of 7.9 per cent per annum as against 8.7 per cent yearly during the period 1970-1979. In other words, future growth, although relatively lower than in the past, would still be high, and would maintain crude petroleum as the most consumed commercial energy in the region. The corresponding level of *per capita* consumption in 2008 is estimated to be about 498.6 kg/person, or an annual average increase of 4.7 per cent from the 1979 level. It should be noted that, in spite of the rapid growth of Africa's crude oil consumption, the level of *per capita* consumption in 2008 would still be lower than the world's average in 1970 estimated at 645 kg/person.

62. On the supply side, projections were based on recent studies of energy resources of Africa 14/ which generally pointed to continued slow growth in Africa's production of crude oil in the coming years. Actually the growth rate of crude production is expected to remain at the level of about 2 per cent per annum in the 1980s followed by a deceleration to 1.5 per cent yearly in the 1990s and beyond. Assuming such a trend, the production of crude oil in 2008 was estimated to be around 508.7 million tons in the year 2008, implying an average annual increase of 1.9 per cent from the 1979 level. This relatively pessimistic projection is based mainly on.

14/ Energy resources in Africa, OAU/ECA secretariats, March 1980 p.57.

(i) the increasing problems in the world oil market resulting particularly from the industrialized countries' policies of substitution and conservation which would significantly reduce the growth of demand for crude petroleum; and (ii) the present pattern of production in the African oil-producing countries which rely mainly on the demand in the developed countries.

63. According to the same sources, Africa's crude oil exports expressed as a percentage of total production dropped from about 90 per cent in 1975 to about 85 per cent in 1980. Such a trend is projected to continue to reach about 65 per cent in 2000 and 50 per cent in 2008. Hence the export volume of crude oil of Africa would be about 254.3 million tons in 2008 or an average annual decrease of 0.3 per cent from the 1979 level. As a result, Africa's crude oil imports (net of stocks) will amount to about 282.3 million tons in 2008 or an average annual growth of 6.1 per cent in the 1979-2000 period. Such a growth in imports would imply a relatively high elasticity of about 1.2 with respect to gross domestic product.

64. In conclusion, the situation of the continent with respect to crude petroleum would not improve in the next 25 years since all oil imports would still represent more than 50 per cent of total consumption in 2008 in spite of a substantial drop from the level of 84 per cent in 1979. As a result, oil imports will continue to have serious effects on the balance-of-payments situation of oil-importing African countries. To reverse such a disastrous trend it is imperative to intensify intra-African co-operation in order to ensure safe oil supplies to African oil-importing countries. In that respect, the continent's oil resources should primarily meet Africa's need and a suitable legal, financial and commercial framework would have to be worked out, as recommended in the Lagos Plan of Action.

2. Future trends in electricity demand and supply

65. During the period 1970-1978, *per capita* consumption of electricity in developing Africa grew at an average annual rate of 4.6 per cent. During the second half of the 1970s, the growth in *per capita* consumption of electricity registered a substantial drop to only 2 per cent as a consequence of increasing energy prices and increasingly difficult domestic conditions. The deceleration in the growth of *per capita* consumption stems also from the substantial reduction in industrial activities in recent years in many developing African countries. Actually, frequent breaks in electricity supply were registered in a large number of African countries because of fuel shortages, poor maintenance of the production, transport and distribution equipment and lack of spare parts. In some other countries supply in electricity is no longer determined by demand. On the contrary electricity producers deliberately discontinue to supply of electricity to some consumers so as to cater for specific priority sectors such as hospitals, schools, airports, telecommunications and other strategic activities.

66. As a consequence of such a declining trend, the elasticity of *per capita* consumption to *per capita* GDP dropped sharply from 3.1 in 1970-1975 to only 0.7 in 1975-1978 although, on the average, the elasticity of *per capita* consumption of electricity with respect to *per capita* GDP was about 2 during the period 1970-1978. If recent trends continue the average *per capita* potential demand in developing Africa in 2008 would not be more than 687.2 kWh/person which implies an average annual growth rate of about 5 per cent from the 1978 level of 159 kWh/person. In other words, the average *per capita* potential demand of electricity in developing Africa in 2008 would be only slightly over the 1979 *per capita* consumption of Zimbabwe estimated to be about 659 kWh/person. 15/ The total electricity potential demand of developing Africa was projected to be around 739,771 GWh in 2008 or an average increase of 9 per cent from the 1978 level, which is almost the same trend as in 1970s.

15/ United Nations, Yearbook of World Energy Statistics, 1979.

67. Although the level of potential demand for electricity is moderate, the supply projections show that the demand might not be met if current trends were to continue. In developing Africa, the rate of increase in the production of thermal electricity was about 7 per cent per annum in the 1970s. Historical projections on the basis of past trends point to an average annual growth of about 6.8 per cent between 1978 and 2008 which implies a total thermal production of about 161,601 GWh. Hydroelectric production, which in 1978 had a share in total production of developing Africa of about 68 per cent, has registered a substantial increase in the 1970s with an average annual growth rate of about 9.6 per cent during the period 1968-1978. 16/ However, recent trends show a decline in the growth of hydroelectric production mainly because of technical as well as financial factors. It is well known that in addition to the long time required for studying and harnessing water resources, hydroelectric installations are highly capital intensive and the financial resources required are difficult to raise by any developing African country, especially in the present context of rampant financial crises, high interest rates and reduced financial flows to developing countries including official development assistance. Taking into account the above factors, hydroelectric production was, therefore, projected to grow at an average annual rate of about 8 per cent which implies a total production of 478,500 GWh in 2008. Over all, total electricity production in Africa would be about 604,104 GWh in 2008 under the scenario based on the continuation of historical trends and patterns, or an average annual increase of 7.4 per cent.

68. The above projections of electricity production show that, unless developing African countries increase and diversify their productive capacity, the relatively moderate projected historical demand would have to be substantially curtailed to match available supply. The frustrated demand by 2008 would amount to 135,667 GWh or twice total electricity consumption in 1978. The implications of such a situation are quite disastrous as (i) an increasing number of households would have to live much below the minimum standard of living; (ii) rural electrification would be seriously jeopardized as would, in consequence, productivity in the agricultural sector; and (iii) a growing number of industrial activities would continue to be negatively affected by energy shortages. Indeed, if actual consumption in 2008 would have to be limited to available supply, the level of *per capita* consumption in 2008 would be only 561 kWh/person, which corresponds to the 1979 *per capita* consumption of the Libyan Arab Jamahiriya.

69. Assuming that the average use of installed capacity in developing Africa would increase to about 5,000 hours from the 1978 level of 3,569 hours, the projected electricity production level, although modest compared with the projected potential demand, would imply installed capacities of about 95,700 MW and 32,300 in hydroelectric and thermal plants respectively by 2008, or a total installed capacity of 128,000 MW. The cumulated additional capacity that would have to be installed from 1978 to 2008 would therefore be about 109,000 MW or an average of 363 MW per year. Over all, the average annual growth rates of installed capacities would be 7.5 per cent and 4.6 per cent for hydroelectric and thermal plants respectively. Such increases would require substantial investment amounting to about 200 billion 1980 United States dollars on the average or 6.7 billion 1980 constant United States dollars per year which represents about 9 per cent of the total investments of developing Africa in 1980.

3. Future trends in coal production and consumption in Africa

70. As indicated earlier, developing Africa's share in the coal production and consumption of total Africa (including South Africa) is very small. In 1978, developing Africa's coal consumption and production were only 6.8 and 4.8 million tons respectively which implies a deficit of about 2.0 million tons, covered by imports. While Africa's total consumption and production

16/ Energy resources in Africa, OAU/ECA, March 1980.

(including South Africa) grew at average annual rates of 4.6 per cent and 5.9 per cent respectively during the 1970s, developing Africa's rates of growth were only 1 per cent and 0.2 per cent during the same period. However, such trends in developing Africa's consumption and production of coal might be reversed since relatively high petroleum prices might induce more African countries to exploit more of their coal resources for both domestic consumption and export. Another reason which could be advocated for a faster growth in coal consumption and production is the possibility of its distillation to obtain synthetic petroleum.

71. According to relevant sources 17/, a number of African countries have already started research and intensified exploration and exploitation of their coal resources which might, in the long term; bring about a relatively fast increase in developing Africa's consumption and production of coal. It was therefore assumed, given present trends, that coal production and consumption of developing Africa could increase at annual average rates of about 1.3 per cent and 2.5 per cent respectively. Consequently, developing Africa could by 2008 be self-sufficient in coal with a slight surplus as compared to the 1978 situation when imports represented about 30 per cent of total coal consumed. Such improvement in the coal sector would undoubtedly relieve the burden on the balance-of-payments of countries with coal deposits such as Zimbabwe, Swaziland, Botswana, Mozambique, the United Republic of Tanzania, etc. However the prospects could be significantly improved if more intensive exploration and exploitation were to be undertaken in the 1980s and 1990s.

4. Historical projections of natural gas demand and supply in developing Africa

72. As indicated above, Africa's consumption of natural gas is very low as a result of the low demand both for household and industrial uses, amounting to only 6.7 billion m3 and 7.4 billion m3 in 1978 and 1979 respectively. However, natural gas consumption has grown relatively fast especially in the latter half of the 1970s because of increasing use in two main producing countries, namely Algeria and Nigeria. Actually, in addition to the small, but growing household consumption, these countries are orienting some of their industrial activities towards using natural gas, especially in thermal power plants and steel production. Therefore, in the historical scenario, it was assumed that natural gas consumption will continue to grow, particularly in oil-producing countries, at an average annual rate of 6.2 per cent, which is the trend of the late 1970s. Consequently, the projected domestic consumption of natural gas in 2008 could be about 40.7 billion m3.

73. As the supply of natural gas is generally demand-determined and taking into account recent trends showing an increasing share of domestic consumption in total production, it was assumed that by the year 2008 domestic consumption of natural gas would represent about 40 per cent of total production as against 32 per cent in 1978. Hence total production in 2008 would be about 101.8 billion m3 and export would account for about 61.1 billion m3. At present, Algeria is exporting about 70 per cent of its production of natural gas, mainly to developed countries, and Nigeria is also planning to export part of its production to the industrialized countries where demand is increasing rapidly. However, over the 25 years between now and 2008 the European market might be oversupplied mainly because of the volume of natural gas production in Soviet Union and the recent trade arrangements between this country and other European countries. The growth of natural gas exports have, therefore, been projected to slow down in the next 25 years to about 5.1 per cent per annum. But if exports of natural gas cannot maintain the 5.1 per cent growth, African producers might have to reduce their production of gas or increase their domestic consumption of natural gas.

17/ Energy resources in Africa, OAU/ECA, March 1980.

Table 5. Selected commercial energy types - Africa 2008 under the historical trends scenario

	1978 a/	2008	Average annual growth
A. Crude oil (million tons)			
Total production	289.7	508.7	1.9
Exports	279.0	254.3	-0,3
Imports b/	50.1	282.3	6.1
Apparent consumption	59.8	536.7	7.9
B. Electricity (GWh)			
Potential demand	69 985 c/	739 771	8.2
Installed capacity (in MW)	19 121	128 000	1.1
- Thermal	8 298	32 300	4.6
- Hydroelectric	10 823	95 700	7.5
Total production	69 985	604 104	7.4
C. Coal (million tons)			
Total consumption	6.8	10.1	1.3
Total production	4.8	10.2	2.5
Net imports b/ (exports)	2.0	(-0.1)	
D. Natural gas (billion m3)			
Total demand	6.7	40.7	6.2
Total production	20.0	101.8	5.6
Net exports	13.6	61.1	5.1
E. Per capita demand level			
Crude oil (kg/person)	131.6	498.6	4.7
Electricity (kWh/person)	159.0	687.2	5.0

Source: ECA secretariat projections, 1983.

a/ The figures for crude oil refer to 1979.

b/ All import figures are net of stocks.

c/ Actual consumption

G. WORSENING INDUSTRIAL DEPENDENCY

74. In projecting the trend in Africa's industrial development by the year 2008, three basic areas have been covered namely (a) capital goods, (b) intermediate goods and inputs, and (c) manufactured consumer goods. In each of these areas some representative and crucial product groups have been taken and projections made for both supply and consumption of each group by the year 2008. In the capital goods sector two product groups are considered: (a) tractors and animal trac-

tion from the agricultural machinery and implements group and (b) passenger cars and commercial vehicles from the transport equipment group. In the intermediate goods sector three critical inputs - fertilizers, cement and iron and steel - are dealt with. Finally, textiles and pharmaceuticals have been chosen among the consumer goods, to illustrate the special paradox of Africa's continued consumption of what it does not produce and the rejection of what it produces.

75. The overall picture of the projections of the above industrial product groups on the basis of a continuation of present trends in Africa's industrialization process shows that the region as a whole will, by the year 2008, continue to be highly dependent on the industrial products of other regions. This disturbing situation is projected without taking into account the rate of technological change in the industrialized countries which, if accounted for, would imply an even worse dependence. According to the projections, if the present industrial trends persist for the next 25 years, the African region would still have to import over 97 per cent of its tractor requirements, over 96 per cent of the region's projected demand for passenger and commercial vehicles, 37 per cent of fertilizers, 12.3 per cent of cement and 59 per cent of iron and steel. This situation would, no doubt, imply that the African region would, if present trends continue without drastic industrial structural changes, remain unindustrialized even by the year 2008. The details of the projections for each industrial product analysed are outlined below.

1. Selected capital goods from the agricultural machinery and transport equipment groups

(a) Tractors

76. The historical scenario is based on the trend of an annual growth rate in the number of tractors in use in developing Africa of 3.88 per cent between 1969 and 1979 and the growth elasticity of tractor utilization with respect to the growth in total GDP. With the historical elasticity of 0.8 and the projected growth in total GDP of around 5.3 per cent during the period 1980-2008, the growth rate in the number of tractors in the next 25 years is estimated at 4.2 per cent per annum. Using this trend and assuming a replacement rate of 10 per cent, the region as a whole would need an annual increase in the number of tractors in use by the year 2008 of about 113,830. Assuming the present level of domestic production in a few countries 18/ the supply of tractors is extrapolated to reach an additional 570 tractors per year in the year 2008. Given that the utilization of tractors affects the rate of agricultural and food output, a continued low level of tractor supply would have serious implications on the region's overall economic development. Agriculture and the related industries will suffer severe production setbacks and the severe food crisis would worsen with a tremendous drain on the already depressed foreign exchange reserves and foriegn exchange export earnings.

(b) Animal traction equipment

77. In the absence of reliable data on the 1970s, the historical projection of the demand for animal-traction was based on the number of draught animals. The demand for animal traction is projected to reach 1.1 million units for the region as a whole by the year 2008. 19/ It should be noted that this projection reflects the slow change towards the modernization of the agricultural sector. Since imports are not generally involved in animal traction equipment, self-sufficiency has been assumed. In this sence, the projected total requirements determine the required level of domestic production which also is usually undertaken by the informal sector.

18/ Production in Africa is mainly in the form of assembly only. This was converted into an equivalent number of tractors produced.

19/ This estimate is based on the projections of FAO: Agricultural mechanization and demand for agricultural machinery and equipment to the year 2000.

(c) Projections of passenger cars for the African region in 2008

78. The historical demand projections for passenger cars have taken into account the needs of the population. The rate of change in the number of persons per car has been estimated from the number of passenger cars in use between 1970 and 1978 at -4.6 per cent yearly. On the basis of this rate which reasonably reflects the likely income effects on increased demand for passenger cars with an elasticity of -1.9 with respect to *per capita* income, the number of persons per car by the year 2008 is projected to drop significantly to 36 from a level of 124 persons per car in 1978, implying a total number of passenger cars in use of 29.9 million. Using the average annual growth of 7.7 per cent in the number of passenger cars together with an estimated replacement rate of about 7 per cent, the annual increase in passenger cars by the year 2008 will reach 4.4 millions.

79. It should of course be stressed that, despite the severe foreign exchange shortages being experienced by developing African countries, the past trends show that a very considerable amount of resources continue to be spent on imports of transport equipment. As the domestic production of passenger cars in developing Africa consists basically of assembling imported parts, a ratio of 10 per cent was estimated to represent the value of the domestic component in the total value of the assembled car. With the assumption that the region will assemble about 30 per cent of its total requirements of passenger cars, 20/ the total production of passenger cars by the region is projected to reach 132,000 in vehicle equivalent by the year 2008. It is apparent that the high tendency to conspicuous consumption particularly in the form of expensive private cars would reflect seriously on the region's economic growth especially in terms of the level of savings to be attained and the shortages of foreign exchange resources for productive activities.

(d) Projected demand and supply of commercial vehicles in Africa in 2008

80. The demand and production of commercial vehicles in the historical scenario are estimated on the basis of growth elasticities. The observed growth rate of commercial vehicles in use of 8.2 per cent and of total GDP of 5.2 per cent between 1970 and 1978 implies an elasticity of 1.6 which gives a growth in commercial vehicles in use of 8.5 per cent between now and the year 2008. Using this growth rate, the projected number of commercial vehicles in use by the year 2008 is about 200 million. Taking account of the replacement rate, the total annual requirement of commercial vehicles for developing Africa as a whole, is estimated to reach 3 million vehicles by 2008. However, it should be kept in mind that such projected increases in the demand for transport equipment have to be accompanied by substantial increases in the establishment of the necessary transport services.

81. On the side of supply, it is known that in many countries of the region commercial vehicle bodies are domestically built as some of the basic components are locally available. Thus, to estimate the level of domestic supply by the year 2008, a ratio of 2 per cent representing the domestic contribution to the supply of commercial vehicles was used to obtain domestic production in vehicle equivalent. 21/ If the ratio is applied to the total number of commercial vehicles required then the domestic production of the region will supply only about 60,000 vehicles by the year 2008.

20/ On the basis of the historical trends in car assembling in Africa, this assumption would seem relatively moderate. For example, the number of cars assembled in developing Africa increased from 36,700 in 1970 to 101,200 in 1977. However, even this moderate share of assembled cars in total annual demand of cars by 2008 would represent about 1.3 million cars produced elsewhere but merely assembled in Africa.

21/ On the basis of the historical trends in commercial vehicle assembling in Africa, the proportion of vehicles assembled to total vehicles acquired has declined. While in 1970, 22,600 commercial vehicles were assembled in the region, only 16,900 commercial vehicles were assembled in 1977.

Table 6. Selected capital goods: Africa by 2008 under the historical trends scenario

	1980	2008
A. Tractors:		
Tractors in use ('000s)	253.3 a/	801.6
Annual demand for tractors ('000s)	7.0 a/	113.8
Domestic supply	n.a.	0.6
Imports	n.a.	113.2
B. Passenger cars:		
Number in use (millions)	3.3 a/	29.9
Number of cars per 1,000 persons	8.0	28.0
Annual increase (millions)	0.4	4.4
Domestic production (millions) b/	n.a.	0.1
Imports	n.a.	4.3
C. Commercial vehicles:		
Number in use	1.7 a/	19.9
Annual increase (millions)	n.a.	3.0
Domestic production ('000s) b/	16.9	60
Imports (millions)	n.a.	2.9

Source: ECA projections, 1983.

a/ Data refer to 1978.

b/ The figures refer to value added equivalent in the total number of vehicles assembled.

2. Selected intermediate products

(a) Projections of demand and supply of fertilizers in developing Africa by 2008 under historical trends

82. Fertilizers, together with pesticides, constitute the major agricultural chemicals. Fertilizers are among the most expedient inputs for increasing agricultural, particularly food productivity, in the short and long term and their role in mitigating the worsening food crisis in Africa will be increasingly crucial. It is therefore apparent that the development of agriculture, and food in particular, determines the demand for fertilizers. In other words, demand for fertilizers can be projected using parameters related to agriculture in addition to those based on the historical trends. These include (i) *per capita* fertilizer consumption, (ii) per hectare fertilizer application, and (iii) desired food production levels. In view of the food crisis, projections based on increased food production to improve the food situation appear to be the most realistic approach. This approach was used in the present study. Thus, on the basis of the projected level of food production by the year 2008, the level of total fertilizer requirements by the year 2008 was projected to reach about 7,880 thousand tons.

83. The projections of the supply of fertilizers under the historical trends scenario were based mainly on the observed self-sufficiency ratios in fertilizers of the 1970s. A review of the gap between total fertilizer consumption and production reveals that the self-sufficiency ratio recorded a pronounced decline from an average of 78.6 per cent in the first half of the 1970s to 63.2 per cent in the second half. On the basis of the average self-sufficiency ratio observed in the second half of 1970s, the supply of fertilizers was determined from the projected consumption level in the year 2008. Thus, domestic production was projected to reach 4, 980 thousand tons or average annual rate of increase of 4.6 per cent. None the less, the projected rate of increase in Africa's production of fertilizers is apparently on the high side compared to the recorded historical rate, mainly because the self-sufficiency ratio has been assumed to stay at the level of the mid-1970s whereas it has been declining throughout the decade. However, even with this optimistic assumption, the projected overall deficit of 2,900 thousand tons to be met by imports to satisfy the growing consumption requirements in the year 2008 will have serious implications for the scarce foreign exchange reserves of the region. But, if the region is to avoid the chronic calamities of food shortages, particular attention has to be placed on arresting the trend of declining agricultural productivity.

(b) Projections of cement in developing Africa by 2008 under the historical trends scenario

84. The basic determinant of the demand for cement is construction activity which covers not only housing but also public, commercial, industrial and social infrastructure. Cement consumption has been increasing especially in the second half of the 1970s as a result of the boom in construction activity. For the African region as a whole the average annual growth rate of *per capita* cement consumption in the second half of the 1970s was 2.5 per cent with an elasticity with respect to *per capita* income of 1.1. With a projected *per capita* GDP growth of 2.1 per cent in the next 25 years, the *per capita* consumption of cement was projected to grow at an average annual rate of 2.3 per cent between now and the year 2008. The corresponding level of cement consumption by the year 2008 would therefore amount to 130.3 million tons implying an average annual growth rate in total consumption of 5.6 per cent between 1980 and 2008. This would imply a doubling of cement consumption every 18 years. 22/ Nevertheless, the *per capita* consumption of cement, which is projected to increase substantially from 64 kg in 1980 to 121 kg in 2008, would still be lower than the 1980 *per capita* cement consumption in developing countries like Argentina (194 kg) or Turkey (174 kg).

85. Historical trends show that the supply of cement has been growing faster than the demand implying a narrowing of the gap between the demand and supply of cement. Hence, the supply of cement in the historical trend scenario assumes a continued narrowing in the share of the gap relative to total output from 18 per cent in 1980 to arount 14 per cent by the year 2008, giving a total production level of 113.9 million tons in the year 2008 and an overall deficit of 16.4 million tons to be covered by imports. The region as a whole will, therefore, have to continue to depend on cement imports.

(c) Iron and steel projections for the African region in 2008

86. The projections of iron and steel consumption have been based on the iron and steel intensity as the consumption of steel is closely related to the development of the economy as a whole. Steel consumed in the steel-using industries has been related to GDP to derive the historical growth of iron and steel intensity which comes to around 1.9 per cent per annum. The steel

22/ Some historical data on cement consumption have shown a doubling in cement demand every 10 years.

intensity per dollar of GDP was estimated at 0.218 x 10^{-3} tons by the year 2008 which gives a total consumption level of iron and steel in the African region as a whole of 97 million tons in the year 2008. This level implies a growth in steel usage in developing Africa of 7.3 per cent per annum which is a reasonable estimate in comparison with other developing regions. 23/

87. The projections of iron and steel supply have been based on historical capacities. From the available data of the 1970s, it has been observed that domestic production of iron and steel meets about 8.2 per cent of the region's total requirements. However, this is a very conservative estimate in view of the capacity planned to be installed in some countries of the region, namely Nigeria, Algeria, Egypt, the Libyan Arab Jamahiriya, Morocco and Kenya. As a result a significant improvement in steel production has been assumed in the projections of the supply of iron and steel under the historical scenario. Thus, a five-fold increase in present capacities 24/ is

Table 7. Selected intermediate products: Africa by 2008 under the historical trends scenario

	1980	*2008*
A. Fertilizers (thousand tons)		
Total demand	2 278	7 880
Total production	1 422	4 980
Balance	-856	-2 900
B. Cement (million tons)		
Total demand	28	130
Total production	23 a/	114
Imports	n.a.	16
C. Iron and steel		
Steel intensity (tons/$ of GDP x 10^{-3})	0.129	0.218
Total direct and indirect demand for iron and steel (million tons)	13.4	97.0
Total production (million tons)	6.5 b/	39.8
Imports (million tons)	n.a.	57.2

Source: ECA projections, 1983.

a/ Data refer to 1979.

b/ Installed capacity.

23/ The growth rate is higher than the 4 per cent estimated by UNIDO in the low growth scenario because of differences in the projected GDP growth. See 1990 Scenario for the iron and steel industry, IO/WG.374/2A and addendum 1.

24/ This assumption is not on the high side as quite a number of developing African countries produced steel which constituted about 10 to 20 per cent of their national requirements in the 1970s.

projected which would imply a growth of 10.9 per cent per annum in steel production in the next 25 years. The level of iron and steel production in developing Africa would reach 39.6 million tons by the year 2008. This, however, would imply that developing Africa would still remain a heavy importer of iron and steel since about 57 million tons or to 59 per cent of the total direct and indirect requirements of iron and steel would be imported.

3. Selected consumer goods

(a) Future trends in textile fabrics

88. In the historical scenario, the projections of demand for textile fabrics was based on a projected growth of *per capita* income of 2.3 per cent yearly and an elasticity of 0.83 of *per capita* consumption of fabrics. On this basis the *per capita* consumption of textile fabrics is projected to increase from a level of about 2.0 kg in 1980 to 3.2 kg in 2008. The projected *per capita* consumption is still lower than in some developing regions such as Latin America which has a *per capita* consumption of over 4 kg of fibre in the 1970s. Thus the projected total textile consumption by the year 2008 is 3.4 million tons.

89. The supply of textile fibres has been projected taking into account the trend of concentrating on the development of cotton fabrics for which Africa has an advantage over man-made fibres. Using the share of cotton processed out of the total cotton lint produced and applying the technical conversion factor of cotton to fabrics estimated at 0.85, total domestic production was projected to amount to about 2.5 million tons. However, as past indications show, Africa has not always consumed a large share of its production of cotton. For example in 1980, the region as a whole consumed only 52 per cent of its total output of cotton lint. For this scenario the projected production of fabrics corresponds to 60 per cent of the total production of cotton lint by the year 2008 which leaves a balance of 1.9 million tons of cotton lint for export as compared to an export level of about 0.6 million tons in 1980. However, a balance of 0.9 million tons of fabrics would have to be covered by imports of synthetics. If such dependence on imported man-made fabrics were to continue without corresponding efforts to initiate import-substitution programmes, the African region would face unwarranted foreign exchange losses which could easily be alleviated by persuading the African population to consume more of the cotton fibres which it can produce.

(b) Projected trends in pharmaceuticals

90. Factors determining consumption of pharmaceuticals include Government policies and programmes, personal disposable income, availability of drugs at reasonable prices, availability of and access to health service facilities, population size, type and prevalence of diseases, etc. In this connection, it should be noted that pharmaceuticals form an essential component in WHO's Health for all by the year 2008 programme.

91. Statistics on pharmaceuticals are not readily available particularly in quantity terms. Resort had therefore to be made to estimating the apparent consumption in value terms. Such consumption was estimated on the basis of imports, exports and production. Export and production in terms of active ingredients are negligible at present and probably limited to vegetable alkaloids and derivatives, glycosides, glands, seras and vaccines. On the basis of historical data, a relationship between *per capita* pharmaceutical consumption and *per capita* income 25/ gave an estimate

25/ See Pharmaceuticals in Africa (E/CN.14/INR/217), August 1976.

of $7.3 billion at 1980 prices as the level of pharmaceutical consumption in the African region by the year 2008. Because of margins of importers, formulators, wholesalers and retailers, the likely apparent consumption on the basis of pharmaceutical sales would at least be double the c.i.f. values.

92. With regard to supply, indications are that about 20 per cent of the pharmaceutical consumption is formulated in the region. As the bulk drugs for formulation are imported, the self-sufficiency ratio for modern drugs is likely to be close to zero. Historical trend would then imply continuing complete dependency on foreign supply of pharmaceuticals.

Table 8. Selected consumer goods: Africa by 2008 under the historical trends scenario

	1980	*2008*
A. Textiles		
Total demand (million tons)	0.8	3.4
Per capita consumption (kilograms)	2.0	3.2
Exports (million tons of lint)	0.6	1.9
Imports (million tons of man-made fabrics)	n.a.	0.9
Total production	0.3 a/	2.5
B. Pharmaceuticals (in billions of $ at 1980 constant prices)		
Demand based on c.i.f.	1.1 b/	7.3
Demand based on sales	2.2	15.6

Source: ECA projections, 1983.

a/ Data refer to 1979.

b/ Data refer to 1978.

H. TRANSPORT INFRASTRUCTURE IN 2008 UNDER THE HISTORICAL TRENDS SCENARIO

93. Owing to the paucity of data relating to the main transport indicators, the quantitative projections have been limited to a few modes of transport namely air and maritime. Even in these selected fields, the orders of magnitude indicated in the scenario (table 9) should be interpreted only as broad indications of the likely transport situation in Africa if present trends were to continue up to the year 2008. However, two other important transport modes critical to the development of the region, namely roads and railways, have also been qualitatively analyzed in the framework of the on-going United Nations Transport and Communications Decade (UNTACDA) and beyond. More specifically, the planned Trans-African Highways and their feeder links have been taken into account with respect to their role in ensuring an integrated African transport network.

94. It should be noted that, in the overall perspective of the transport sector in Africa by 2008, the primary development focus, based on UNTACDA, has to be on (a) the promotion and development of integrated infrastructures; (b) formulation and implementation of harmonized

transport anc communications regulations and rules on a subregional and regional basis; (c) minimization and facilitation of procedures to permit easier access to land-locked countries and other isolated regions and the faster movement of persons and goods; (d) promotion of the development of basic communications and transport industries in Africa; (e) important relationship linking the productive sectors of agriculture, mining and industry to the development of road, railways and air transport modes; and (f) political will to integrate the African region not only in terms of infrastructure, production and trade but also in terms of the social structure of its people. Such elements are at the very core of all the on-going African efforts to establish subregional co-operation structures.

1. Maritime transport

95. The importance of maritime transport in Africa is reflected firstly by the fact that more than 95 per cent of the total volume of the region's trade (imports and exports) is seaborne. Secondly, maritime transport is of vital importance to the island countries of the African region. Thirdly, the African region, as of now, spends over $6 billion on freight payments. In terms of volume, the seaborne trade of Africa amounted to 560.5 million tons and 571 million tons in 1980 and 1981 respectively. Crude oil has been the major component of the region's seaborne trade accounting for about 70 per cent of all the region's merchandize carried by sea. However, the share of the actual freight transported by Africa's own fleet in the total seaborne trade of Africa is only about 1.6 per cent since the region as a whole has a vessel capacity of only 7.2 million dwt from a fleet of about 290 vessels.

96. On the basis of the projected growth of Africa's exports and imports under the historical trends scenario, the total seaborne trade of Africa is expected to more than double in the next 25 years to reach 1.35 billion tons in 2008. Assuming that the share of seaborne trade transported by Africa's fleet will not increase significantly given the scarcity of resources and the fact that the efficiency of the fleet and port operations will be at the low levels recorded in the past, the total volume of seaborne trade that would be transported by Africa's fleet is projected to around 27 million tons in 2008 as against 9.1 million tons in 1981 which implies a near trebling in the next 25 years. In terms of vessel capacity in dead weight tonnage (dwt), the region as a whole would need an additional capacity of about 14 million dwt equivalent to about 570 vessels.

2. Air transport

97. In 1980 the total volume of Africa's air transport amounted to 3.5 billion ton/kilometres for freight and 29.3 billion passenger/kilometres as compared to a world total of 130.6 billion ton/kilometres and 1.008 billion passenger/kilometres. 26/ However, it must be emphasized that the air transport operations involving direct links among African countries constitute only about 20 per cent of the total traffic implying a high polarization of Africa's air traffic towards other regions, mainly Europe which absorbs over 70 per cent of Africa's passenger traffic.

98. The projections of air traffic outlined below are based on a recent study on perspectives for air transport in Africa. 27/ Consideration has also been given to projected economic activity and increased intra-African trade. Overall, Africa's total air freight is projected to grow at an average

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26/ It should be noted that the volume of traffic is not evenly distributed as over 60 per cent of the passenger traffic is concentrated in North and Southern Africa.

27/ Réalités et perspectives du transport aérien en Afrique, Etudes ITA, 1982/No.1.

annual rate of 7.6 per cent to reach 35.5 billion ton/kilometres in 2008 assuming that there is no likelihood of traffic substitution between air and surface modes. In addition, it is believed that there will be no drastic changes in world commodity prices relative to air tariffs which would influence the trends in the volume of air freight. Although recent trends show a sharp increase in passenger traffic of over 10 per cent yearly, it has been projected that such a trend will decelerate slightly after the 1980s owing to factors like a slowdown in tourism, foreign exchange constraints and increased indigenization of African businesses. The total passenger traffic by 2008 is projected to reach about 232 billion passenger/kilometres compared with the 1979 world level of 431.6 billion passenger/kilometres.

Table 9. Selected transport indicators for Africa, 1981-2008

	1981 (actual)	*2008*	*Average annual increase in percentage*
Seaborne trade (million tons)	571.0	1 346.3	3.2
African fleet (million dwt)	7.18	21.2	4.1
Air freight (billion ton-km)	4.9	35.5	7.6
Air traffic passenger (billion passenger-km)	32.0	232.5	7.6

Source: ECA projections, 1983.

3. Development of roads and railways in Africa under present trends and on-going projects

99. As of now, it is estimated that the total length of Africa's road network is about 1.3 million kilometres, giving a road density of about 0.05 km/km2. Of the total road network, primary roads constitute only 20.5 per cent which demonstrates the underdeveloped state of the road infrastructure in the African region. Secondary roads, which serve most inter-urban areas and play a major role in commercial, industrial and passenger traffic, constitute only about 27 per cent of the entire network. With respect to the trans-African highways, there are as of now, five major projects in progress, namely (i) the Trans-Saharan Road; (ii) the Mombasa-Lagos Trans-African Highway; (iii) the Dakar-Ndjamena Trans-Sahelian Highway; (iv) the Lagos-Nouakchott Coastal Highway; and (v) the Cairo-Gaborone Trans-East African Highway. These five Trans-African Highway projects are at very different stages of development but are estimated to cover a total length of 33,089 kilometres and have feeder links amounting to a total length of 41,273 kilometres.

100. In a perspective assessment of the African road network, it should be emphasized that this transport mode will constitute the major infrastructural basis for Africa's socio-economic integration. In addition, the development of road infrastructure is of crucial importance for the opening up of the 15 land-locked or semi-land-locked African countries. Although it is difficult to capture the evolution of African roads in quantitative terms, it should be stressed that the successful implementation of UNTACDA would bring about a marked improvement in the road network and consequently in the road density. Firstly, there will be increased connections between countries, substantially increased feeder roads within individual countries and easier

access to the sea. Secondly the quality of roads is likely to be significantly upgraded such that a large proportion of the African network by the beginning of the next century will be bitumen-surfaced or paved.

101. Historically, among all transport modes in Africa, railways have seriously suffered from neglect through lack of investment and poor maintenance. In addition the entire railway structure continues to be characterized by the colonial set up where railway lines were built to permit the exploitation of Africa's resources by the metropolitan Powers. Thus, the railway system is composed of unintegrated, disjointed parallel lines. Against this poor background, the perspectives of the African railway system in the next 25 years are gloomy unless significant changes are made. However, on the basis of existing data and assuming that historical trends in trade will continue, it is estimated that railway cargo could increase at an average annual rate of about 5 per cent while railway passenger traffic could expand at a rate of about 6 to 7 per cent yearly for the region as a whole.

102. Over-all, however, the African region would have to make increased efforts to (a) rehabilitate and modernize the existing railway infrastructure; (b) change the tractive power so as to, *inter alia*, increase the speed of railways; (c) improve railway management; (d) increase the efficiency of operations so as to achieve higher frequencies and turnover for cargo and passengers; and (e) focus attention on the production of wagons so as to make the development of railways in Africa less dependent on the outside world. It should be emphasized that, according to present estimates, rehabilitation of railways in African can bring about an immediate increase of 40 per cent in the cargo capacity and 34 per cent in the passenger capacity for the African railway network as a whole.

I. THE EXTERNAL TRADE AND FINANCE TRAP

103. The external trade and financial situation of the African region has been projected on the basis of some major and significant commodities including those which have been analysed in the previous key sectors. Given the fact that the exports of the African region are limited to a few commodities, the selected 10 export items represent about 75 per cent of Africa's total exports of goods and non-factor services. The groups of export commodities which have been analysed include cash crops (coffee, cocoa, cotton, tobaccco and tea), minerals (copper, iron ore and bauxite) and main primary commercial energy resources (crude oil and natural gas). However given the heterogeneity of the region's import, the items analysed have been confined only to those which are treated in the key sectors of food, energy and industry. It should be noted that the order of magnitude in quantity and value for the different export and import commodities relate only to trade outside the region as a whole, although the macro-economic analysis results with respect to external trade include intra-African trade in total exports and imports of goods and services. To maintain coherence, the projections of trade in the selected commodities have been integrated with relevant macro-economic parameters. In addition, the external resource gap is derived and related to the trends in the financial flows of the region.

1. Exports projections under the historical trends scenario

a) Exports of selected cash crops

104. The prospects of cash crop exports by the year 2008 were based on FAO historical trends projections, which show, except for cotton, relatively slow annual growth rates of about 1.5 to 3.5 per cent. Such moderate export performance is explained mainly by the present and probably continuous fall in world demand especially for coffee and cocoa. The share of these two commodities in total exports of the five leading cash crops will consequently drop from 64 per cent in 1980 to about 48 per cent in 2008. In addition to the projected slow increase in the

volume of agricultural exports of the African region it is likely that the overall agricultural export performance will be further adversely affected by (a) the unstable or decreasing world market prices for agricultural primary products; (b) the protectionist measures that are likely to persist in the developed countries; (c) the development of substitutes for industrial agricultural raw materials.

105. In general, agricultural prices relative to the international price level have shown a very consistent tendency to decrease over the long term, especially for commodities like coffee, cocoa, tobacco, tea, cotton, etc. The factors behind such decreasing price trends have included the relative low income elasticity of demand of agricultural primary products and the technological improvement which reduces the agricultural raw material inputs per unit of industrial output. Although efforts are being made to enlarge and liberalize existing compensatory financing facilities (e.g. IMF compensatory facility, STABEX scheme, etc.,) it is distressing to note that there is very little progress towards the establishment of adequate mechanisms like the Common Fund and new International Commodity Agreements (ICAs). Secondly the developed countries' protectionist policies such as trade barriers, import quotas, minimum price provisions and discretionary import licensing procedures, will continue to affect the volume of agricultural exports of the region adversely. The development of technology of industrial substitutes for agricultural commodities like rubber and cotton will also continue to dampen the region's exports. It therefore seems very likely that Africa's export earnings from agricultural primary products will continue to fluctuate but with a decreasing trend in the next 25 years if present structures and patterns of production and direction of trade continue.

106. Besides the above factors relating to the external demand for Africa's agricultural exports, some important supply considerations are also likely to affect the overall performance of the region's agricultural exports. The difficult climatic conditions would for example necessitate large investments in irrigation schemes, as well as expanded research for more appropriate crops and cropping patterns. Also the physical and institutional infrastructure will continue in the next 25 years to be critical for the expansion of the agricultural production. If for example the present trends in the development of feeder roads, storage facilities and marketing systems were to continue without much changes in the next 25 years, the export performance could be even lower than what has been projected on the basis of demand parameters. Other important supply elements that would affect Africa's agricultural export performance relate to (a) the insufficient incentive policies which, without significant improvement, will continue to constrain the domestic supply response; (b) inordinate concentration of the region on only a few primary agricultural commodities which makes it difficult for African countries to adjust to changes in international markets of agricultural commodities.

(b) Selected mineral exports

107. Projections of mineral exports by 2008 under the historical trends scenario have been based on trends in world demand for individual mineral products, 28/ using past elasticities of Africa's exports with respect to total world exports. For three minerals, projections of trends in world demand show disparate average annual growth rates of 2.6 per cent of copper, 2.9 per cent for iron ore and 7.1 per cent for bauxite. With the historical elasticities of Africa's mineral exports with respect to world demand estimated at 0.6, 0.4 and 0.2 for copper, iron ore and bauxite respectively, it is projected that the volume of exports would, by the year 2008, reach

28/ See for example table 3.6 of Accelerated development in sub-Saharan Africa: An agenda for action, World Bank, 1981.

about 1.6 million tons for copper (blister and refined), 36.6 million tons of iron ore and 19.3 million tons of bauxite. As a result the relative weight of the three leading minerals exports in total exports of the 10 selected commodities will not change significantly.

108. As in the case of agricultural exports, Africa's export earnings from minerals are also likely to be adversely affected by the uncertainties in the world market and therefore in export prices. Indeed, if present trends in developed market economies (e.g. recession, protectionism, financial uncertainties, etc.), were to continue and assuming that African countries will not drastically improve the rate of absorption and processing of their mineral products, the prospects for mineral exports are very bleak. Such bleak prospects would be further aggravated if the present domination of the transnational corporations in mineral production continues since investment, technology, marketing and pricing policies would remain outside the control of the African mineral producing countries.

(c) Exports of mineral fuels

109. As indicated earlier, exports of crude oil and natural gas under the historical trends scenario were projected at nearly 254.3 million tons and 61.1 billion m3 respectively by the year 2008. The projected decline in crude oil exports is based mainly on the trend of decreasing world demand resulting from conservation measures and the development of alternative sources of energy. Similarly the rate of increase in natural gas was projected to decelerate in the next 25 years. In terms of value, crude oil and natural gas exports will remain dominant in the total exports of the region as a whole. However, if recent trends in world oil prices persist over a long period, earnings from crude oil exports will fall substantially and the relative importance of this commodity in Africa's total exports would decline. In addition, the region's total export earnings would be far below the level required to sustain the projected overall growth rate under the historical trends scenario.

(d) Overall exports

110. Overall total exports of goods and services outside the region are projected to grow at a dismal rate of about 1 per cent not only because of the projected decline of crude oil exports which represented over 60 per cent of total exports in 1980, but also because of bleak prospects in exports of services, particularly tourism. It should also be noted that the overall structure of exports of the region will not change significantly. For example, the 10 analysed commodities would by 2008 still represent over 70 per cent of the total exports of the region as against about 75 per cent in 1980. However, while the share of crude oil exports in total exports will decline, the share of agricultural raw material exports would increase. The relative importance of mineral exports is projected to stagnate at about the same historical level.

111. In addition to the projected continuation of product concentration of Africa's exports, the direction of trade is not projected to change significantly under the historical trends scenario. For example intra-African trade, which has been declining during the 1970s, is projected to pick up only marginally. Also an extrapolation of historical trends shows that exports to centrally planned economies and other developing countries will not increase significantly. Such a lack in market diversification coupled with protective measures taken by the industrialized countries is likely to diminish any prospect of expanding Africa's export.

112. From the projected slow growth of total exports in both volume and value, the continued dependence on few commodities and the polarization of Africa's export towards a diminishing market clearly imply that export-led growth policies now pursued in Africa have to be very carefully examined at the national, subregional, regional and international levels. This would call for new dimensions and approaches such as (a) commodity diversification including appro-

priate product specialization among countries of the region; (b) market diversification, particularly in intra-African trade and trade with other developing countries; (c) joint policies at the subregional and regional levels; (d) improving the quality and competitiveness of the region's export through more processing and increased productivity; (e) restructuring of the international trade with a view *inter alia* to reversing the trends of protectionism; and (f) enforcement of "disciplines of an open trading system governed by multilateral agreements". 29/

2. Import projections under historical trends scenario

113. As indicated above, import projections have been limited to the commodities analysed in the previous sections of this part (tables 4 to 8). For cereals, it has been projected that, under the historical trends scenario, Africa would have to import about 33.6 million tons by 2008 in order to fill the food gap resulting from increasing demand and the near stagnation of domestic food production. It should be noted that, during the next 25 years, the volume of cereal imports would grow at an average annual rate of 3.8 per cent which is above the rate of population growth implying that the *per capita* consumption of imported cereals will be growing at an average annual rate of around 0.6 per cent, bearing in mind that the majority of the African people are under-nourished and that *per capita* consumption has bees stagnant during the last decade.

114. Imports of crude oil are also projected under the historical trends scenario to continue to increase at an average annual rate of 6.1 per cent which is higher than the growth rate of total imports of goods and services. This implies that, in real terms, crude oil would, by 2008, account for a larger proportion of total imports of the region as a whole than it does at present. Since crude oil imports are for oil-importing countries, the projected growth of crude oil imports implies an increased oil bill burden for these countries, thus aggravating their balance-of-payment problems. This trend points to the need for African oil-importing countries to pursue further conservation measures and to develop alternative sources of energy. This is particularly important given the tendency to increase consumption as a result of the decline in crude oil prices.

115. For manufactured goods, Africa will still have to import almost all of its capital goods requirements in the next 25 years. Machinery and transport equipment would, by the year 2008, constitute the largest component of imports of manufactures since, under the historical trends scenario, no important changes in the production of capital goods have been projected. For example, the production pattern of transport equipment, which is merely assembling imported parts, coupled with the conspicuous consumption pattern of the region, would imply that annual imports of passenger cars in 2008 would be over 4 million units. Worse still is the fact that the prospects with respect to intermediate goods are also gloomy since the region will have to import an increasing amount of basic inputs such as fertilizers, pesticides, cement, iron and steel, etc., even though the region has the potential to achieve self-sufficiency in many of these products. Given the projected slow growth of exports under the historical trends scenario, the high dependency on imports of intermediate goods will further worsen the already very low utilization of industrial capacity. Imports of man-made fabrics are projected to reach 900,000 tons on the assumption that, even under the historical trends scenario, some progress will be made in consuming domestically produced cotton fabrics. Another frightening trend relates to pharmaceutical imports which are projected to jump significantly from $1.1 billion in 1980 to $15.6 billion in 2008 at 1980 prices.

29/ Common crisis - North-South: Co-operation for world recovery, Brandt Commission, 1983.

116. Overall, total imports of goods and services from outside the region are projected to increase at an average annual rate of about 5.4 per cent. At this rate, the trade gap will reach about 25 per cent of gross domestic product, which is clearly unmanageable. This implies that, unless sound and efficient import substitution policies are implemented and exports diversified in terms of both products and markets, the projected historical growth of GDP might not materialize. The areas of particular importance and urgency for import substitution in the next 25 years include food, particularly cereals, energy, intermediate inputs, especially fertilizers, cement, iron and steel, chemicals and pharmaceuticals. In addition vigorous efforts should be made drastically to cut imports of services so as to reduce the deficits in the invisible account and the foreign exchange leakages that occur through shipping and insurance, import overinvoicing, export underinvoicing, banking services, tourism, consultants and management services, etc. 30/ Finally attention has to be drawn to the financial strains brought about by huge expenditure on armaments all of which is imported.

3. External finance and aid

117. The present international financial system is in a state of flux with many consequential financial distresses for the developing countries. In addition to the increasing privatization of the international financial system, the relatively high interest rates as well as the variability of exchange rates implying increased financial insecurities and uncertainties for investment and foreign trade have brought about serious distortions in the development path of developing regions. The debt burden has also reached alarming levels with debt service ratios amounting to about 20 per cent in developing countries. According to various sources, 31/ aid as a proportion of donors' GDP has also fallen from about 0.5 per cent in early 1960s to about 0.35 in the 1970s as against a target of 0.7 per cent which most donors had committed themselves to for the Second and Third United Nations Development Decades. The quality of aid has also worsened with increasing conditionality from bilateral and multilateral donors and deteriorating trends in aid modalities.

118. For the African region the prospects for inflow of foreign resources in the next 25 years would therefore be bleak if the above trends were to continue. Indeed the rate of increase of total inflow of resources to developing Africa dramatically slowed down in the late 1970s to only 6.1 per cent per annum in current terms as against over 20 per cent in the first half of the last decade. In real terms, aid to the African region has therefore been falling both for concessional and non-concessional finance. With respect to debt service, it is distressing to note that the rate of increase has been well over that of the inflow of foreign resources in recent years. It is therefore evident from an extrapolation of the trends of resources inflows and outflows, including leakages, that it will be impossible to cover the region's mounting external deficit projected by the year 2008 under the historical trends scenarios. Indeed if such trends were to continue without structural changes domestically and internationally, African countries would undoubtedly collapse under the implied debt burden.

30/ For more details on financial leakages see the Report of the Workshop on leakages in African economies, SERPD/WLAE/83/3.

31/ See for example Common crises - North-South, op.cit.

Table 10. Projections of selected commodity exports outside the region under the historical trends scenario

	1980		2008		
	Quantity (thousands of tons)	*Value at 1980 prices (million $)*	*Quantity (thousands of tons)*	*Value at 1980 prices (million $)*	*Average annual growth rate (percentage)*
Cash crops					
Coffee	957.0	3 177.2	2 324.9	7 718.7	3.2
Cocoa	837.0	1 944.3	1 568.8	3 642.7	2.3
Cotton	622.0	2 101.7	3 098.7	10 470.5	5.9
Tobacco	148.0	340.4	245.2	563.5	1.8
Tea	177.0	658.4	483.3	1 251.7	3.6
Minerals					
Copper a/	980.5 b/	2 137.5	1 578.6	3 441.3	1.6
Iron ore c/	26.2	461.0	36.6	644.2	1.2
Bauxite c/	13.1	539.7	19.3	795.2	1.4
Energy					
Crude oil c/	279.0 b/	66 067.2	254.3	60 147.2	-0.3
Natural gas d/	13.6 b/	2 448.0	61.1	10 998.0	5.1

Source: ECA secretariat projections, 1983.

a/ Blister and refined.

b/ Figures refer to 1978.

c/ In million tons.

d/ In billion m^3.

J. A GLOOMY OVERALL MACRO-ECONOMIC PICTURE

1. Brief review of the past economic parameters in developing Africa

119. The overall macro-economic set up, briefly presented in part I, is the result of a moderate growth of about 5.2 per cent in the 1970s with a disappointing performance in the agricultural sector which grew by only 1.3 per cent during the same period. What is more disheartening is the wide disparity in growth performance among groups of countries. While the African least developed countries registered a mere 3.1 average annual growth rate, with a negligible *per capita* increase, the major oil exporting countries have been growing at around 7.9 per cent on the average with, however, poor agricultural performance and increasing social distress. On the expenditure side, while domestic saving increased substantially in major oil-exporting countries, the 21 least developed countries 32/ registered a negative growth in their saving rate which was only 8.4 per cent of GDP in 1980. Investment rate expanded steadily from 16.1 per cent of GDP in 1960 to cover 26 per cent in 1980 although the expansion in the level of investment was not accompanied by increases in efficiency in capital use. With regard to the external sector the performance for the African region as a whole also showed a deterioration in the 1970s, with the volume of exports increasing by only 2.1 per cent per annum while imports increased by 5.9 per cent yearly in the same period. Consequently, the external deficit of developing Africa widened substantially, reaching in some countries more than 50 per cent of GDP.

120. The above performance of the African region was used to project the overall macro-economic picture by the 2008. The macro-picture was, in turn, used in some cases to determine the key variables analyzed in the preceding sections. In the present scenario, the main macro-economic variables were projected using a system of relationships linking these variables. The main results are briefly presented below.

2. Historical projections of GDP by industrial origin

121. Gross domestic product in developing Africa as a whole is projected to grow at average annual rate of 5.3 per cent per annum during the period 1980-2008. The sectoral growth rates that are consistent with the projected GDP growth are not at all satisfactory, with agriculture growing by only 2.3 per cent per annum relative to a population growth rate of over 3 per cent. Also, the projected growth of the manufacturing sector, of about 6.3 per cent per annum, does not portray a very happy picture especially in terms of overall structural change that can usher in a steady industrialization process in Africa by 2008. The services sector, will continue to be the main component of GDP with an average annual growth rate of 5.7 per cent between 1980 and 2008.

122. Projections under the historical scenario show that Africa's growth will continue to rely mainly on external financial flows. Given the present deepening world recession, developing African countries might face a tighter situation as regards export prospects (especially for oil-exporting countries) and consequently, development financing will become increasingly difficult. Hence, even the projected moderate GDP growth might be relatively optimistic if the recent development trends and patterns persist for a long time. Since most of the key variables dis-

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32/ The present study included only the 21 African least developed countries of 1982. Five additional African countries were however added to the list of LDCs by the United Nations General Assembly at its thirty-seventh session in December 1982.

cussed earlier are closely related to overall economic performance, such a gloomy prospect would have disastrous implications on the food and energy situation as well as on social conditions such as education, health, housing, etc.

3. Projection of GDP expenditure in developing Africa

123. On the expenditure side, the variables of major concern are private consumption and total investment expenditures reflecting the standard of living and the growth stimulant respectively. These two elements are projected to grow at the average annual rate of 5.5 per cent and 7 per and investment would be a rise in imports which are projected to grow annually at a steady rate of 5.6 per cent as against a quasi-stagnation of export growth rate at only 1.2 per cent per annum.

124. The above factors imply another macro danger to the economy of the region as a whole, namely the growth in the absolute level of the trade gap as well as the expansion of the share of the trade deficit in total GDP projected to rise from 7.7 per cent in 1981 to an unsustainable level of about 25 per cent in 2008 at 1980 prices. As indicated earlier, such a situation will further tie African growth to the apron-strings of uncertain foreign donors and link its consumption, including food, to uncertain food assistance. Such prospects are clearly undesirable and would undoubtedly necessitate new genuine and dedicated efforts to implement the strategies and approaches outlined in the Monrovia Strategy, the Lagos Plan of Action and the Final Act of Lagos.

125. One must not lose sight the fact that the quantitative variables which characterize the historical trends scenario and which form the basis of the projections to the year 2008 depend for their magnitude on specific, if unstated, assumptions regarding the behaviour of particular qualitative or non-quantifiable variables, of which by far the most important is probably the degree of economic co-operation and integration. The gloomy overall macro-economic picture for the year 2008 painted by the historical trends scenario implies, for example, that current efforts at strengthening existing or creating new economic integration groupings and technical co-operation institutions will continue to confront the same uncertainties and fluctuating fortunes that have been responsible for the ineffectiveness or collapse, of such institutions in the past. Certainly, the assumptions of the historical trends scenario effectively exclude any spectacular success in the present endeavours to establish subregional common markets and a regional economic community by the year 2000 as required in the Lagos Plan of Action. All the same, the scenario does not presuppose a complete failure of current regional and subregional economic co-operation and integration efforts; there is no doubt that, if total failure (including disintegration of existing groupings) were to be assumed, the resulting macro-economic picture for the year 2008 would be even more dismal than the one depicted here.

PART III

PERSPECTIVES OF THE AFRICAN REGION BY THE YEAR 2008 : A NORMATIVE DEVELOPMENT SCENARIO

A. BACKGROUND

126. While the historical trends scenario described in the preceeding part assessed the perspective of the African region without major changes in both domestic and external environments, the preliminary projections presented in this part are based on a normative willed future in the coming 25 years, with explicit or implicit important and major transformations in the African economies as recommended in the Monrovia Strategy and the Lagos Plan of Action. 33/ It will be recalled that the Lagos Plan of Action adopted in April 1980 at the second extraordinary summit of African Heads of State and Government laid down the basic guidelines for self-reliant and self-sustained development. In a nutshell, these include (i) the use of Africa's vast resources to meet the needs and aspirations of the people; (ii) a change from total reliance on export of a few raw materials to a growth path based on a combination of natural resources, enterpreneurial, managerial and technical resources, and the restructuration and expansion of the domestic market; (iii) the mobilization of all Africa's human and material resources for industrial development, the outside contributions being only supplementary to domestic efforts; and (iv) the promotion of African economic integration in order to create a continent-wide framework for economic co-operation for development based on collective self-reliance.

127. It should be noted at the outset that the development scenario analysed and described in this part is not a futuristic adventure. In essence, the scenario is based on a will not only to survive but to reach greater heights. No doubt the efforts implied to attain all the goals - quantitative and qualitative - outlined are tremendous. But the exercise takes special note of the ongoing efforts to make Africa a better place. Thus, recent and ongoing efforts in the fields of transport, industry, co-operation, etc. have given a sound basis for believing that change is desirable and possible. In a way, the scenario sums up the success of such noble endeavours as the United Nations Transport and Communication Decade in Africa, the Industrial Development Decade for Africa, the Preferential Trade Area for Eastern and Southern Africa, the Southern African Development Co-ordination Conference, the Economic Communities of West African States and of the Countries of the Great Lakes, etc.

128. The above broad guidelines as well as the present encouraging efforts and increasing awareness of Africa's problems have been translated into specific quantitative assumptions and qualitative policy changes regarding the relationships among development variables and the links between the different critical variables analysed. To get an integrated and coherent perspective of the development scenario, all analyses have been interlinked with a macro-economic framework to simulate some important behaviorial patterns such as income effects, product substitution, etc. The macro-economic framework was projected to the year 2008 on the basis of the targets indicated in chapter 13 of the Lagos Plan of Action. In some cases normative sectoral projections

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33/ It has also been generally assumed that the efforts of the developing countries to change the international economic order, especially in the fields of trade, finance and technology will result in some improvement in the external international environment.

have been made separately although the final results, with the necessary adjustments, have been integrated with the over-all framework of the development scenario. Since most of the projections under the normative scenario assume a steady and sometimes radical improvement in the behaviour of the key variables and the macro-economic framework, the projected figures have been consistently checked against physical limits such as the nature and levels of reserves of natural resources that the region has. Like in the historical trends scenario, the population variables included in the normative scenario are obtained exogenously from a population model. However, the figures provided by the population model under the scenario in this part are different from those used in the historical trend scenario, being based on a medium variant of population growth in Africa.

129. Finally, along with the projections of the key variables and the macro-economic framework, an analysis of major implications is also provided especially with respect to domestic policies required. More specifically, some changes in African consumption and investment patterns have been simulated and the results analysed with respect to their implications on the growth and structure of the African economy as well as on the standard of living of the African people in the next 25 years.

B. OUTLINE OF A NEW DEMOGRAPHIC SETTING IN AFRICA IN 2008

130. The brief analysis in part II examined some very serious implications of a continuation of past demographic trends in the African region. This part is intended to assess the prospects of a new and better demographic setting that will not bring about unsustainable pressures and tensions but will rather ensure the progress and prosperity of all African countries. It has, however, to be emphasized that, given the young structure of the African population as of now, drastic structural changes in the demographic situation of the region cannot occur just within the next 25 years of the present perspective study. Indeed major changes in population take a long time. But a first step has always to be made and the normative demographic scenario described in this part should be seen as the necessary transition towards the desirable changes in Africa's population trends and patterns in the coming century. Such changes, of course, include not only a more balanced expansion in the population but also, and perhaps more importantly, a better utilization of the population as a resource dialectically directed towards its ownself and its own development and welfare.

131. Under the medium variant of the population projections by the ECA secretariat, the population of the region could be maintained at a slightly slower annual growth rate of around 2.9 per cent between now and the year 2008, so that it could just about double from the estimated 1983 level of 482 million to 997.3 million. At this slightly lower population growth rate as compared to that of 3.2 per cent projected on the basis of a continuation of recent historical trends, the region as a whole could probably ensure better welfare of its people especially if the economic performance can be put into a much higher growth gear as described in the other sections of this development scenario. As regards the structure of population, the medium-variant projections show that even with changes in the demographic trends in the next 25 years, the African population will still be one of the youngest in the world by the year 2008. The children in the 0-14 age group would represent about 41.6 per cent of the entire population as compared to a projected 44 per cent if present fertility and mortality rates continue. The percentage of the active population in the 15-64 age group would be higher than the 52.4 per cent projected under the historical trend scenario representing about 55.1 per cent of the whole population in 2008. With this improvement in the population structure, although small, the burden on the active population will drop from the 92 per persons in the historical trends scenario to over 80 dependants per 100 active persons in 2008.

132. The distribution of the population between the rural and urban population depends a lot on the distribution of opportunities for progress which attract people. Assuming that, under the development scenario described in this part of the paper, African Governments will pay the necessary attention to the rural sector in terms of provision of essential services and creation of productive and remunerative employment opportunities for the rural people, then, no doubt the rural - urban exodus will slow down. With such policies in mind, it is projected that the population distribution would reach a much better balance. The rural population would represent about 53.4 per cent of the entire population, amounting to about 531 millions, while the urban population would total about 464.3 million. It is interesting to note that, because of the slower population growth, the lower urban population level would not mean a lower overall urbanization rate. Indeed the region as a whole would be about 50 per cent urbanized as compared to an urbanization rate of 44 per cent projected on the basis of a continuation of recent trends. The overall population setting is summarized in table 11 below.

133. Although it is culturally and generally accepted in Africa that population growth is not the cause of the region's stagnation, a new awareness is starting the emerge that, especially in some small countries, population growth cannot be left to expand *ad infinitum*. Thus, although elaborate population programmes are not yet seen as urgently necessary, there is an increasing number of countries pursuing some policies to keep the population growth on an even keel. But, while it can generally be assumed that socio-economic changes in the course of fast development would ultimately reduce fertility rates, some other areas in population might require more conscious programmes. Reducing mortality and morbidity is an area to which increasing attention had to be paid. Emphasis has also to be placed on rural-urban integrated development schemes to stem the rural-urban drift. Income distribution programmes are also necessary because of their important, albeit diffuse, effects on the dynamics of population as a whole.

134. The implications of the slowdown in the rate of population growth contrast with the disastrous problems that result from a population explosion. However, even with a slower population growth, improved services have to be aimed at. It does not therefore directly follow that the slower population growth projected in the present development scenario would necessarily or automatically mean a corresponding slowdown in the provision of essential services. On the contrary, while the historical trend scenario concentrated on the orders of magnitude of the services needed for a highly expanded population, the development scenario is concerned with both the quantity and the quality of the basic services for a smaller population. For housing, for example, it is estimated that if Africa's population growth could be maintained at the projected normative scenario rate, the total number of housing units required for the region as a whole would amount to about 914 million units, assuming a slightly reduced family size. However, if the standard of living of the people is to improve significantly, the quality of housing has to improve markedly in terms of the materials used and the actual house space per occupant. Thus while the number of housing units required in the normative scenario is less by about 6 per cent relative to the projected requirements under the scenario of a rapidly expanding population, the actual burden is not any smaller if housing conditions are to improve.

C. HUMAN RESOURCES : EDUCATION AND EMPLOYMENT BY 2008

1. Employment

135. Employment is the basis for any region's prosperity and continued improvement in the welfare of its people. It is, therefore, of paramount importance to have a preliminary perspective of how, by the year 2008, the African region would perform in this field under a development

Table 11. The normative demographic situation in Africa by 2008
(in millions and percentages unless otherwise indicated)

Demographic indicators	*1980*	*2008*	*Annual growth rate*
Total population	439	997	2.9
Urban population	120	464	4.8
Rural population	319	533	1.8
Population aged 0-14	198	415	2.6
Population aged 15-64	228	550	3.1
Population 85+	13	32	3.2
Population aged 6-11 (millions) (primary school age group)	73	160	2.8
Population aged 12-17 (millions) (secondary school age group)	59	139	3.1
Population aged 18-23 (millions) (higher education age group)	48	120	3.3
Life expectancy at birth - males	50.1	58.2	-
Life expectancy at birth - females	53.1	61.7	-
Average completed family size	5.1	4.6	-
Dependency ratio	94	82	-
Met migration (000s)	22	0	-

Source: ECA projections, 1983.

scenario. The first thing to note is that even in the next 25 years, the agricultural sector will remain the biggest employer of Africa's strong and able bodied people. A second important aspect of overall employment prospects in Africa by the year 2008 relates to the limited capacity rate at which the Government sector can continue to expand and absorb enough labour force. Thus while outlining the employment situation in Africa in 2008 under a development scenario, emphasis should be placed on the need to democratize the African economy and to expand output and employment opportunities in sectors outside government such as private industries, large-scale agriculture and mining. A large number of entrepreneurs should thus be developed who, in the process of creating employment for themselves, will also provide employment opportunities for others in the critical productive sectors.

136. The population projections under a development scenario indicate a slower rate of population growth which will have a favourable impact on the size of the labour force by 2008. The percentage of labour force to population will decline from 43.4 per cent in 1985 to 39.9 per cent in 2008 on account of the slower rate of natural increase and slightly higher school enrolment rates depressing the number of new entrants in the labour force. In spite of this, however, there will be more people in the labour force (397 million). A total of 212 million persons will constitute the rural labour force as against 185 million in the urban wage labour force. Comparing the development and the historical scenarios, the rural labour force would have decreased by 74 million persons. This should not have an adverse effect on productivity in agriculture, since it is assumed that increased mechanization and provision of other factor inputs would have compensated for labour loss and the higher skill levels envisaged would have increased worker productivity. Such a decrease will also reduce the rate of rural underemployment from a high level of 70.8 per cent in

the historical trend projections to only 49.7 per cent under the development scenario, affecting 105 million workers in that sector.

137. With the projected increased aggregate output in the economy over the years, the formal wage sector of African economies is projected to be able to provide employment to 158 million workers, leaving 27 million or only 14.6 per cent of the wage labour force openly unemployed. This improvement would result not only from a much healthier performance of the region's economy but also from the developments in education and training systems which would result in a correction of the imbalance between the skill needs of African economies and the skills outputs from education and training systems. Table 12 summarizes the improvements in respect of the African employment situation under a development scenario.

Table 12. Labour force, employment and unemployment in Africa under a development scenario in 2008

	(in millions)
Labour force	397.0
Rural	211.8
Urban	185.2
Wage employment	158.9
Open unemployment	27.2
Underemployment	135.5
Rural	105.5
Urban	30.0

Source: ECA projections, 1983.

2. Education

138. In the field of education the normative scenario projects by the year 2008 enrolment ratios of 83 per cent for the primary school children, 55 per cent for secondary level education and 16 per cent at the higher level (table 13). The primary school enrolment ratio implies a total of 155.5 million children which in turn would imply a minimum of 80,000 primary schools with each one large enough to educate an average of 2,000 pupils in a year. Similarly, assuming that the student-teacher ratio which can ensure proper education is around 40 students per teacher, then the region as a whole would have to have as many as 4 million teachers by the year 2008. But, in addition to such numerical magnitudes it must be stressed that the African region will have to face the challenge of transforming its education system. The region as a whole will have to create a new generation of school leavers not composed of the "educated elite" but the "trained worker". The inherited tendency of training an agricultural officer merely to administer the peasants or an engineer to manage the factories has to be overhauled. From the grassroots, the African student would have to be trained and reoriented in such a way that he or she could positively render productive services for the regeneration of agricultural output, the transformation of industry, the indigenization of the economy in all fields, etc. It is only with such a conscious change that the region as a whole will develop and efficiently utilize the skills of its people. But, to bring about such a change and reorientation in education, a start is imperative now in terms of concrete manpower policies and drastic revisions of existing school curricula.

Table 13. Magnitudes of growth in education in Africa by 2008 under a development scenario

Areas	*(millions)*	*Percentage*
Gross enrolment a/		
1st level	150.3	97.0
2nd level	63.9	46.0
3rd level	7.8	6.5
Enrolment		
1st level	133.40	83.0
2nd level	76.4	55.0
3rd level	19.1	16.0
Primary schools	0.80	
Total teaching staff	4.0	

Source: ECA projections, 1983.

D. BRIGHTER FOOD PROSPECTS IN AFRICA BY 2008

139. In projecting the food prospects in Africa by the year 2008 under the development scenario, the major objective has been to assess whether and how the African region can, by the year 2008, achieve the fundamental goal of self-sufficiency in food. Thus, throughout the analysis of the development scenario in the context of food self-sufficiency, food consumption levels commensurate with the envisaged overall level of development were first projected. Corresponding to the food requirements in each food commodity group, production levels have been determined on the basis of an assumed self-sufficiency ratio for the region as a whole by the year 2008. This assumption is based on the objective of the Lagos Plan of Action "to lay the foundation for the achievement of self-sufficiency in cereals, livestock and fish products" over the period 1980-1985. 34/ It is therefore believed in the normative scenario that the African region as a whole should aim at achieving the objective of food self-sufficiency by the year 2008.

140. Caution should be exercised concerning two elements in the present study. Firstly the food self-sufficiency projections presented in this part are mainly quantitative. It would have been desirable to make projections of food self-sufficiency not only with regard to the balance between the volume of food produced and consumed but also with regard to the type of diet that the projected food would offer to the population as a whole. In this way it would have been possible to project the changes that would be required so as to produce the most nutritionally optimum food commodity mix. Secondly, care should be taken in interpreting the projected food self-sufficiency for the region as a whole. Given that the continent is large, the weather conditions are varied, the soil endowments differ from country to country and the cultural backgrounds are diverse and heterogeneous, the patterns of food consumption and production differ from one subregion to another. Thus while one subregion could have surpluses in one food commodity, another subre-

34/ A/S-II/24, annex I, chapter 1, paragraph 20.

gion might have serious deficits in the same commodity. This aspect has an important implication especially at the national and subregional levels. It implies on the one hand that national efforts have to be directed not only to achieving self-sufficiency at the national level but rather to ensuring that some surplus can be produced so as to maximize the comparative advantages that different countries have for the different food crops. On the other hand, countries should conceive their food production plans in such a way that there is some complementarity with other neighbouring countries. In this respect, it could be underlined that the idea of food exchanges being one of the cornerstones of a future African common market might not be far-fetched.

1. Projections of improved self-sufficiency in cereals by 2008

141. The projections for the total demand of cereals under a development scenario was based on three major premises: (a) a possible structural shift in the food consumption patterns of the African population as a whole resulting from *inter alia*, rapidly increasing incomes and high urbanization rates; (b) a long-term improvement in *per capita* cereal consumption levels to ensure better nutritional levels and (c) the amount of food losses, feed seed and industrial cereal consumption which enter into the overall demand for cereals.

142. As can be seen from table 14, the projected *per capita* consumption of cereals in 2008 is 171.4 kg as compared to the present *per capita* level of 170.6 kg. This *per capita* level was based on a relatively conservative elasticity of cereal consumption with respect to the growth of *per capita* income. The elasticity taken was around 0.16. The low elasticity was, however, based on the consideration that cereals, like rice, maize, millet and sorghum, are already staple foods in many parts of the African region implying that changes in income are unlikely to cause a very dramatic rise in the people's consumption of those cereals that they have been consuming for a long time. At the same time, in those areas where cereals might be quickly substituted for other traditional foods, as a result of income rises, it was felt that the effect would be most important in the urban areas and that, even in this case, it would asymptotically taper off after any initial rises. Thus using the *per capita* level of 171.4 kg it was projected that total cereal consumption would amount to 170.9 million tons by the year 2008 which would imply an average annual rate of growth of 3.8 per cent in the consumption of cereals for food in the region as a whole.

143. On the basis of the projected demand for cereals for food, and applying the shares of feed, seed, industrial demand and waste projected by FAO for the year 2000 under Scenario A 35/, the total demand for cereals in the year 2008 was estimated to reach around 224 million tons. Relative to the projected demand of 203.1 million tons under the historical trends scenario, the normative demand is 10.3 per cent higher mainly as a result of a faster growth in the *per capita* income projected for the region as a whole in the normative scenario.

144. Since the development scenario aims at an overall food self-sufficiency for developing Africa by the year 2008, it was assumed that the region would have to produce an increasing share of its cereal requirements. On the basis of the increased self-sufficiency ratio in cereals projected by FAO by the year 2000 36/ total output was projected to have to reach about 190 million tons by the year 2008 or about 85 per cent of total demand. No doubt, to achieve this

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35/ The shares out of total cereal demand derived from the FAO computer printouts for the year 2000 for 40 African countries under scenario A were 76.3 per cent for food, 0.8 per cent for industry, 10.8 per cent for feed, 2.2 per cent for seed and 9.9 per cent for waste.

36/ The self-sufficiency ratio in total cereals derived from FAO Computer Printouts was 75.0 in 1980 and 80.7 in 2000.

projected level of cereal production specific policies will have to be pursued in the African region in the next 25 years. Most of the necessary policies have been well articulated in the African Food Plan, the Lagos Plan of Action and Agriculture towards 2000. By way of emphasis, some of the policies are outlined in paragraphes 147 to 151 below.

2. Increased production of roots, tubers and pulses

145. In the development scenario, projections have been made on the basis of continued self-sufficiency in the roots, tubers and pulses commodity group. However, it has to be pointed out that the *per capita* consumption of roots, tubers and pulses would soon reach a stable point whereby increases in *per capita* income would imply a reduction in the consumption of roots, tubers and pulses only because of a preference for cereals, meat or fish. However, realism made it imperative to acknowledge the fact that the *per capita* income of the region is now very low while, at the same time, many essential needs remain unsatisfied. It was therefore believed that, on the basis of FAO projections under scenario A, that the region will, despite some substitution effects resulting from higher *per capita* income, still maintain a fair level of *per capita* consumption of roots, tubers and pulses projected to be at around 152.5 kg.

146. The total consumption of roots, tubers and pulses for food is then projected to reach a level of 152.1 million tons by the year 2008. It will be noticed that the projected total food requirements in the form of roots, tubers and pulses is less than the level projected in the historical trends scenario. This is due to two main factors, namely the change in the overall population level by the year 2008 under the two different scenarios and the expected substitution in favour of cereals as a result of income effects and higher urbanization. In addition to food demand and on the basis of FAO projections, the requirements of roots, tubers and pulses to satisfy demand in the industrial sector and for animal feed and seed as well as some level of inevitable post-harvest losses is projected to be about 50.2 million tons, thus implying a total demand for roots, tubers and pulses of 202.3 million tons by the year 2008. Taking into account the FAO projected self-sufficiency ratio of 100.6 in this food commodity group, total domestic production is projected to amount to 203.5 million tons by the year 2008.

147. In general the three main areas of decision influencing strategy choices for crop production are (a) area expansion versus intensified land use; (b) cropping patterns; (c) alternative technologies for increasing yields and the associated choices of input mixes. It is expected that intensification of production will account for 73 per cent of production growth as compared to 23 per cent from area expansion. Cropping patterns are not likely to change very much over the next two decades and the mainstay of production strategies must be heavy reliance on yield increases. Over all to achieve considerable improvement in the situation of African crops by the beginning of the twenty-first century, the policies below have to be emphasized.

(a) Broadening the production base

148. About 45 per cent of the 638 million hectares of potential arable land of Africa are classified as problem areas and 38 per cent as good rainfall land. It is expected by the year 2000 to bring about an additional 38 per cent of the land under cultivation. The cropping intensity rates should increase from 101 in 1980 to 114 in year 2000 for irrigated areas, and from 53 to 64 for rainfed agriculture. For these goals to be achieved, some tenurial and agrarian reforms may be necessary in many countries.

(b) Irrigation, drainage and land improvement

149. Major changes in the use of irrigation and drainage are not expected by the year 2000 or 2008. The share of irrigated land as a percentage of the total arable area was 2 per cent in 1980

and will reach 3 per cent by the year 2008. In addition, it is estimated that about 55 per cent of total land in Africa is likely to be affected by desertification, and appropriate policies should be introduced to reduce land and water degradation.

(c) Increasing yields

150. It is widely recognized that yeiid increases can be most effectively achieved through the application of balanced packages of inputs which include water inputs, fertilizers, improved seeds, plant protection and power inputs. The consumption requirement of NPF-fertilizer in 2008 is estimated at 7.9 million tons with an annual growth rate of 4.5 per cent between 1980 and 2008. Seeds are assumed to be the focal point around which yield development strategies can be built. Africa will require about 9.6 million tons of seeds by 2008, 38 per cent of which should be of the improved types. Greater efforts should be made to protect plants and products from losses inflicted by pest, diseases and weeds before and during growth and after harvest. The growth rates in total use of pesticide excluding herbicide is estimated at 4.9 per cent per year. The bulk of power input would still come in year 2000 from human labour and draught animals. As indicated in the analysis of capital goods, regional co-operation in agricultural machinery, especially tractors, could substantially reduce African countries extraregional dependence on imports.

(d) Reduction of post-harvest losses

151. Post harvest losses are estimated at about 10 to 15 per cent of total production. Major efforts are expected to be taken to improve the handling of stored commodities and to generate better storage facilities at all levels that will help not only to reduce waste but also to carry stocks and seeds for later planting without undue losses between good and bad year.

3. Continued self-sufficiency in meat

152. In the historical trends scenario, it was indicated that the prospects for meat are the best in the food perspective of the African region as a whole. Similarly, the projections of meat prospects under the normative scenario show that the region as a whole can easily maintain and even improve upon the levels of consumption and production outlined in the historical trends scenario. *Per capita* consumption of all meats, excluding camel meat for which data was not available is projected to increase relatively fast to reach a level of 18.4 kg by the year 2008 as a result of the projected fast growth in the *per capita* income of the region as a whole (table 14). Out of the total *per capita* meat consumption level, poultry consumption is projected to represent 5 kg per person while meat would contribute about 13.4 kg per person. However, the fastest growing meat items will continue to be poultry which, both historically and in the present projections, has a much higher consumption growth elasticity with respect to *per capita* GDP growth. Thus while *per capita* poultry consumption is projected to increase by nearly 2 per cent yearly up to the year 2008, the *per capita* consumption of non-poultry meat is projected on the whole to increase by only about 1.4 per cent. Such trends could, to a large extent, be attributed to some cultural factors which tend to inhibit a high rate of slaughter of cattle and domestic animals like goats and sheep since, in parts of the region, the keeping of a large herd is one of the major symbols of wealth and an insurance for the rural families. Other factors like religion would tend to favour a higher rate of poultry consumption since the pork component in the overall meat consumption of some regions in non-existent. In total, meat demand is projected to reach 18.4 million tons.

153. Although the production of meat was projected to cover the domestic meat requirements of the region, the potential for export cannot be discounted especially if certain cultural barriers can be transcended. The cattle herd is projected to increase at about the rate of 2.6 per cent yearly as in the historical trend scenario mainly because of the problems of overgrazing which are

likely to put a brake on a rapid expansion of cattle in the region as a whole. However, the sheep and goat herd is projected to grow slightly faster at about 2.7 per cent yearly while pigs would increase at only 1.3 per cent. However, a significant increase of around 10 per cent over the 1980 average carcass weight of cattle has been projected. Offtake ratios have been kept at conservative levels except the pig offtake ratio which is assumed to increase mainly as a result of increased processing of pork. Under these basic parameters, the production of all the different types of meat was projected to more than double between now and the year 2008.

154. Livestock production systems will have to undergo radical changes if the projected targets are to be fulfilled. The strategies in this sector would have to include (a) major structural changes in the composition of livestock; (b) integration of livestock and crop production activities; (c) progressive substitution of red meat for white; and (d) changes in technologies. The main inputs will have to increase rapidly for the high growth production targets to be met. The first major input is animal feed including both roughages and concentrates and the second is veterinary services and medicines. For the ruminant species (cattle, buffalo, sheep and goat), the bulk of feed requirement will come from roughages in the form of grazing, crop byproducts and fodder grown specifically for feeding. Veterinary services should be concerned predominantly with preventive medicine, mainly with control of major diseases. Emphasis should be put on raising the average level of staff training and improving the organization and management of the animal health systems.

4. Some nutritional implications of the development scenario

155. Africa (particularly equatorial forest zones, low lands around the great lakes, and the coastal areas of Western Africa) is particularly vulnerable from the point of view of protein deficiency. This is due mostly to its dependence more on roots and tubers as a source of energy supply. Nutrition programmes will have to be interwoven with the overall development programmes and the initiative for eliminating undernutrition and malnutrition must come from within society. Increasing the income earning opportunities of the poor is often suggested as a way if improving their nutritional status. One general method of raising the purchasing power of the poor is through public works programmes and pricing policies to increase their real income at the farm gate. Nutrition education is necessary to improve food consumption habits. Among the important targets of nutrition education should be popularization of breast feeding among women and elimination of waste which is mainly due to inefficient methods of food preparation. A closely related issue is environmental sanitation programmes with the expansion and up grading of public health services in rural areas, particularly maternity and child care services. Nutritional surveillance should also be an integral part of any applied nutrition programme. It should be based on a set of nutrition indicators on which observations are taken from time to time and for which boundaries of acceptability are defined.

Table 14. Improved food situation in Africa by 2008: A normative scenario

	1978-1980 a/	*2008*
A. Cereals (million tons)		
Food	59.9	170.9
Industry	0.2	1.8
Feed	5.3	24.2
Seed	2.6	4.9

Waste	6.8	22.2
Total demand	74.8	224.0
Total domestic production	58.4 b/	190.4
Imports	20.9	33.6
B. Roots, tubers and pulses (million tons)		
Food	64.6	152.1
Industry	0.1	0.6
Feed	1.8	7.1
Seed	4.8	9.5
Waste	13.8	33.0
Total demand	85.1	202.3
Total production	88.2	203.5
C. Meat (million tons)		
Total demand	4.7	13.6
Total production	4.3	13.6
- Beef	2.3	5.0
- Mutton	1.0	3.7
- Pork	0.2	0.8
- Poultry	0.8	4.2
D. Self-sufficiency ratios (percentage)		
SSR in cereals	75	85.0
SSR in roots, tubers and pulses	100	100.6
SSR in meat	93	100.0
E. Per capita food consumption levels (kgs)		
Cereals	142.1	171.0
Roots, tubers and pulses	153.3	152.5
Meat	11.1	12.6

Source: ECA projections, 1983.

a/ The 1978-1980 figures are based on the FAO estimates of 40 African countries except those figures with a symbol b/ which apply to 50 countries for 1980 only. The 10 remaining African countries not included in the FAO study are Cape Verde, Guinea-Bissau, Sao Tome and Principe, Equatorial Guinea, Seychelles, Lesotho, Swaziland, the Comoros, Djibouti and Botswana.

E. IMPROVED ENERGY BALANCE IN AFRICA BY 2008

156. The historical trends projections have shown that Africa might continue to face major difficulties in meeting the potential demand for energy, especially crude oil and electricity. At the same time, the historical trend scenario pointed to the fact that some energy resources such as coal, natural gas, hydropower and new and renewable energy sources are insufficiently exploited given the known and potential reserves. It was also shown in the historical scenario that the foreign exchange requirements resulting *inter alia* from high import dependency has led the major

oil-producing countries in Africa to export most of their production to developed countries while other African countries are forced to import almost all their oil needs from outside at very high opportunity costs especially in terms of foreign exchange.

157. The normative scenario which is analyzed below attempts, therefore, to project a better balance among Africa's main commercial energy resources (i.e. crude oil, electricity coal and natural gas) in order to make it possible for Africa's resources to be primarily used to meet the needs of its own people. However, the overall normative energy balance derived from the projections of these four commodities should also be seen in relation with other energy resources such as solar energy, wind, biomass and geothermal energy, for which great potential exist, although it is not quantifiable.

1. Normative projections of crude oil demand and supply

158. It was pointed out in the historical trend scenario that the growth rate of *per capita* consumption of crude oil dropped substantially in the late 1970s to about 2 per cent per annum. Such a reduction is attributable to the continuous increases in petroleum prices coupled with acute foreign exchange shortages which made it difficult for oil-importing countries to import the required crude oil. In the normative scenario, it is assumed that the growth in *per capita* crude oil consumption will not accelerate in view of the likely conservation measures in the world at large and especially if alternative energy resources were to be developed and the consumption patterns of energy progressively shifted in favour of those resources. It is, therefore, assumed that the elasticity of *per capita* consumption of crude oil with respect to *per capita* GDP would drop to below 1 in spite of a substantial acceleration in the growth of *per capita* income under the normative scenario. Therefore, the overall growth of *per capita* consumption of crude oil would remain at a level of about 4.7 per cent per annum in the coming 25 years which implies a *per capita* consumption of 498.6 kg in 2008 or a total consumption of 497.3 million tons.

159. It should be noted that the total consumption of crude oil in 2008 under the normative scenario would be less than what is projected under the historical trends scenario. In other words, the normative scenario assumes a shift towards other forms of energy equivalent to about 34.9 million tons of oil which, in other forms of energy, is equivalent to 49.9 million tons of coal, 405,814 GWh of electricity or, 43.6 billion m3 of natural gas. It is therefore clear from the above figures that,the total volume of consumption of other forms of energy as a result of shifts from crude oil would depend on a judicious combination of all the other forms of energy,taking into account the region's endowments and the investment requirements to exploit each type of energy source.

160. The main forces likely to bring about such shifts are varied and could all be contemplated in future perspectives. First, the increased exploitation of Africa's hydroelectric potential could make electricity prices cheaper relative to oil prices. Secondly, rural electrification would imply a shift from paraffin to electricity in rural areas which would reduce the demand for petroleum products and consequently for crude oil. A third is the possibility of exploiting more new and renewable sources of energy especially for domestic uses. Finally, coal is likely to become an important source of energy in view of the growing number of countries that have embarked on coal exploration and exploitation.

161. The projections of crude oil production in developing Africa, under the normative scenario, were based on domestic consumption as well as demand for oil exports. Assuming that the world demand for African crude oil would not be worse than what was projected in the historical trends scenario, the necessary supply of crude oil in order to satisfy total demand was pro-

jected at 751.6 million tons implying a growth of 3.3 per cent per annum between 1979 and 2008, as against 1.9 per cent yearly under the historical trend scenario.

162. From the above results African production of crude oil under the normative scenario assumes a regional self-sufficiency in crude oil. Although such an assumption implies faster growth in production, it is believed that, given the region's endowment in petroleum which is confirmed by the increasing number of African oil producers, it is possible not only to satisfy the domestic demand but also to maintain export earnings at satisfactory levels. Another implication of the projections of demand and supply of crude oil is the necessity for African countries to put into practice the recommendations contained in chapter 11 of the Lagos Plan of Action. These include, *inter alia*, stable and guaranteed supplies of oil to African countries, adoption of a bartering system between oil exporters and oil importers and the granting of preferential tariffs to oil-importing African countries.

2. Normative projections of electricity demand and supply

163. The historical trend scenario has shown that Africa's demand for electricity would grow steadily although the elasticity of *per capita* demand with respect to *per capita* income was projected to remain at a moderate level compared with the elasticity recorded in the first half of the 1970s. It was also noted that total projected potential demand of electricity under the historical trends scenario could not be supplied under the present electricity production levels, structures and patterns.

164. The normative scenario assumes therefore that the average elasticity of *per capita* consumption of electricity with respect to *per capita* income in the coming 25 years would not reach the average level of the 1970s which was 1.9. Indeed, it is likely that the expected sharp increase of the elasticity of *per capita* consumption of electricity with respect to *per capita* income in the rural areas would, to some extent, be offset by the expected decrease in the elasticity in urban areas 37/. Accordingly an average elasticity of 1.5 was assumed which implies an average annual growth rate of *per capita* consumption of about 6.4 per cent during the coming 25 years. Therefore, the *per capita* consumption of electricity by the year 2008 was projected to reach about 1022 kWh per person which, corresponds to a total demand for electricity of 1,019,639 GWh. Overall, the average annual increase of electricity consumption under the normative scenario implies an average annual increase of 9.3 per cent per annum. The total demand for electricity under the normative scenario in 2008 represents an increase of 219,868 GWh with respect to the projected level under the historical trends scenario. Such a difference corresponds to the combined effect of increases in income in both urban and rural areas, and a shift from petroleum to electricity.

165. The production of electricity, under the normative scenario, was based on the objective of achieving overall regional electricity self-sufficiency. The African region has therefore to meet the projected demand which implies a total production of 1,019,639 GWh in 2008 or an increase of 415,535 GWh compared with the projected figure of 604,104 GWh in 2008 under the historical trends scenario. Since crude oil consumption and, consequently, that of petroleum products would have to be reduced by the year 2008 compared with the projected demand under the historical trends scenario, such increases in electricity supply should be provided mainly by hydroelectric plants, coal-fired thermal plants or gas turbines.

166. Given the hydroelectric potential of Africa and the trend in the production of hydroelectricity, the share of hydropower in total electricity production could reach a level of 85 per cent

37/ As indicated earlier, the normative scenario assumes a better balance in rural and urban development.

by 2008 compared with the 1978 level of about 68 per cent. On the basis of an improved average use of installed capacity of 6,000 hours per annum by the year 2008 compared with the assumed 5,000 hours under the historical trend scenario, the corresponding installed capacity of hydro-electric plants would be about 144,450 MW. The additional hydroelectric capacity which would have to be installed between 1978 and 2008 would therefore be 133,627 MW. For thermal plants, the required capacity by 2008 would be about 25,492 MW which is lower than the corresponding figure projected under the historical trend scenario, since petroleum-based thermal plants would have to be reduced to take into account the reduction in crude oil consumption. The additional thermal capacity to be installed from 1978 to 2008 would have to be about 17,193 MW with a substantial part coming from coal-fired thermal plants, gas turbines, etc.

167. The implications in terms of investment are estimated at about 295 billion 1980 dollars or an average annual capital expenditure of 9.8 billion in 1980 dollars, which corresponds to about 12 per cent of the 1980 total investment of developing Africa. With increased regional co-operation especially in development financing, such an investment level is within the possibilities of the African region.

3. The coal prospects under a normative scenario

168. Since recent trends in coal producing developing African countries have shown a significant improvement in coal consumption and production levels, it seems reasonable to assume, under a normative scenario, that these countries will increase efforts to explore and develop their coal reserves. Such a possibility is likely to occur as the mining technology of coal is well established and its economic competitiveness with other energy resources substantially improved. All these factors would make it reasonable to assume that coal consumption in developing African countries will continue to expand. On the basis of projections already made on coal consumption in Africa including South Africa 38/ and taking into account developing Africa's share in the total consumption of Africa, an average annual growth rate of 4.8 was derived which resulted in a total coal consumption level of about 24.2 million tons by 2008. Such an increase takes into account not only the higher consumption resulting from the increase in income, but also the likely shift from crude oil and petroleum products to coal as well as the potential in using coal in industry especially in the engineering industries.

169. On the supply side, the projections made for all of Africa were used. Assuming that the rate of coal discovery in developing Africa will be able to offset the depletion of reserves throughout the present century, an average annual rate of growth of coal production of about 6 per cent may be safely assumed. At this rate total coal production would reach 27,830 million tons by the year 2008. Hence, in the twenty-first century, Africa would have a surplus of about 3.65 million tons of coal for export.

170. Such relatively bright prospects in coal consumption and production imply, however, more co-operative efforts within the African region with a view to increasing intra-African trade which accounted for only 3.8 per cent of total African coal trade in 1977. Moreover, the coal-producing countries should devise appropriate measures in order to encourage coal consumption. Governments might, in this respect, consider introducing high taxes to discourage the use of other competitive energy resources such as petroleum products. In addition, the necessity for establishing an adequate transport structure to transport coal has to be stressed if the region is to benefit from increased exploitation of the resource.

38/ Energy resources in Africa, OAU/ECA, March 1980.

4. Projections of natural gas demand and supply under a normative scenario

171. The natural gas prospects in developing Africa under the present normative scenario could be considered as promising given the large potential of the region (some estimates put the reserves at about 5,900 billion m3) and the present low level of exploitation (only 20 billion m3). However, given the present energy consumption pattern in African countries, especially in industry, it will take time to implement coherent policies for large-scale use of natural gas even in the producing countries. Moreover, the difficulties in the transportation and storage plus the lack of liquefaction plants would make it difficult for African non-gas-producing countries to import natural gas from the producing African countries.

172. Under such conditions, only a moderate acceleration of domestic consumption was projected on the assumption that the main consumer countries, which happen also to be the major producers, will continue and perhaps increase the shift towards greater utilization of natural gas especially in view of the projected general deceleration in crude oil consumption. On the basis of an average annual increase of about 8 per cent, the total demand for natural gas in developing Africa was projected to reach around 67.3 billion m3 by the year 2008.

173. Assuming further that the increase in the domestic consumption levels would be coupled with a likely slow down in the world demand for Africa's natural gas, the share of exports of gas from developing Africa by the year 2008 has been projected to decline to about 55 per cent of total production. In other words domestic consumption would account for about 45 per cent of total supply projected to amount to about 100.2 billion m3 by the year 2008.

Table 15. Selected commercial energy types in Africa in 2008 under the normative trends scenario

	1978 a/	*2008*	*Average annual growth*
A. Crude oil (million tons)			
Total production	289.7	751.6	3.3
Exports (including stocks)	279.0	254.3	-0.3
Imports	50.1	-	-
Apparent consumption	59.8	497.3	7.6
B. Electricity (GWh)			
Potential demand	699 85 b/	1 019 639	9.3
Installed capacity (MW)	19 121	169 941	7.6
Thermal	8 298	25 491	3.8
Hydroelectric	10 823	144 450	9.0
Total production	69 985	1 019 639	9.3
C. Coal (million tons)			
Total consumption	6.8	24.2	4.3
Total production	4.8	27.8	6.0
Net imports	2.0	-3.7	

D. Natural gas (billion m^3)

Total demand	6.7	67.3	8.0
Total production	20.0	150.2	7.0
Net exports	13.6	82.9	6.2

E. *Per capita* demand levels

Crude oil (kg/person)	131.6	498.6	4.7
Electricity (kWh/person)	159.0	1 022.0	6.4

Source: ECA secretariat projections, 1983.

a/ The figures for crude oil refer to 1979.

b/ Actual consumption.

F. AN INDUSTRIAL TAKE-OFF BY 2008

174. The projections for the selected industrial product groups under the normative scenario are basically conceived so as to highlight the desirable path of industrial development in the African region resulting from some basic structural changes in the policy framework, but account is taken of the fact that the overall interactive effects cannot be systematically detailed as most of the variables are treated under relatively simple relationships. Nevertheless the findings reveal that, unless the region steps up its efforts in pursuing proper industrialization strategies such as those contained in the Industrial Development Decade for Africa, it will continue to depend on imports for its much needed capital goods, industrial intermediate inputs and basic consumer goods.

175. The intermediate goods sector assumes a more acceptable degree of self-sufficiency in some of the critical products analyzed in this study. Unfortunately the heterogeneity of consumer goods precluded any explicit evaluation of the success of future substitution policies. However, indications are that there are no special barriers to attaining self-sufficiency in many of the manufactured consumer goods if a major part of the intermediate inputs can be made within the region. But this will call for innovation and increased enterpreneurial capabilities as well as a change from mimicking whatever is done and consumed outside while ignoring Africa's own products.

1. Establishing a capital goods sector by 2008: Agricultural machinery and equipment

(a) Tractors

176. The normative scenario for capital industrial products centred on agricultural machinery, especially tractors, in view of the need to bring about an improvement in agricultural productivity. Bearing in mind the need for extension and intensified use of agricultural land to achieve faster growth in agricultural output, the elasticity of the number of tractors in use with respect to total GDP is assumed to increase to 1.0 as compared to 0.8 in the historical trend scenario. With this elasticity the average annual growth in the number of tractors in use is projected to be 7.3 per cent giving a total number of 1.8 million tractors in use by the year 2008. Assuming a replacement rate of 10 per cent, the region's annual requirement of tractors is estimated to reach 309,700 by the year 2008.

177. The supply of tractors in the normative scenario is based on the targets set in the Lagos Plan of Action which stipulates the achievement of 2 per cent of world industrial production in accordance with the Lima target. Thus, on this basis, the number of tractors to be produced by the African region has been projected taking into account the trends in world production of trac-

tors. The African region would have to produce about 210,000 tractors yearly by the year 2008. This relatively high production figure would still imply that the region has to continue to depend on other regions for about one third of its total requirements in tractors. Nevertheless, broad scope exists for national action by strengthening Africa's engineering core and in joint ventures in the production of agricultural machinery.

(b) Animal traction equipment

178. The normative scenario for the demand for animal traction was based on the assumption that in most countries, despite tractorization of large to medium farms, the smaller plots (2 to 5 hectares) will be tilled by animal traction. In 1975 there were about 16 million draught animals. Based on the projected rate of increase of 1.5 per cent per annum projected by FAO for draught animals between 1975 and 2000, the number of draught animals will be about 25,775,000 by the year 2008. Assuming that the implements for each pair of animal will have a replacement factor of 10 per cent, the region will require 1,288,750 pieces of animal drawn equipment annually. The projected level, which takes into account increased mechanization in the agricultural sector, would seem to imply that the rural sector would still continue to use traditional methods. However industrial research would be needed to produce better and more adapted animal traction equipment.

179. The supply of animal traction by the year 2008 will be demand-determined as imports of animal traction equipment are not assumed. However, as the production of agricultural machinery and equipment in Africa is expected to rise to meet the much needed modernization in the agricultural sector, the use of animals will have to be limited to areas of small plots and it could easily be assumed that supply will be able to satisfy the level of demand.

(c) Passenger cars under the normative scenario

180. The basic assumption behind the normative scenario for the projection of demand for passenger cars is the need to bring about substantial savings by the African population as a whole through the reduction of conspicious consumption. This would imply greatly reduced imports of expensive private cars and other durable consumer goods and would in addition ensure that the African market can take pride in consuming its products even though these might be of lower quality. In this context, the elasticity of persons per car with respect to growth in GDP was drastically changed from -1.9 under the historical trend scenario to -0.5 which gives a rate of decline of -3.6 per annum and a number of passengers per car of 44 by the year 2008 39/. The implied total number of cars in use by the year 2008 would be about 22.7 million. Assuming a replacement rate of 10 per cent and using the implied average annual increase of 6.6 per cent of the number of cars in use, the demand for passenger cars in 2008 will reach 3.8 million cars.

181. The total number of passenger cars to be produced domestically is also projected on the basis of the Lagos Plan of Action target of 2 per cent of world production by the 2008. On the basis of projected world production by 2008, the African region would have to produce 1.7 million cars by the year 2008. 40/ To attain this target, the investment and manpower require-

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39/ This level, which implies 23 cars per 1,000 people would seem optimistic since normal trends are for a very fast decrease in the number of persons per car as income rises. For example, Europe had in the 1970s an average of 3 persons per car or 299 cars per 1,000 persons. However, the normative scenario aims at reducing the trend of fast growth in conspicous consumption.

40/ The normative scenario assumes no assembling.

ments are estimated to be about $14.6 billion at 1977 prices and 303,500 persons respectively. Under this scenario, the imports of passenger cars as a percentage of total demand will drop substantially to reach about 55 per cent by 2008 as compared with the projected level of 97.7 per cent in the historical trend scenario. However, even this relatively low import level of passenger cars would constitute a financial burden in terms of foreign exchange not only for the vehicles but also for the spare parts and the fuel to run them. It would therefore seem apparent that clear measures would have to be adopted to curb such increasing conspicious consumption. Quota restrictions and other controls on imports as well as measures to orient consumption to local production would seem not only desirable but necessary.

(d) Commercial vehicles under the normative scenario

182. For commercial vehicles, a slightly higher elasticity of 1.7 of the number of commercial vehicles in use with respect to total GDP has been assumed implying an average annual rate of growth of 11.9 per cent in the demand for commercial vehicles as compared to an annual average growth of 8.5 per cent derived in the historical trends scenario. The corresponding level of commercial vehicles in use by 2008 would be about 49.6 million. The resultant level of demand for commercial vehicles is around 8.3 million vehicles which shows a tremendous increase relative to the level projected under the historical trends scenario. This high growth is predicated firstly on the assumption of increased substitution of private passenger cars by commercial and public transport vehicles. Secondly the completion of the trans-African highways as well as the projected increases in the volume of intra-African trade are all likely to increase the volume of commercial vehicles required for the region as a whole. Thirdly, the rural population will require an increase in the number of versatile commercial vehicles. The projected demand by the year 2008 is based on a lower replacement rate of only 5 per cent as compared to the 10 per cent used in the historical scenario. 41/

183. The methodology used in the estimation of domestic production of passenger cars under the normative scenario is again followed for commercial vehicles. To attain the target of 2 per cent of world production of commercial vehicles by 2000 and beyond, the domestic production should reach a level of 747,700 vehicles by the year 2008. 42/ At this level of production of commercial vehicles within the region, imports as a percentage of total demand would be about 91 per cent as compared to about 97 per cent under the historical trend scenario.

184. The high level of production envisaged under the normative scenario can be attained by strengthening the region's equipment production capabilities, the development of basic engineering support facilities and strengthening the engineering core. With such changes the region could greatly increase its contribution to the requirements of the transport sector in terms of trucks, buses, rail wagons, etc. It must, however, be emphasized that the projected volume of commercial vehicles would imply a tremendous burden on the region in terms of the implicit oil bill and maintenance cost. Thus, it might be desirable in many instances to explore ways of substituting commercial vehicles with electrified intercountry railways.

185. As the rural population will have an increased demand for low-cost transport it is envisaged that by the year 2008 the majority of African countries will be manufacturing bicycles and motocycles which require a relatively low level of investment. According to present estimates, by the

41/ The lower replacement rate would result from improved roads and better maintenance of vehicles.

42/ No assembling is assumed in this scenario.

year 2008 the demand for bicycles and motocycles or scooters would amount to about 5.6 million units and 2.6 million units respectively. Domestic supply would be able to satisfy about 45 per cent and 36 per cent of the demand for bicycles and motocycles or scooters respectively.

Tableau 16. Selected industrial goods: Africa by 2008 under the normative trends scenario

	1980	*2008*
A. Tractors		
Tractors in use (000s)	253.3 a/	1 821.5
Annual demand for tractors (000s)	7.0 a/	309.7
Domestic supply	n.a.	210.0
Imports	n.a.	99.7
B. Passenger cars		
Number in use (millions)	3.3 a/	22.7
Number of cars per 1,000 persons	8.0	23.0
Annual increase (millions)	0.4	3.8
Domestic production (millions)	n.a.	1.7
Imports	n.a.	2.1
C. Commercial vehicles		
Number in use (millions)	1.7	49.6
Annual increase (millions)	n.a.	8.3
Domestic production (000s)	16.9 b/	747.7
Imports (millions)	n.a.	7.6

Source: ECA projections, 1983.

a/ Data refer to 1978.

b/ The figure refers to the vehicle equivalent of the value added in the assembly.

2. Possibilities of self-sufficiency in industrial intermediates by 2008

(a) Fertilizers

186. Under the normative scenario, projections of the demand for fertilizers in the African region as a whole are based on the desired level of food production. Since to ensure brighter food prospects, increased use of fertilizers was assessed to be necessary, the total fertilizer requirements for the region as a whole was projected to reach to around 21.5 million tons by the year 2008, implying an average annual growth rate of 9.2 per cent in the demand for fertilizers as compared to a 4.3 per cent growth under the historical trends scenario between 1980 and 2008. The fertilizers would be needed in the following proportions: 7.8 million tons of nitrogenous, 7.4 million tons of phosphatic and 6.8 of potash fertilizers.

187. Consequently, to meet the self-sufficiency requirement, total domestic production is projected to satisfy a large part of the region's fertilizer demand by the year 2008. In this connection, a self-sufficiency ratio of 100 per cent is assumed for the region as a whole which would necessitate additional capacities of 7.2, 6.6 and 6.3 million tons of nitrogenous, phosphatic and potash fertilizers respectively. It should be noted that, while Africa continues to be a net importer of nitrogenous and potash fertilizers, it remains a net exporter of phosphate fertilizers.

188. In view of the self-reliant objective and the need to attain self-sufficiency in food and given the fact that the region is endowed with a range of raw materials and energy resources (phosphate rock, potash, sulphur, coal, petroleum, natural gas, hydroelectricity and geothermal energy), there is no reason why the region as a whole could not reach a production level to satisfy the whole of its fertilizer requirements. To this end, it is estimated that developing Africa would need to establish respectively about 27, 20 and five large-scale production units for nitrogenous, phosphate and potash fertilizers by the year 2008. This would imply investment requirements of the order of $18 billion at 1980 prices. The magnitude of growth in fertilizer production by 2008 would require approximately 158,200 unskilled and skilled workers in all relevant categories. The requirements are broken down below: 43/

- Managers and supervisors	66,466
- Health and personnel	1,741
- Engineers and chemists	7,754
- Draughtsmen	633
- Skilled worker/foremen	28,008
- Secretaries/clerks	9,020
- Operators	35,762
- Unskilled and service workers	68,676

(b) Projection of cement in developing Africa by 2008 under the normative trends scenario

189. With the normative scenario, the elasticity of *per capita* cement consumption with respect to *per capita* income is assumed to increase between now and the year 2008, implying a corresponding growth in *per capita* consumption of 5.2 per cent per annum in the next 25 years. Thus, by the year 2008 *per capita* cement consumption in the region would reach to about 264.6 kg. The total cement consumption is therefore projected to total 264 million tons by the year 2008. It should be pointed out that the projected *per capita* cement consumption is relatively low compared to the present *per capita* levels in other developing regions. Since increased demand for better housing conditions resulting from the general improvement in income levels as well as from a narrowing in rural-urban income disparities will necessitate an increasing level of cement supply, it might be necessary to promote joint ventures in large-size cement and clinker plants.

190. For the region as a whole, self-sufficiency in cement by the year 2008 would necessitate heavy investments and a large number of workers. Thus it is estimated that between now and the year 2008, real investment and manpower requirements for cement production would have to grow by about 8.4 per cent and 5.9 per cent respectively to be able to set up the required cement production. Equally important, is the reduction and economy in cement consumption per unit of

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43/ Coefficients of occupational employment in the fertilizer industry were obtained from International Labour Organisation, *Human resources for industrialization* 1967 and Economic and Social Council, *Training of National Personnel for the Accelerated Industrialization of Developing Countries*, 1985.

construction through (a) increased research in building and building materials; (b) standardization of building materials; and (c) the substitution of alternative material like lime pozzelana for cement.

(c) Iron and steel projections for the African region in 2008

191. The demand for steel in Africa is still far from being satisfied. As steel is important in key sectors such as building and construction, engineering industries, agriculture, manufacturing and transport, the projection of demand for steel has to be linked to the growth of the steel using sectors. Overall, the normative scenario assumes a significantly increased steel intensity with respect to the level of total GDP since faster industrialization to achieve the Lima target will undoubtedly imply a higher utilization of iron and steel. With a projected steel intensity per one dollar of GDP of 0.228 x 10-3 ton/SUS in the year 2008, the total consumption level of iron and steel for developing Africa as a whole would reach 195 million tons by the year 2008. The projected steel intensity reflects the necessary shift from light to heavy industries with the increased exploitation of the region's iron ore resources. It should also be noted that historical trends show that the direct demand for iron and steel is growing faster than the indirect demand for the region as a whole.

192. The projected level of iron and steel that will be domestically produced is around 61 million tons by the year 2008, implying a self-sufficiency ratio of about 31 per cent. Thus developing Africa would remain a net importer of iron and steel throughout the next 25 years. However, the potential market in the African region reflected in the high levels of consumption requirements may be a stimulating factor for the expansion of domestic steel production especially given the availability of the necessary raw materials such as iron ores, ferro-additives, scrap, coal, natural gas, etc. Over all about 352 million tons of iron ore and 131 million of coal will be required for the production of the level of iron and steel projected by the year 2008. This would imply an investment of the order of $190 million at 1980 prices.

193. The manpower required to produce the projected output of iron and steel will be in the order of 274,500 workers. 44/ They will be distributed among the relevant occupational categories thus:

- Engineers and managers	19,215
- Technical	32,940
- Administrative/clerical	27,450
- Skilled workers	109,800
- Unskilled workers	85,095

194. While the supply of the last category of workers for the iron and steel industry in Africa will constitute no problem whatsoever, the availability of manpower to fill the others, especially the engineering, managerial and technical categories, might prove to be a constraint on the achievement of planned output targets. Once again, education and training systems should take early cognizance of the manpower needs in this industry and plan to fulfil them.

44/ Coefficients of employment for iron and steel were based on International Labour Organisation. *The establishment of iron and steel industries in developing countries and its impact on training and development of skills*, 1981.

195. The normative scenario has further assumed an increase in the installed capacity in developing Africa from its present level of 0.7 per cent to 6 per cent of world capacity by the year 2008 in the belief that fast mobilization of the continent's abundant resources and the fundamental change in the structure of production and promotion of self-sustaining industrial development would bring the African region to an industrial take-off by the year 2008.

Table 17. Selected intermediate products: Africa by 2008 under the normative trends scenario

	1980	*2008*
A. Fertilizers (thousand tons)		
Total demand	2 278	21 490.0
Total production	1 422	21 490.0
Balance	-856	-2 900
B. Cement (million tons)		
Total demand	28	264.0
Total production	23 a/	264.0
Imports	n.a.	-
C. Iron and steel		
Steel intensity (tons x 10-3/$US)	0.129	0.228
Total direct and indirect demand of iron and steel (million tons)	13.4	195.0
Total production (million tons)	6.5 b/	61.0
Imports (million tons)	n.a.	134.0

Source: ECA projections, 1983.

a/ Data refer to 1979.

b/ Installed capacity.

3. Consuming Africa's own consumer products

(a) Future trends in textile fabrics

196. The normative scenario assumes a rise in the marginal propensity to consume manufactured goods given increases in the general income level and the expected improvements in urban-rural income disparities. Thus the *per capita* consumption of textile fabrics is projected to grow fast at about 3.7 per cent yearly to reach 5.1 kg by the year 2008. This estimate, however, is modest as some African countries (e.g. the Ivory Coast) have already recorded a *per capita* consumption level of nearly 4 kg. The projected total requirement of about 5.1 million tons in the year 2008 would imply a fast growth of 6.7 per cent as compared to 5.2 per cent projected under the historical scenario.

197. The basic assumption behind the supply of textile fabrics under the normative scenario is the desired shift in the consumption pattern to local textile products and the possibilities of developing more domestic textile industries in the African region especially for cotton to take advantage of the readily available raw materials on the continent. Therefore, the share of domestic consumption out of the region's total production of cotton lint has been projected to increase to 80 per cent under the normative scenario as compared to 60 per cent under the historical trends scenario. This assumption presumes that significant progress will be made in changing the life styles of the African population so that the products of the region can be consumed with more confidence.

198. Since domestic consumption of cotton lint is assumed to be 80 per cent of the region's total production in the year 2008, total domestic production of cotton fabrics is projected to be about 4.1 million tons of cotton fabric by the year 2008. A deficit of 1 million tons of cotton fabrics is projected to be covered by imports of mainly synthetics and other man-made fabrics. 45/ In addition to the indicated need to change the life-style in Africa, efforts will be required to increase training in textile technology and to create African multinational textile firms for the production, promotion and marketing of textile products. Further, it will be necessary to (i) improve the quality of domestic textile products, (ii) increase the price competitiveness of Africa's textile fabrics, (iii) ensure a stable supply of the appropriate raw cotton, and (iv) set up specific programmes for the manufacture of textile equipment. Increased intra-African trade in cotton fabrics will also be instrumental in bringing about an increased consumption of the region's own products.

(b) Pharmaceuticals in Africa by 2008

199. The normative scenario is based on the relationship between *per capita* consumption of pharmaceuticals and *per capita* GDP. The total consumption of pharmaceuticals is projected to reach a level of $US 10.3 billion at 1980 prices by the year 2008. From information pertaining to some member States, it is likely that, on average, about 20 per cent of pharmaceutical consumption is formulated in Africa, the balance being imported in finished dosage forms. This would mean making provision for the formulation of up to about 80 per cent of consumption as well as the manufacture of the major active ingredients. In view of the fact that no country in the world is 100 per cent self-sufficient in pharmaceuticals, the following production programme in respect of active ingredients is proposed under the normative scenario:

Proposed production programme	1980	2000	2008
percentage of consumption	20	50	80
total production/sales	190	819	2058
Value added	95	410	1 029

It would be necessary to mention here that Africa has tremendous potential in the area of traditional medicines which could easily be processed into important and new pharmaceutical products.

200. Very rough indications of investment requirements for the manufacture of the active ingredients and the expansion of formulating facilities were estimated at about 6 billion at 1980 con-

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45/ A few countries like Egypt and Morocco do produce some man-made fabrics.

stant prices. This level was arrived at using a capital ratio of 0.9 or $0.9 of investment for every $1of sales for the period 1983-1990. This ratio, which is appreciably higher relative to the one in developed countries, has been used to take care of African reality in the 1980s. For the periods 1990-2000 and 2000-2008, the ratio has been projected to decline to 0.8 and 0.7 respectively. As for manpower requirements, the projected orders of magnitudes were arrived at on the basis of average value added per employee of $8,000 with value added estimated at 50 per cent of sales volume. Of the total required manpower of 130,000 in 2008, university graduates (chemists, pharmacists, bacteriologists, engineers and accountants) constitute about 15 per cent while high-school graduates account for about 25 per cent.

Table 18. Selected consumer goods: Africa by 2008 under the normative trends scenario

	1980	*2008*
A. Textiles		
Total demand (million tons)	0.8	5.1
Per capita consumption (kg)	2.0	5.1
Exports (million tons of lint)	0.6	1.2
Imports (million tons of man-made fabrics)	n.a.	1.0
Total production (million tons of cotton fabrics)	0.3 a/	4.1
B. Pharmaceuticals (in US billion at 1980 constant prices)		
Demand based on c.i.f.	1.1 b/	10.3

Source: ECA projections, 1983.

a/ Data refer to 1979.

b/ Data refer to 1978.

G. AN INTEGRATED TRANSPORT AND COMMUNICATIONS NETWORK UNDER THE NORMATIVE SCENARIO

201. The historical trends scenario highlighted the fact that, unless drastic changes occur in the field of transport, the development of the region will continue to be constrained since, even after the completion of the 1978-1988 Transport and Communications Decade in Africa, feeder roads, railways and maritime transport would need to be expanded further. Therefore, in the normative scenario which assumes substantial progress in the areas of food and agriculture, industrialization, natural resources development, socio-economic welfare and economic co-operation including intra-African trade, a commensurate rate of development of the various transport modes has been anticipated. The envisaged changes are quantitatively and/or qualitatively outlined below for maritime and air transport, roads and railways.

1. Maritime transport

202. On the basis of the targeted growth in the volume of Africa's trade including intra-African trade, it is projected, in the normative scenario, that Africa's seaborne trade would amount to 1,463.6 million tons by the year 2008. This normative figure is only slightly higher than that of the historical trends scenario as most of the expansion in the volume of trade is projected to originate from expanded intra-African trade coupled with a reduction in the volume of imports as a result of increased national and collective self-reliance. Further, the volume of seaborne crude oil trade is not projected to be significantly different from the projected historical trend level owing to the anticipated intra-African co-operation in the field of energy and the projected stabilisation in the volume of crude oil exported by Africa outside the region. Actually, crude oil trade would represent, in 2008, about 48 per cent of total seaborne trade as against 70 per cent in 1981.

203. At the projected level of 1,463.6 million tons of seaborne trade, taking into account the proposed UNCTAD Code of Conduct for Liner Conferences, 46/ the volume to be carried by the Africa's fleet by 2008 is targeted to be about 585.4 million tons. Assuming marked improvements in the efficiency of port and fleet operations the projected volume to be transported by Africa would be equivalent to a vessel capacity of 115.5 million dwt. This capacity would, in turn, necessitate a total fleet of almost 5,000 vessels by the year 2008.

2. Air transport

204. Under the normative scenario, the total volume of the region's air freight is projected to reach 46.3 billion ton-km by the year 2008. As for passenger traffic the projected level by the year 2008 is about 301.3 billion passenger-km compared with the projected level of world passenger traffic of 4,713 billion passenger-km. 47/ At this level, the share of developing Africa in the world's total passenger traffic would rise from the 1980 level of 2.7 per cent to nearly 7 per cent by 2008.

Table 19. Selected transport indicators for Africa 1981-2008 under normative perspectives

	1981 (actual)	*2008*	*Average annual increase in percentage*
Seaborne trade (million tons)	571.0	1 463.6	3.5
African fleet capacity (million dwt)	7.18	115.5	10.8
Air freight (billion tons x km)	4.9	46.3	8.3
Traffic passenger (billion passenger x km)	32.0	301.3	8.7

Source: ECA projections, 1983.

46/ The proposed UNCTAD Code of Conduct recommends that 80 per cent of the seaborne trade should be transported in equal proportion by any two trading partners.

47/ Based on the Airbus Industry projections in *Realites et perspectives du transport aerien en Afrique*, 1982, no. 1.

205. However, it has to be emphasized that, for the African region to achieve the projected volume of air traffic, policy action would be needed to (i) intensify co-operation and co-ordination between airlines in the commercial and technical fields; (ii) promote multinational airlines; (iii) strengthen and establish multinational training centres; (iv) harmonize regulations and facilities in the field of civil aviation; (v) improve the region's civil aviation infrastructure.

3. Road and railway infrastructure

206. As was indicated under the historical trends scenario, road infrastructure in Africa has the most critical and pivotal role in the integration of the balkanized African region. Therefore, in the normative scenario, particular attention has to be paid to the development of an efficient road infrastructure especially in view of (i) the projected increase in overall economic activity; (ii) the need to open up new domestic markets for increasing intra-African trade; (iii) expanded industrial activities more appropriately linked to the region's natural resource base; and (iv) the African Common Market envisaged in the Final Act of Lagos. Indeed, the success of the projected industrial take-off will depend, to an extent, on the capability of the region's transport network (especially roads) efficiently, reliably and cheaply to transport raw and intermediate materials among countries and distribute the finished products to the various consumption centres within the region. Also, the major components of the African Food Plan as well as the projected improvement in the food situation in Africa will require a solid and efficient road infrastructure in individual African countries and in the region as a whole.

207. Consequently, the perspectives of road development by the year 2008 have to go much beyond the United Nations Transport and Communications Decade in Africa due to end in 1988. Indeed, it has to be emphasized that the 20 years that will follow the completion of the Transport Decade will have to see a clear consolidation and expansion of the achievements that will have materialized by 1988. Since it is currently estimated that the ongoing five trans-African highway projects will have been completed by 1990, it is therefore assumed under the normative scenario that work will have started on four additional trans-African highways namely (i) Tripoli-Luanda-Windhoek, (ii) Nouakchott-Cairo, (iii) Dakar-N'Djamena-Massawa and (iv) Beira-Lobito. These four additional highways considered in the normative scenario would bring the total length of trans-African highways, to 101,922 km by 2008. In addition to the trans-African highways, the normative scenario stresses the importance that has to be paid to the development of rural access roads. In this respect, it should be noted that, besides the importance of these roads in terms of distribution of goods and services, rural access roads have tremendous potential for triggering off some very important elements of a development scenario such as employment, increasing the cultivable lands through increased access and habitation, etc.

208. With respect to railways, the normative scenario would necessitate a drastic departure from the present railway structure to a more integrated, efficient and modern railway network. Firstly the normative scenario envisages increased use of more efficient engines as well as electrification. Indeed the projected supply of hydroelectricity would make it possible to electrify - at a reasonable cost - a very large part of the African railway network by the year 2008. Secondly, there would be need for clear policies directed towards the normalization of stock and equipment including, in particular, the development of techniques for changing from one gauge to another. Thirdly, the development of rail industries in Africa must be given particular attention so as to create a capacity for the assembly of traction machines (locomotives, shunters, railcars). Fourthly, with the growth of competition from other means of transport, the African railways operating conditions have to be drastically improved so as to raise productivity. Lastly, the creation of sub-regional training centres is of paramount importance for the development of African railways in the next 25 years. Overall such policies, if implemented, would substantially improve both the efficiency and length of the African railway network. The additional 26,000 km projected in the

Master Plan of the Union of African Railways 48/ could then be achieved by 2008 and the average speed of 100 km/h would be possible.

H. NEW DIMENSION IN AFRICA'S EXTERNAL TRADE AND FINANCE

209. The results of the historical trends scenario for the African region point to an almost unsustainable position in the field of foreign trade and external finance. Thus the normative scenario attempts to analyze more desirable relationships between and structures of domestic growth and the external sector. In this respect particular attention has been focused on improving the structure of Africa's trade including in particular (a) increasing intra-African trade; (b) more processing of Africa's agricultural and natural resources; (c) diversification of exports; (d) increasing self-sufficiency in major import items such as food, energy and basic industrial products; (e) reform in the region's monetary and financial institutions, mechanisms and structures; and (f) more favourable and equitable international trade and financial environment. Thus the projections in the external sector under the normative scenario take into account the analysis carried out in the key sectors, the objectives of the Lagos Plan of Action and the basic elements of a new international economic order.

210. In carrying out the projections of the region's exports, the same commodity groups as in the historical trends scenario have been treated, namely cash crops (coffee, cocoa, tobacco and tea), minerals (copper, iron ore and bauxite) and energy (crude oil and natural gas). It should be kept in mind, however, that other important and strategic products such as uranium, cobalt, chrome, platinum, coal, etc. will have an important role to play in the region's future development in terms of both domestic utilization and trade under the normative scenario. Moreover the role of gold and other critical minerals in southern Africa has to be kept in perspective, as it is likely that significant political changes will occur in that part of the region by the year 2008. Import projections have also been confined to those commodities covered in the analysis of demand and supply in the key sectors under the normative scenario. More specifically import projections take into account increased self-sufficiency in important items in sectors such as food, energy, machinery, transport equipment, intermediate industrial goods, textiles and pharmaceuticals.

1. Exports projections under normative scenario

(a) Cash crops

211. The projections of exports of *cash crops* are based on the results of the FAO study "Agriculture: Towards 2000". The FAO projections point to a marked acceleration in the growth rates of the selected agricultural commodities as a result of (i) increased investment in commodity development aimed at enhancing export earnings; (ii) reduced trade barriers in agricultural commodities; (iii) increased trade with other developing countries and the Socialist countries of Eastern Europe; and (iv) faster growth in the world economy. Overall exports of the selected agricultural commodities are projected to grow at a rate higher than total exports, thus implying that their relative weight in the total exports of the region as a whole by 2008 will increase significantly. In addition, assuming that the African region will achieve a higher level of processing of its agricultural raw materials for exports, the export earnings from this commodity group would then increase substantially. This would however require that the semi-processed products would be competitive in the world market so as to reverse the tendency of the region's being a price-taker. In addition efforts to reduce price fluctuations for agricultural primary products will have to yield results, especially in the area of Common Fund for Commodities, international commodity agreements and buffer-stocks schemes.

48/ Union of African Railways, Retrospect and prospects, 1981.

(b) Minerals

212. While increased mineral production is contemplated under the normative scenario, the volume of mineral exports is relatively moderate compared to the historical trend scenario. For example, the growth rate for copper exports is projected to remain at the same level as in the historical trends scenario on the ground that Africa will increase processing of that mineral for domestic use. For iron ore, the projected trend in domestic production of iron and steel under the normative scenario implies that exports of primary iron ore would grow at much slower rate than in the historical trends scenario. Similarly, export growth rate of bauxite is projected to decelerate appreciably as a result of the trends towards more processing in the main bauxite producing African countries. Other factors which are likely to slow down Africa's mineral exports include (a) shifts in the types of final goods demanded by consumers and investors in developed countries; (b) technology developments that alter the intensity of utilization of mineral in final goods; and (c) substitution among raw materials. Therefore the importance of exports of minerals in primary form, relative to the total exports of the region as a whole, is projected to decline substantially by the year 2008.

213. As a result the major objective of Africa's mineral development policies would have to be directed towards " . . . expansion of African indigenous capabilities to determine and exploit African mineral resources for intra-African and extra-African purposes, research and development in the pattern of change in mining technology in relation to net advantages of and to the region; the monitoring of trends in the development of technologies of exploration . . .; the development of technologies for small-scale mineral resources exploitation". 49/ Another important aspect of mineral exploitation and utilization relates to the necessity to establish joint multinational ventures especially in the fields of iron and steel and other strategic minerals.

(c) Mineral fuels

214. As indicated above, the normative scenario, assuming that present exploration efforts will bear fruit, has projected that crude oil production in the region as a whole will increase steadily to reach 751.6 million tons in 2008 as against 508.7 million tons projected under the historical trends scenario. However, it was also emphasized that such increase in production is projected to be mainly consumed within the region. Thus Africa's export of crude oil outside the region is projected to remain at the same level as in the historical trends scenario. It should be noted that such a prospective view of the crude oil situation in the African region is aimed at ensuring a regional balance so that Africa will not, by 2008, be dependent on other regions for its energy requirements. In addition, such desirable prospects would make it possible for implementing the proposals in the Lagos Plan of Action with respect to "the possibility of importing countries being allowed to pay in local currency, or to use bartering . . .". 50/ Also it is likely that import cost of crude oil from within the region will be lower than it would have been from outside the region, thus relieving the balance-of-payments burden on many oil-importing African countries.

215. Natural gas exports under the normative scenario were also projected taking into account the need and the possibility for the African region increasingly to utilize its natural gas resources. Due consideration was also given to the fact that the likely main external importers of natural

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49/ ECA Proceedings of the first Regional Conference on the Development and Utilization of Mineral Resources in Africa - Arusha, 2-6 February 1981, pages 4 and 5.

50/ A/S-II/14, annex 1.

gas - mainly European countries, are now in the process of establishing important arrangements for securing natural gas from other regions, particularly the USSR. Thus the proportion of natural gas exported relative to total production is projected to drop to around 55 per cent by 2008 under the normative scenario, as compared to the present share of about 70 per cent. In terms of magnitude, natural gas exports are projected to reach about $15 billion at 1980 prices making it a major export earning item for the region as a whole. Although coal was not covered in the export projections, it should be kept in mind that, in addition to the projected increase in domestic consumption, Africa could also be a net coal exporter by 2008.

(d) Goods and services

216. With respect to Africa's total export of goods and services, the projections under the normative scenario point to major changes in structure since the selected 10 export commodities will, by 2008, account for 40 per cent of total exports outside the region as against about 75 per cent in 1980. This implies that under the normative scenario the next 25 years will witness a diversification in exports with increased exports of semi-processed products and finished manufactured goods. Indeed with the anticipated attainment of the Lima target and the target of the Lagos Plan of Action of 2 per cent of world industrial production for the African region by the year 2000, the region as a whole will have to increase its exports of manufactures substantially. Overall exports outside the African region are projected to increase at an average annual rate of about 3.4 per cent as against 1 per cent growth rate projected under the historical trends scenario.

217. In line with the Lagos Plan of Action, the normative scenario aims at changing the African region's economic structure. Thus in the field of exports, it is assumed that the region as a whole should move from undue dependence on exports outside the region as the engine of growth. As a result one of the major new dimensions of the normative scenario in the export sector is the substantial expansion of intra-African trade. In this regard, on the basis of the prospects analysed under the normative scenario, intra-African trade will account for about 30 per cent of the total volume trade of the region, thus allowing for more expansion of productive capacities in individual countries. Another important dimension is the expansion of processing activities through the establishment of African multinational production corporations and joint ventures, which will allow for more flow of primary resources and products among the countries.

2. Imports projections under the normative scenario

218. Under the normative scenario, it is assumed that, by the year 2008, Africa will substantially improve its self-sufficiency ratios in food, energy, capital goods, intermediate goods and basic manufactured consumer products. Consequently total imports of goods and services from outside the region are projected to grow on the average at a moderate rate of about 4.5 per cent yearly. Of course this growth rate will result from a gradual slowdown in imports from outside the region in conformity with the expansion of the region's productive capacity and intra-African trade over the next 25 years.

219. Since for the African region as a whole the self-sufficiency ratio in cereals by the year 2008 was projected to reach about 85 per cent, the region would have to import about 33.6 million tons of cereals in 2008 implying a food import bill of about $8 billion at 1980 prices. At this level, however, the share of cereals imports in total imports of goods and services from outside the region would be much lower than it is at present. Capital goods on the other hand would continue to account for a very large proportion of the region's imports since 91 per cent of commercial vehicles requirements and 55 per cent of demand for passengers cars would, by 2008, have to be imported from outside Africa. For agricultural machinery, however, the normative scenario has envisaged a dramatic increase in domestic production, thus reducing the amount of

imported agricultural equipment like tractors to about one third of the requirements by the year 2008.

220. Further, the normative scenario has projected a substantial reduction in the volume of imports of intermediate and manufactured goods. For example by the year 2008, it is projected that Africa will not have to import cement and fertilizers. Imports of pharmaceuticals and textiles fabrics would be only about 20 per cent of the total requirements of the region as a whole. However the African region will still have to import about 70 per cent of its direct and indirect iron and steel demand by the year 2008.

221. The above projections of total imports, which assume a substantial drop in import elasticity with respect to GDP, imply that the African region as a whole needs to restructure vigorously its import substitution programmes. Specifically, import substitution programmes should be envisaged at the subregional and regional levels in order to avoid duplication among countries and ensure greater efficiency and competitiveness in price and quality of regional industries. In addition, regional import substitution programmes will make it possible to lessen the present protection policies among African countries. For this policy to succeed, it has to be complemented by well articulated campaigns to encourage the African people to consume with pride Africa's own manufactured goods. Another area in which the African region would have to make a major breakthrough is that of the import of services. In this regard it is of paramount importance for the region to pool its resources in the development of skilled manpower including consultancy services, technology, shipping and air transport, insurance and banking. African countries individually and collectively should also embark on negotiations aimed at rationalizing procurement procedures with a view to minimizing foreign exchange leakages. Finally it is important to draw attention to the need to standardize imports, especially capital goods, as this would *inter alia* enable the region as a whole to consolidate its master technology through the manufacture of standardized spare parts in the region.

3. Finance and aid

222. As it may be seen from the projections of total imports and exports which imply a substantial reduction of the trade gap as a proportion of GDP, the African region will endeavour to mobilize and pool its resources with a view to bearing the primary responsibility for financing its development, in the spirit of national and collective self-reliance. However, domestic efforts will undoubtedly need to be supplemented by external assistance and aid. A healthy international financial environment will also be necessary. As has been noted by the World Bank, to complement the domestic efforts a "committment is necessary from the international community . . . to increase aid and to provide assistance in ways more suitable to Africa's need than in the past and in support of the reform programmes defined by the African Governments." 51/

223. The major critical areas in the financial sphere include (a) increasing privatization of the international financial system; (b) increasing conditionality; (c) interest and exchange rates; and (d) decreasing, in real terms, of resource flows to developing countries. These problems would have to be resolved so that a more attractive financial milieu can be established. For the African region it might be useful to consider some of the proposals outlined by the Brandt Commission in the field of financial co-operation among developing countries which include "strengthening regional payments arrangements, expansion of developing countries" financial facilities including

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51/ World Bank, op.cit., p. 121.

Table 20. Export projection of selected commodities under normative scenario

	1980		2008		
	Quantity (thousand tons)	*Value in million 1980 US dollars*	*Quantity (thousand tons)*	*Value in million 1980 US dollars*	*Average annual growth rate in percentage*
Cash crops					
Coffee	957.0	3,177.2	2,834.1	9,409.2	3.9
Cocoa	837.0	1,944.3	1,961.0	4,555.4	3.1
Cotton	622.0	2,101.7	4,223.1	14,269.8	7.1
Tobacco	148.0	340.4	458.7	1,055.0	4.1
Tea	177.0	458.4	568.0	1,471.1	4.2
Minerals					
Copper a/	980.5 b/	2,137.5	1,578.6	3,441.3	1.6
Iron ore c/	26.2 b/	461.0	33.7	593.1	0.9
Bauxite c/	13.1	539.7	15.9	655.1	0.7
Energy					
Crude oil c/	279.0 b/	66,067.2	254.3	60,147.2	-0.3
Natural gas d/	13.6 b/	2,448.0	82.9	14,922.0	6.2

Source: ECA secretariat projections, 1983.

a/ Blister and refined.

b/ Figures refer to 1978.

c/ In million tons.

d/ In billion of m3.

considering the establishment of a third World Bank, support for enlarging refinancing and guaranteeing developing countries export credit facilities, increased direct investment in the third world by developing countries, reform of the IMF and World Bank in the direction of greater power sharing, ..." 52/

224. The African region for its part will also need to strengthen its monetary and financing structures including in particular the creation of an African Monetary Fund at the regional level. As stipulated in the Lagos Plan of Action, there is need for a "complete restructuring and reorientation of the policies and programmes of monetary and financial institutions imported into

52/ Op.cit., pages 155 and 156.

African (central banks, commercial banks, etc.) in such a way as to integrate them better in the development objectives of each country." 53/ Also, at the subregional level, existing financial co-operation arrangements should be reviewed with a view to integrating them into single subregional multilateral clearing and payment arrangements, and appropriate clearing and payment arrangements should be established in subregions where institutional payments systems do not exist.

I. A MACRO-ECONOMIC FRAMEWORK FOR SELF-SUSTAINED ECONOMIC GROWTH

225. Under the normative scenario, gross domestic product is projected to grow at an average annual rate of about 7.3 per cent during the period 1980-2008. Such growth performance would be accompanied by consistent sectoral expansion and, of course, structural changes particularly in key sectors such as food and agriculture, manufacturing, energy and mining, and transport and communications. Similarly, the evolution of the main domestic expenditure variables, namely consumption, savings and investment, and the external sector is projected with a view to increasing self-reliance and self-sustained economic growth for the region as a whole.

1. Selected sectoral performance under the normative scenario

226. The agricultural sector is planned to grow at an average annual rate of 4.3 per cent between 1980 and 2008 with emphasis on food production so as to ensure the attainment of an overall self-sufficiency in food. Such substantially improved growth performance would necessitate a new focus on the agricultural sector with radically improved national and regional agricultural policies. Particular attention will have to be given to increased and more appropriately distributed agricultural investment, enlargement of national and subregional markets in order to boost the demand for agricultural products within the region, adoption of effective pricing and fiscal policies in favour of agricultural producers, promotion of small-scale agro-processing industries in the rural sector and easy access of farmers to agricultural inputs, extension services and credit facilities.

227. Industry as a whole is projected to grow at an average annual rate of 8.8 per cent during the period 1980-2008. The manufacturing mining and energy sectors are projected to be the major source of industrial expansion. As pointed out in the analysis of some critical variables in industry under the normative scenario, the growth in the manufacturing sector would have to involve increased transformation fo raw materials into finished products so as *inter alia*, to establish the base for the increased production of agricultural machinery, transport equipment, chemicals and basic intermediate products such as building materials, fertilizers and iron and steel. To ensure an efficient industrial production pattern, national and subregional policies should aim at promoting enterpreneurial capabilities especially for small- and medium-scale private enterprises and at improving management and technical skills. Multinational enterprises or joint ventures in the productive sectors for more efficient resource utilisation would also seem to be an important area in the overall industrial development of the African region.

228. The energy sector is also projected to contribute substantially to the overall performance of industry. With the projected expansion in electricity, coal and gas production together with an improved supply of crude petroleum to meet the needs of the African region, the mining and energy sectors would grow at an average annual rate of well over 6 per cent during the period 1980-2008. However the achievement of such performance implies increased subregional and regional co-operation.

53/ A/S-II/14, annex 1.

229. The implementation of the United Nations Transport and Communications Decade for Africa and the materialization of more subregional economic co-operation arrangements as well as the setting up of an African common market would contribute substantially to the acceleration in the rate of growth of the transport and communication sector to reach about 7.5 per cent per annum on the average between 1980 and 2008. Also, the projected increase in the domestic supply of transport equipment and the improved maintenance system would contribute to a steadier development of transport activities, especially when a better regional energy balance is achieved

2. Domestic expenditure and external trade under the normative scenario

230. With the objectives of self-reliance in most of the key areas analysed in the preceedings sections and the overall target of growth of over 7 per cent per annum during the period 1980-2008, investment is projected to have to increase at an average annual rate of about 8.5 per cent. At this rate the share of investment in total GDP would rise to about 30 per cent by the year 2008. Moreover, such an increase in investment is expected to be accompanied by an improvement in capital efficiency with an incremental capital output ratio maintained at around 4 in spite of the required heavy investments in economic infrastructure, energy resources and the heavy industry sector. Actually the improvement in capital efficiency would have to be based essentially on an internalization of the factors of production through the use of domestic factor inputs and the improvement of corporate planning and management.

231. To realize such a high level of investment, domestic savings would have to increase to reach a level of well above 20 per cent of gross domestic product. It should be noted that, from the projected levels of the key variables, a large proportion of the consumption of food, intermediate goods, energy and some capital and consumer goods could be supplied domestically by 2008, thus reducing substantially the negative effects of imports on the level of consumption. Such a change in the consumption pattern would, hopefully, result in a higher saving rate for the region as a whole. Also, a critical review of company tax policies and depreciation allowances together with a rationalization of pricing policies in both public and private enterprises could increase corporate savings and consequently government revenue and public savings. Finally, if efforts are made to control the level of resource leakages in the African economies, tremendous savings could be made in the next 25 years.

232. In the external sector, increased subregional co-operation and intra-African trade as well as stronger trade relationships with other developing regions would make it possible for most African countries to register an export growth of about 5 per cent per annum during the period 1980-2008. Such export performance, especially in the context of intra-African trade, would have to be based on diversification so that African countries can trade among themselves in the commodities they require. The anticipated shift in the direction of trade from North-South to South-South as well as the projected increase in domestic supply would make it possible to reduce the import elasticity of the region as a whole to below 1 by 2008. Hence the overall external balance of African countries is projected to improve substantially.

J. SOME QUALITATIVE ASPECTS OF THE DEVELOPMENT SCENARIO

233. From the various results of the normative scenario, it would seem that African countries would have to restructure their economies extensively in order to achieve the above targets. The dynamics of development would have to be based on the region's own resources and potential instead of depending on earning enough foreign exchange to run a whole economy as is the case at present. The countries will have to establish - perhaps jointly - capital, intermediate and consumer goods industries. This means that foreign trade has to be perceived as a component of growth

rather than as its sole determinant. Thus, the main thrust of the normative scenario is that Africa's future development should be conceived not in terms of how much GDP but rather in terms of how much actual physical goods are being produced with local expertise and domestic resources and how much change is being made to structure the economy in terms of diversification and greater vertical and horizontal sectoral integration. On the part of the African people, it seems critical to aim at more far-sighted perceptions and a greater feeling of collective responsibility so that qualitative and quantitative changes can be achieved in areas like savings, consumption, investments, etc.

234. Development must be thought of as a long, continuous and arduous process. Some of the essential elements of the development process to which little attention is given include important areas like systematic collection, classification, storage, retrieval and use of information, analysis of such information in order to illustrate options, selection of viable choices, planning, execution, review, mobilization of inanimate as well as human resources and, last but not least, project analysis, design and implementation. These features are undoubtedly administrative and managerial. Further, the development process requires explicit methods of co-ordination, clarity of purpose and direction as well as the capacity to ensure continuity and self-sustainment in the midst of international uncertainities. In short, for a development process to be carried out successfully effective organization is necessary.

235. Lack of organization causes wastage of resources, dissipation of effort and in the end failure and frustration which may lead to political upheavals and instability. Often, lack of organization can even put those countries which have the necessary resources in development bottlenecks and thereby place them at the mercy of foreign exploiters. The symptoms of economic malfunctions which are mentioned in the first and second parts of this study would then be inevitable. In the end, the policy-makers as well as the technical and professional cadres would find themselves helpless and ineffective.

236. Furthermore, every sector of the economy will need effective institutional machinery. Agriculture, industry, natural resources, transport and communication, trade and finance will need the support of efficient institutions such as ministries, public enterprises and private organisations and companies. These institutions would have to have the right environment and incentives to achieve concrete results in the shortest possible time without wasting resources. To enable these institutions to be efficient it is necessary that they be staffed with men and women with the necessary expertise that ensures the right relationship between the activities and the objectives of development. The expertise would, therefore, need to have the capability to prepare and design projects, to map out efficient uses of investment funds, to screen project proposals and to make the necessary analysis of issues so as to be able to make pertinent policy recommendations.

237. Finally for the projections envisaged in the 'willed future' scenario to materialize, it has been repeatedly emphasized that economic co-operation and integration is not only necessary but must be stepped up and sustained to match the rigorous demands of the Lagos Plan of Action and the Monrovia Strategy. As was noted, the development scenario sums up the picture of success of co-operative efforts such as the United Nations Transport and Communications Decade, the Industrial Development Decade for Africa, the Preferential Trade Area for Eastern and Southern African States, the Southern African Development Co-ordination Conference, the Economic Community of West African States, the emerging Economic Community of Central African States, etc. It needs therefore to be emphasized that there are particular sectors of this scenario whose success hinges critically on the fulfilment of economic co-operation and integration efforts. The energy sector and the industrial sector, to cite but two, are cases in point. Whether attention is focused on the establishment of a capital goods sector, or on self-sufficiency in industrial raw materials, or on Africa's demand for textiles and pharmaceuticals being met out of

its own domestic production, the conclusion is inescapable that no industrial take-off will be possible unless the envisaged degree of regional and subregional economic co-operation is achieved. This means, *inter alia*, that an African Economic Community should materialize by the year 2000, which, in turn, implies that current efforts to forge subregional common markets through the MULPOC must bear fruit.

PART IV

THE WAY TO A WILLED FUTURE: SOME CONCLUDING REMARKS

A. REFLECTIONS ON AFRICA'S FUTURE DEVELOPMENT PATHS: AN OVERVIEW

238. A diagnosis of the African situation - social, political and economic - has been attempted on many occasions by many eminent Africans. 54/ The assessment, in all cases, has been unanimous: the African region is most seriously affected by the burden of underdevelopment. In spite of its vast human and natural resources, in spite of the efforts of its leaders and the dedication of its people, the region is unable to boast of any significant achievement of wellbeing. The use of its resources is not only below its potential but also in the hands of outsiders. Mass poverty, unemployment, social unrest, disease, hunger and ignorance continue to plague the region. As a result, Africa continues to resound with cries of distress.

239. The present study set out not to restate the known elements of an already well understood diagnosis. Instead, the study tried to sketch out alternative African conditions - mainly from the economic and social point of view - 25 years from now. In peering into the future of the year 2008, the present analysis tried to reflect on the nature and content of two alternative development paths or scenarios. The first scenario dealt with the perspective of the African region by the year 2008 if the past development trends were to continue without major conscious changes in patterns of production, distribution and lifestyles on the African people. The second scenario is intended to form a clearer basis for the answer to the question posed many years ago. Which way Africa? No doubt, the wisdom and foresight of the leaders of Africa already culminated in a succinct formulation of the answer to the question when the Lagos Plan of Action was adopted by the extra-ordinary summit of Heads of State and Government. Thus, the development scenario described in this study is only a preliminary "peep" into the beautiful and mature African region that the leaders had in mind when they adopted the Monrovia Strategy, the Lagos Plan of Action and the Final Act of Lagos. The major thrust of the scenario is to give some idea of the orders of magnitude of effort that would seem necessary for achieving a willed future compatible with the potential and possibilities of the region.

1. Some consequences of maintaining the status quo

240. The picture that emerges from the analysis of the perspective of the African region by the year 2008 under the historical trend scenario is almost a nightmare. Bearing in mind that the future of 2008 is the future of the young and unborn children of Africa today, the implications have to be taken seriously. Firstly, the potential population explosion would have tremendous repercussions on the region's physical resources such as land and the essential social services - education, health, housing, nutrition, water, etc. At the national level, the socio-economic conditions would be characterised by a degradation of the very essence of human dignity. The rural population, which would have to survive on intolerable toil, will face an almost disastrous situation of land scarcity whereby whole families would have to subsist on a mere hectare of land.

54/ See for example: OAU, What kind of Africa by the year 2000, 1979, Adebayo Adedeji, Africa and the New International Economic Order: A Reassessment, 1979, Ali Mazrui, The African Condition, 1979 and also Report of the Seminar on Alternative Patterns of Development and Life Styles for the African Region, 1979.

Poverty would reach unimaginable dimensions since rural incomes would become almost negligible relative to the cost of physical goods and services.

241. The conditions in the urban centres would also worsen with more shanty towns, more congested roads, more beggars and more deliquents. The level of the unemployed searching desperately for the means to survive would imply increased crime rates and misery. But, alongside the misery, there would continue to be those very few who, unashamedly, would demonstrate an even higher degree of conspicuous consumption. These very few would continue to demand that the national department stores be filled with imports of luxury goods even if spare parts for essential production units cannot be procured for lack of foreign exchange.

242. Against such a background of misery and social injustice, the political situation would inevitably be difficult. The very consequence of extreme poverty would be social tensions and unrest which, in turn, would result in political instability. Management systems, which are at the very core of a proper development that produces the necessary physical goods and services for the people, would be increasingly undermined by problems of corruption, nepotism and inefficiency. Further, the weak and fragile social political structure would mean highly unstable national structures vis-à-vis external powers and forces. With increased food shortages, many Governments would be put at the mercy of food donors with many implicit strings that undermine deliberate national action for progress. With the continuous and cumulative financial difficulties, Governments would have little choice but to yield to the often unkind designs of international monopoly capital. As a result, the very notion of national sovereignty would be at stake.

243. At the subregional and regional levels, the implications of the historical scenario are as disastrous as at the national level. Firstly, as a result of the penetration by outside forces given very weak social, political and economic national structures, the African region would, by 2008, be under a new and more dangerous form of balkanisation: a balkanisation in terms of markets to dump the products of other regions and in terms of international power games. This neo-parcelling of Africa would mean that the region would face a crisis of identity. The different African countries - with only apparent sovereignty - would look at each other in terms of the "camp of donors" to which they belonged. The psychological and cultural erosion that such a situation would bring about would then complete the sorry picture of a resigned, depleted and self-pitying continent.

2. Features of another future for Africa

244. Faced with such a disturbing and unacceptable situation in Africa by the year 2008 if present trends were to continue, it is imperative to explore an alternative future, assess its internal logic, coherence and derive - albeit vaguely - the necessary course of action. The normative scenario hazarded to map out, on the basis of some selected critical areas, the quantitative elements of a willed future. But it is important to reiterate here the main features of the envisaged future of a fully liberated and matured continent.

245. Can the dream of an African free from hunger, disease, unemployment and poverty, social and cultural imbalances, external domination and racism come true? Can Africa come to terms with the idea of autonomy and collective and self-reliance? The history of mankind and that of many other regions persuades one to be unequivocal about the potential of the African region. Then the question is what future should Africa set out to conquer by the year 2008. Firstly, the African region has to aim at a future which recognises that man is the author and beneficiary of development. Thus, the very first element that has to characterise Africa's future by the year 2008 relates to the development and utilisation of the human factor. In this respect the edu-

cation system by the year 2008 should have been redesigned such that there are no barriers between education and employment, education and society, education and culture, education and technology, etc. Similarly, the socio-political milieu in which the individual exists simultaneously as a generator and consumer of wealth has to be tuned so as to bring out of society, while at the same time offering society, the best of life. This means that at the national level the democratisation of the entire social, economic and political subsystems is a necessary feature of Africa's future.

246. Secondly, the normative scenario has repeatedly drawn attention to the need for a new lifestyle for the African people. The analyses of the development scenario poignantly show the disastrous implications of consuming what Africa does not produce while neglecting its own products. This calls for a new social feature of self-confidence and pride. In this respect it should be noted that, while the development scenario did not project total self-sufficiency in all physical products and services, it emphasized the need to eliminate the social and psychological dependency of society that brings about unwarranted mimicry. Indeed, the indigenisation of the African economy, the attainment of self-reliance, the expansion of domestic production capabilities and markets, innovation, etc. cannot come about if the African region remains psychologically dependent on other regions. Thus, new cultural, social and scientific values have to become important features of Africa's socio-economic development by the coming century.

247. But in addition to the national features, the African region has to be convinced that effective and meaningful co-operation among African States is a necessary for the willed future analysed in the normative scenario. Given the balkanisation of the region and the large number of small economies, given the many land-locked countries and given the disparities in resource endowments, regional co-operation becomes a critical complement to national self-reliance. If the willed future is to materialize, the region as a whole has to develop the will to co-operate in all fields - food, energy, industry, transport, trade, money and finance, human resource development, etc.

248. To complete the picture of the development scenario for the year 2008, it is pertinent to reflect on the features of the international environment that Africa would wish to prevail in the next century. There is, of course, little doubt that world peace will be necessary for Africa to achieve its aspirations. But, in addition, Africa will require a better and more equitable international economic order and the region as a whole must be convinced that with solidarity it can and, indeed, must negotiate to bring about a new international order. This order must be such that Africa will be an equal partner in the production, distribution and consumption of the world's wealth. The world order must hear the voice of Africa in the formulation and implementation of decisions that affect international relations. That world order must recognize, accept and respect the sovereignty of the African States.

B. ACTION TOWARDS A 'WILLED FUTURE'

249. The socio-economic prospects for the African region under the historical trends scenario are undoubtedly undesirable. Therefore a radical change of the African social, economic and political environment is urgently called for to lay the foundation of individual and collective

self-reliance and self-sustainment. On many occasions 55/, African Governments and intergovernmental organizations have stressed the dangers of continuing with past policies and the imperative need for a change of course. Since Africa is not resource-poor, bringing about the desired change is not impossible. What is necessary, if perhaps not sufficient, is for African Governments and people to resolve to break with the past concepts, habits, attitudes, approaches, etc. Hence, to avoid the terrible spectre of increasing mass poverty, unemployment and general instability which are implied in the historical trends scenario and to create the basis for the normative scenario, African countries must devise and implement adequate national, subregional and regional measures. In other words the future emerging from the normative scenario depends mainly on the "will" of Africa i.e. its people to initiate change.

1. National measures

(a) Necessary increased economic sovereignty

250. The analysis of the present situation of the African region has already pointed out the weakness of the region with respect to the knowledge of and sovereignty over its huge natural resources. It is therefore particularly important for individual African countries to undertake a complete inventory of water, forestry, mineral and energy resources with a view to laying the basis for efficient and rigorous management of those resources. In addition, the promotion of local skilled manpower for the exploration and exploitation of natural resources is a main instrument for ensuring control of African countries over their natural resources since natural resources are the basis of all production especially in the industrial sector. Actually, the industrial take-off contemplated in the normative scenario cannot be envisaged without the African people mastering Africa's natural resources.

251. Generally, there is a need to exercise more efficient control over key areas such as mining, manufacturing, banking and finance, insurance and transport and communications which, in many African countries, are directly or indirectly dominated by transnational corporations. Such an objective could be achieved through better knowledge of the activities of the transnational corporations with a view to substituting the internal factors of production for external ones. More specifically, the development of appropriate manpower skills for project formulation, analysis and implementation, for corporate planning and management and for productive activities including production control together with the mastery of technology are critical prerequisites in the process of internalizing the factors and forces of production and people-oriented development.

55/ ECA, ("Revised framework of principles for the implementation of the new international economic order in Africa" (E/CN.14/ECO/90/Rev.3).

"What kind of Africa by the year 2000" final report of Symposium on the Future Development Prospects of Africa up to the year 2000 (E/CN.14/698/Add.2), Monrovia, 12-16 February 1978.

OAU, "Strategy for the African region in the International Development Strategy for the Third United Nations Development Decade". Resolution CM/Res.722(XXXIII), Monrovia, July 1979.

United Nations, "Lagos Plan of Action for the Economic Development of Africa 1980-2000" (A/S-11/14, annex 1.)

(b) Proper perception of socio-economic development and more efficient design and implementation of development plans

252. To make radical changes, it is necessary to have clear perceptions of socio-economic development and to establish efficient planning and plan implementation systems. Thus, Africa has to appreciate the ultimate purpose of development as "the development of man - the realisation and unfolding of his creative potential through improvement not only in his material conditions of living which enable him to fulfil his psychological needs but also through the satisfaction of his psychic needs." 56/ Consequently, in addition to giving high priority to the production of goods and services for the purpose of raising the standard of living of the people, development should equally be based on the values, cultures, goals, aspirations and preferences of the African people. Such an approach is the only way to ensuring the self-confidence of the population and laying the foundation of self-reliant and self-sustained development.

253. Such an approach means placing the human factor at the centre of socio-economic development. In addition, African countries would have to improve their planning methods as well as the plan implementation process through, *inter alia*, (a) involving all socio-economic agents in setting up the plan's objectives, targets and strategies, (b) analysing the range of domestic factor inputs (human, material, capital, institutional, financial, organizational) with a view to their effective mobilization, (c) taking into consideration sectoral interdependence with a view to covering all economic and social sectors and activities and to correcting organic imbalances and (d) defining and setting up follow-up and evaluation mechanisms. In addition, African countries must make every effort to clearly identify the new "engines of growth" or "essential cores" of their future development, so as to ensure greater and internally dependent transformations.

(c) Improvement of the political and social environment

254. Experience in many African countries has amply demonstrated that the creation of a peaceful and serene political and social climate is a must if the ultimate goal of development is to be achieved. Even with full control over natural resources and sound development objectives and strategies, the lack of social, political and economic justice would nullify the very achievement of sovereignty. It is therefore imperative for African Governments to take or strengthen such measures to ensure (a) the full participation of the people in all the dimensions of a genuine development; (b) the creation of equal opportunities for all; and (c) innovation from within Africa.

255. It must further be appreciated that an improved political and social climate is not merely a guarantee for political stability but a *sine qua non* for the blooming of the genious of the African people who, in the pre-colonial period proved themselves highly resourceful in many activities. What is required from African Governments is to make it possible for the population to interrelate positively with all the development variables: natural and financial resources, development institutions, local and foreign technologies. To this effet, full cognizance should be taken of the positive elements of the African traditions and customs.

56/ Adebayo Adedeji "Perspectives of development and economic growth in Africa up to the year 2008". Statement at the Monrovia Symposium on the future development prospects of Africa towards the year 2000.

(d) Domestic policies

256. Domestic policies in African countries need also to be strengthened particularly in key areas such as food and agriculture, industry, money and finance. Most of such policies have already been discussed in the preceding analyses of the two scenarios. However, it is worth highlighting some of the policy areas of critical importance for the successful implementation of the normative scenario. In agriculture, to achieve the objective of food self-sufficiency African countries must embark upon comprehensive measures including provision of better inputs to farmers, promotion of improved cultural practices, strengthening of storage capacities, remunerative pricing policies and establishment of land-holding systems conducive to increased output per unit of land.

257. In energy, national measures must supplement the regional co-operation arrangements which are called for in the normative scenario. Such domestic measures include conservation policies, promotion of rural electrification, intensification of the domestic use of solar and wind energies and introduction of small hydropower schemes. To rationalise the price structure in energy, energy prices must be maintained at levels that reflect the real economic cost of each type of energy. Only then can it be ensured that each African developing country adjusts to the evolving energy situation and that end-users are given the appropriate signals for more rational consumption patterns. Finally, the inefficient use of fuelwood has to be remedied by, *inter alia*, the development of more efficiently designed cooking stoves.

258. The major domestic policies required in the industrial sector include the need to rehabilitate the present industrial establishment. The rehabilitation policies should be directed mainly to the reduction of the cost of production and increasing the utilization of capacities. Secondly, since the normative scenario envisages the possibility for the African region to embark on increased production of capital and intermediate industrial goods, industrial policies will be required to (a) establish institutions for promoting studies, research, standardization and other services; (b) create or strengthen financial institutions; (c) promote small and medium-scale industries; and (d) monitor the activities of transnational corporations. It should, however, be emphasized that the industrial take-off of developing Africa rests mainly on increased subregional and regional co-operation in areas such as creation of major industrial complexes, training, technology, engineering consultancy, finance, etc.

259. Finally, domestic policies required to achieve the normative scenario should also cover key areas such as management and skill development, money and finance. To develop the managerial capabilities, African countries must reform their present administrative and management systems in both the public and the private sectors so as to make them more result-oriented. In the field of money and finance, African countries must devise policies aimed at reducing the present average annual rate of inflation of over 15 per cent, which not only constrains the ability of Governments to increase taxation, both direct and indirect, but also affects the level of public and private savings. It has also been mentioned earlier that, in order to increase domestic financial resources, attention should be given to company tax policies, pricing policies of enterprises as well as to the rural area with the potential for increasing savings. With respect to the preservation of foreign exchange resources, African countries need to reduce the present foreign exchange leakages through, *inter alia*, (a) the establishment of African insurance and shipping compagnies; (b) the formation of consultancy groups; and (c) the creation or strengthening of support services to public and private enterprises in various areas such as external trade negotiations, feasibility studies, etc.

2. Action at the subregional and regional levels

260 It has been repeatedly emphasized throughout this study that the balkanisation of the continent was one of the constraints to African development. There is no doubt therefore that

economic co-operation is a must in areas such as energy, industry, transport and communications and trade. Although it is not intended here to repeat what was already detailed as subregional and regional components in the United Nations Transport and Communications Decade for Africa and in the Industrial Development Decade, nor the existing or planned arrangements included in the treaties and protocols of the present subregional economic groupings, some critical measures at the subregional and regional levels do have to be reiterated in the context of the normative scenario.

(a) Lessening subregional and regional tensions

261. Peace at the subregional level as at the national and world levels is a necessity for achieving collective self-reliance. This would mean that African countries have to maintain brotherly relations with less selfishness, as tension between countries has on many occasions brought about serious economic and social distortions in the countries concerned. It is therefore imperative, especially for the existing subregional economic groupings, to put into practice the protocols related to the free movement of persons and free entrepreneurship. The democratisation of development is as important at the subregional and regional levels as at the national level.

(b) The need to increase African solidarity

262 African countries, bilaterally or multilaterally, need to strengthen their solidarity in all fields with a view to taking advantage of common culture, traditions and resources. Already some developments in fields like bilateral joint ventures in production activities and joint development of river basin and lake basin resources are taking shape. But there is still need for African countries to harmonize and concretise their policies and regulations especially in the areas of taxation, investment codes, exchange rates, utilization of skilled manpower, etc. so as to maximize the results of bilateral and multilateral economic activities.

(c) The need for more effective subregional and regional technical co-operation institutions and economic co-operation organizations

263 African countries have already courageously embarked on creating co-operation arrangements and institutions which need to be strengthened and expanded in the fields of training, mapping, mineral resource, technology, money and finance, production and trade, etc. Concrete measures to strengthen the present institutions and economic organizations should include increased financial support from African countries and increased use of the services provided by such co-operation arrangements and institutions in the context of the need to internalize all factors of development. In addition, the extent to which African countries will manage to influence the direction and content of events in the world at large will depend on the development and expansion of intra-African technical and economic relations.

C. THE ROLE OF THE ECONOMIC COMMISSION FOR AFRICA

264. In making the transition from the present difficult conditions to a decidedly better future by the year 2008, the institutions of the African region will have to play important roles. Of course, during the past 25 years the Economic Commission for Africa and its secretariat have been relentless in contributing to African development. 57/ The commission has become a useful forum for negotiations by member States on common problems and for evolving joint positions on international issues in the economic, social and technological fields. Further, the

57/ For full details see: ECA, Twenty-five years of service to African development and integration, 1983.

Commission has, particularly through the activities of its secretariat, made valuable studies and publications on the development and economic growth problems of the continent for use by member States and their institutions, researchers, international organizations, etc. Technical advisory services, training as well as the creation of pivotal development institutions have been undertaken by the Commission to foster the advancement and integration of the region. Similarly the operational activities of the secretariat of the Commission have been usefully expanded to serve the member States more effectively.

265. But, while the Commission and its secretariat have recorded such remarkable achievements the justified desire for a better Africa will call for new roles and new challenges for the ECA and its secretariat. The new dimensions in the development scenario will necessitate new dimensions in the activities of the Commission as well as the strengthening of those traditional areas of the secretariat.

1. The Commission as a forum for negotiations and decisions

266. The realization of the goal of collective self-reliance, the establishment of an African Common Market or the effective negotiation of a new international economic order will, no doubt, require that the Commission expand its role as a forum for negotiations and as a channel between the African countries and the international community. While the success of the role of the Commission as a forum for negotiations will depend on the political will of the member States, the secretariat will have to gear itself to face the challenge of bringing up the necessary issues for negotiations, as well as creating the right environment for successful negotiation among member States. This will constitute a challenge in terms of both the quality and the sense of dedication of the secretariat. It will also require that the secretariat will not be constrained by the problem of inadequacy of budgetary resources.

2. Intensified secretariat activities

267 The secretariat of the Economic Commission for Africa in the next 25 years will have to intensify its activities in the areas of research, data collection analysis and dissemination, organization of conferences, expert meetings, workshops, etc. In this regard, the secretariat will have to reorient its activities so as to become more practical and a catalyst in the development of the member States. In line with the necessary changes called for in production patterns and lifestyles of member States, the secretariat will have to undertake research in new areas so that the African countries will have a greater insight into problems and their solutions for keeping on the development path that will ensure that the development scenario materializes.

3. ECA and institution-building in Africa

268. In terms of the development and economic growth needs of Africa more institutions for collective action will be inevitable. Examples are many from the normative scenario: iron and steel development, monetary integration, energy, and human resource development, etc. Therefore the Economic Commission for Africa will in the next 25 years continue selectively to encourage the establishment of institutions in Africa. Naturally, due attention will have to be paid to the ways and means of financing the activities of the institutions so that member States are not overburdened by the financial implications.

4. ECA and the promotion of economic and technical co-operation

269. In calling for the creation of an African Economic Community by the year 2000, African Heads of State and Government highlighted the steps that would have to be taken, namely (a) the strengthening of existing regional and economic communities and the establishment of

others; (b) sectoral integration at the continental level; and (c) harmonization of financial and monetary policies. It is clear that, if these steps are to be coherently implemented, a central mechanism is necessary. Therefore, the Economic Commission for Africa and its secretariat, supported by the general secretariat of the Organization of African Unity, will have to continue its present efforts to promote economic and technical co-operation among its member States.

5. The ECA secretariat as a regional 'think tank'

270. Already, the ECA secretariat has shown its potential in originating ideas dedicated to changing development patterns in Africa for the better. Indeed, the origins of the Monrovia Strategy, the Lagos Plan of Action and the Final Act of Lagos can be traced to the bold initiative of the secretariat to recommend, after analyzing the historical processes of development, economic growth, technological change, etc., that Africa needed a new national and regional economic order. 58/ In view of the complexity of development and the intricacy of implementing a genuine development process, continuous assessment and reassessment of problems and solutions will be essential. Thus, the secretariat of the Economic Commission for Africa will have to be strengthened so as to act efficiently as a centre for development in Africa. It will also be necessary to co-ordinate the activities of national and subregional research institutions so that there is a spread, popularization and internalisation of Africa's own attitudes and approaches to development.

6. ECA at the operational level

271 The evolution of the Economic Commission for Africa and its secretariat in the next 25 years should, *inter alia*, involve the further development of capabilities for project-oriented activities. There cannot be any doubt that the attainment of the various targets of the normative scenario will depend on the national, subregional and regional projects that will be conceived, formulated and implemented. Therefore, assuming that the political will to co-operate will be forthcoming, the secretariat should intensify its efforts in the area of training in project identification and analysis, project implementation, monitoring and evaluation as well as spatial planning. Through such an elaboration of subregional and regional projects, the ECA secretariat will be playing the critical role of consolidating subregional and regional co-operation.

D. THE ROLE OF THE INTERNATIONAL COMMUNITY IN SUPPORTING AFRICA'S MOVE TOWARDS THE 'WILLED FUTURE'

272 In the preceeding sections, great emphasis was put on measures which African countries and African inter-governmental organizations, particularly ECA, should devise and implement in order to achieve the objectives of the development scenario. But these measures will not be enough if the international economic order continues to oppress the efforts of developing countries in general and of developing Africa in particular. Hence, while Africa, through its own efforts at the country, subregional and regional levels, should and must endeavour to influence world affairs, the early establishment of a new international economic order constitutes a major element in the successful transition to a "willed future". The major changes that are called for in the present international economic order relate to both the international structures of production, trade and finance and international institutions.

58/ See "Revised framework of principles for the implementation of the new international economic order in Africa" (E/CN.14/ECO/90/Rev.3).

1. Required international structural changes

(a) Africa and developed countries

273. The efforts required to achieve such objectives as food self-sufficiency, production of capital and intermediate industrial goods, exploitation of the hydropower potential, building an integrated transport and communications network, etc, would undoubtedly necessitate the support of the international community. Thus external resources complementary to the domestic ones would be needed, under appropriate terms and conditions, and the developed countries and other capital-surplus countries should be ready to assist the African region positively to realize its objectives. In particular it is more than urgent that the commitment made by all developed countries to devote 0.7 per cent and 0.15 per cent of their gross national product to official development assistance to developing countries and to the least developed countries respectively is realized soon.

274. In addition to the increased flow of resources to the African region, the developed countries should also encourage and support such measures as (a) more processing of new materials and increased linkages among economic sectors in African countries; (b) stabilization of the price of export commodities and improvement of the terms of trade and African countries; (c) removal of all trade barriers vis-à-vis African countries; (d) promotion of research in science and technology.

275. As summarized by the Executive Secretary of the Economic Commission for Africa, 59/ "the agenda for a new international economic order will therefore include the following: (i) international effort to enable Africa to achieve effective sovereignty over its natural resources; (ii) international support for the physical integration of Africa through full co-operation in the implementation of the United Nations Transport and Communications Decade 1978 to 1988; (iii) international co-operation to achieve a break through in manpower development in Africa; (iv) decolonization of Africa's colonial monetary arrangements and the setting up of an African monetary system; (v) respect for Africa's political independence and the elimination of outside manipulation of the African economy by outside powers with a view to frustrating the achievement of national and regional economic objectives; (vi) acceptance by the entire international community that Africa's continued economic backwardness constitutes a danger to world peace and stability and consequently an international agreement to provide Africa with the wherewithal to enable her to achieve a new national and regional order by the year 2000".

(b) Africa and South-South technical and economic co-operation

276. At a time of increasingly inward-looking policies in many of the developed countries, it is necessary that developing countries should increase and strengthen their economic relations. 60/ In the previous section, selected measures were briefly outlined in relation to subregional and regional co-operation in the African region. Similarly interregional co-operation would be of great importance for the success of the development scenario since Africa could benefit largely from development experiences of other regions like Latin America, China and Asia.

59/ Adebayo Adedeji, Africa and the new international economic order: A Reassessment; December 1979.

60/ A detailed analysis of areas for increased South-South co-operation is contained in the report of seventeenth session of the Committee for Development Planning - Official Records, Economic and Social Council 1981, Supplement No. 7 E/1981/27.

277. Similarly capital-surplus developing countries can greatly assist Africa through, *inter alia*, the expansion of the recent policies of direct transfers of resources to developing Africa instead of transferring such resources to other regions or to multilateral institutions which are dominated by the industrialized countries. Also capital-surplus developing countries could, in the framework of appropriate arrangements and safeguards, invest more in the African region or open soft-loan windows in African subregional or regional development banks.

278. In the field of technology, Africa could strengthen its technological capabilities and skills through greater exchange of information with and training in other developing regions. Another important aspect of co-operation in technology is the use by African countries of consultancy firms and skilled manpower from other developing regions. More generally interregional co-operation would help the African region in expediting the building of its infrastructure and its industrial base through, *inter alia*, the use of low cost technologies.

2. Improved international institutions and mechanisms

279. African countries form part of the international structure and as such they belong to many of the world's international institutions. But, in line with Africa's call for a new international economic order, the international institutions would also have to change so that they are more responsive to the needs of all regions. Actually there is need "to define their functions more specifically in relation to one another, to adapt government membership to trends in the world economy and to improve the way these organizations operate". 61/ It is in this context that several proposals have been and continue to be made in different fora. If a truly new international economic order is to be implemented there is need for (a) more balanced and democratic representation of developing countries in the decision-making processes of international institutions; (b) an integrated reform of the world's monetary, financial and trade-regulating international institutions; and (c) the creation of a world development fund to ensure a substantial increase in long-term development finance. 62/

61/ Organization for Economic Co-operation and Development, Facing the future - Mastering the probable and managing the unpredictable - Paris, 1979.

62/ See Committee for Development Planning - Report on the sixteenth session - Official records, Economic and Social Council, 1980 - Supplement No. 2.

SA
c to OL, NB, GT

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE July 18, 1983

TO Messrs. R. Bouhaouala (WAP), S. Eccles (WAP), J.R. Peberdy (WAPA A), C. Walton (WAPA B), C. Blanchi (WAPA C), B. A. Thoolen (WAPA D)

FROM A. Al-Khafaji, Division Chief, WAPWS AAK

EXTENSION 75266

SUBJECT RURAL WATER SUPPLY ACTIVITIES IN THE WEST AFRICAN REGION

Attached please find a brief proposal on the establishment of a Rural Water Supply (RWS) nucleus team with the objective of assuming full responsibility for future Rural Water Supply activities in the Region.

We would appreciate any comments, and we would propose to organize a meeting on this proposal in due course in order to work out a Departmental position.

cc: Mr. H. Fuchs (WAPDR)
Mr. R. Crown (WAP)
Mr. T. Husain (WAPDR)

(1) ~~FE~~ OCT 3 1984 — a strong paper — sums all the right things — what action was taken by "management"?
(2) SA

Rural Water Supply in the West Africa Region - Some Reflections

Introduction

1. The objective of this note is to draw attention to the need for adequate resource allocation for Rural Water Supply (RWS) activities in our Region and to propose possible departmental arrangements as to the management and responsibilities for this sub-sector.

2. Paras. 1-7 give a brief overview of the RWS sub-sector in our Region, and a summary of the main issues encountered. Paras. 8-12 discuss the Bank's approach to the sector, and paras. 13-17 provide suggestions and recommendations as related to the objectives of this note.

The RWS sub-sector

3. The West African Region, as defined by the Bank, comprises 23 countries with a population of about 160 million; given the estimates of approximately 75% of the population living in the rural areas, this would mean about 120 million people. In terms of water supply, service coverage and needs, one could (even in the absence of substantiating data) estimate that - with the exceptional cases such as the Ivory Coast - only 20 or 30% of the rural population has access to reasonably safe water supply sources. This leaves the need to cover the remaining 90 million people, which at a rate of, say 400 - 500 people per water point, would translate into a demand for 180,000 to 225,000 new water points 1/. The type of water points (whether borehole, open well, spring catchment, etc.) required would obviously vary with the prevailing conditions (physical economic resource availability,

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1/ This covers needs for drinking water only.

social and institutional environment), but if we assume, for simplicity sake, that most new rural water constructions would be boreholes (or open wells) then (at a cost of conservatively speaking about US$10,000 per water point) the investment requirements would be somewhere between US$1.8 billion and US$2.3 billion. This covers only the investment costs; adding to it estimated annual recurrent costs (for a well equipped with a handpump) of say, US$150 per water point, the total recurrent cost needs (new and existing water points) would reach US$3.6 million 1/ (in constant $) by the time a full coverage is achieved.

4. Admittedly, the above rough calculations are nothing more than indicative stretching to speculative, but they help to illustrate the scale of the financial implications. Yet, the financial side is only one of the important aspects: addressing the needs of beneficiaries' groups, which are often outside of the reach of official/well established (monitoring institutions) requires a thorough analysis of this traditional environment and a project design compatible with the follow-up capacities of the target population after project completion and financial arrangements affordable for both the direct beneficiaries and the Governments. RWS projects, thus have a strong influence on community development and other social programs (eg. adult literacy programs, sanitary education programs) which all combine to assure the success of the investments.

5. Against the background of a severe economic environment in the West African region and the very limited institutional absorptive capacity of our

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1/ Assuming about 60,000 existing water points plus 150,000 new ones.

borrowers, the individual projects need to be designed so that they serve as models with the possibility of replication elsewhere in the same country, and conditions permitting, in the region.

6. As to the present stage of development of the RWS sector, the general sector issues can be summarized as below:

(i) Institutional
- general lack of rational, medium and long term planning in order to establish coherent overall sector development strategies;
- unclear and ad-hoc organizational arrangements with blurred sectoral responsibilities (often further emphasized by the myriad of external donors working with separate host country agencies);
- lack of rational budgetary and disbursement processes for both the construction as well as maintenance phases;

(ii) Technical
- sophisticated prospecting and drilling techniques required to tackle the terrain, and technologies which often prove difficult to transfer to nationals;

- the still ongoing search for the perfect handpump which would meet the criteria of VLOM [1/], simple design, low cost, high reliability, high performance,
- the proliferation of different types of equipment as result of the need to accept external assistance from whatever the source;
- the difficulty of establishing project design criteria;

(iii) Financial

- the relative high cost of investment per water point (requiring high proportion of foreign exchange for investments which, in themselves, do not generate any incremental income);
- the need for extension, and expensive outside (of the communities) support structures for maintenance which the governments can ill afford to sustain;
- the difficulty of establishing appropriate cost recovering policies;

1/ Village Level Operated and Maintained.

(iv) Social - the importance of projects which are fully accepted and absorbed by the target groups, so that investments are maintained after project completion;

(v) Manpower - the shortage of qualified, and often also of motivated nationals.

7. Issues ii) to iv) could normally be dealt with through proper project design - even in isolation - however, only too often did the countries have to accept the role of "guinea pigs" for the various donors, who experimented (and still do) with their different concepts of RWS projects. The linkages between proper project design and sectoral development related issues (items i and v), which conceptually should assure the future replicability of the individual projects, have unfortunately not drawn the attention they deserve. The themes of affordability and replicability are precisely the reasons why a more "global" (i.e. sectoral) approach is required and where the Bank could play an important role, given its unique position among donor agencies.

The Bank's Activities

8. The Bank may have been a relatively late entry into the RWS sector [1/] and, in terms of project approach has actually followed the lead of such agencies as FED, some UN agencies, and several NGO's. As the packaging of RWS activities as components within the rural development projects indicates, RWS was not so much regarded as a sector (or sub-sector) per se,

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1/ The earlier involvement were more linked with "hydraulique pastorale" (livestock watering), and rural water supply as such entered the picture in the mid-seventies with the wide application of integrated rural development project design.

but rather as a peripheral item to be dealt with in a general manner. Yet, the investments with Bank participation - while certainly small, in terms of overall needs - have been quite important. It has been noted that in recent fiscal years about 5 to 6 newly approved agricultural projects/year in the West African Region have some kind of RWS component with amounts varying from US$2 ~ 3 million to more than US$20 million (especially for Nigeria), with annual commitments in the order of US$30 ~ 40 million (for RWS alone).

9. An assessment of the conventional Bank approach in the Region towards RWS leads to the following observation:

(i) as mentioned earlier, most of the RWS activities were packaged as "side" components into integrated rural development projects (RDP), and while the importance of this sector has been acknowledged for years, it is generally recognized that these components are processed with little preparation and appraisal and are insufficiently supervised (e.g. Cameroon FSAR I, Mali Livestock I) (Ref. para 6. iii - iv). In general WAP's agricultural divisions, with the best intentions, have (a) not been sufficiently equipped with the technical and institutional expertise; and (b) not had the time during the project cycle of complex RDPs to devote sufficient time to such component. Often, loan/credit agreements pertaining to the RWS component were not actively followed up during supervision. (This statement would appear to apply also to other "socially" oriented components, such as rural health);

(ii) with the exception of one division (WAPA1) where an experienced rural water irrigation engineer 1/ has actively tackled the rural water supply sub-sector, there is a shortage of RWS specialists within the department. This may have been only natural, as the dispersed nature of these components within the agricultural workprogram made the idea of having a full time RWS specialist a very expensive one. The solution has been to rely on consultants; however a consultant can only provide as valuable an input as the supervisor demands.

(iii) the virtual impossibility of considering adequately the wider institutional implications of these components, i.e. an in-depth institutional analysis against the background of overall sector development is often lacking (ref. para. 6 - i-v, and para. 7).

Evolution of Regional Thinking

10. In May 1980, a WAN-regional round table under the chairmanship of the RVP considered the issues, and a decision was reached that the Water Supply Division should be entrusted with the overall responsibilities for RWS activities. This position was reconfirmed during the review process by our Departmental management of the West Africa Sector Strategy Paper 2/. In particular, it was noted that:

1/ however, he will leave the Region at the start of FY84.

2/ Issued September 1, 1982.

(i) the Agricultural Division would in many cases continue to incorporate RWS components in their projects, however with increased WAPWS participation from the early stages of project preparation through appraisal and supervision; and

(ii) WAPWS would be responsible for the institutional development of this (sub)-sector at the national level, and thus for the policy-dialogue.

The key element here is the recognition of RWS as a (sub)-sector as compared to a project component.

11. It has become apparent, however, that this arrangement, whereby the responsibilities between the agricultural divisions and WAPWS at the operational level are scattered, would still be less satisfactory in terms of achieving in-depth approaches toward the sector and pursue effective sector policy dialogues with governments (Annex 2). Furthermore, with present staff resources, WAPWS could deal with only one free-standing RWS project plus one or two RWS components (of agricultural projects) per FY - clearly an unsatisfactory situation.

Resource Implications of WAP Agriculture Lending Program

12. The importance of RWS activities in the Region's future lending program for agriculture appears to increase further, as shown in the brief analysis in Annex 1. Using very conservative coefficients for preparation (4 staffweeks), appraisal (6 staffweeks) and supervision (4 staffweeks) it is estimated that the processing and supervision of RWS components within the proposed 5-year agricultural lending program would require about 136 staffweeks in FY84 rising to more than 200 staffweeks by FY86. This estimate

does not include the resources needed to supervise RWS components of existing projects or those needed for processing and supervising the free-standing RWS projects in the WAPWS program.

What-To-Do?

13. If we want to consider the long term impact of our activities in the RWS sector, we would have to focus inevitably on the institutional aspects with the individual investments implemented under the various projects as building blocks for a sound long term development of the sector. Thus we would have to emphasize the national aspects of regional investments and assure a strong and viable link between the two. In order to do so, it is very important that the RWS activities within the framework of the agricultural projects be dealt with by one single unit. (Inter-departmental communication and coordination problems, as also recently encountered during preparation in Cameroon-FSAR II would be eliminated, and more continuity assured during supervision).

14. It would be desirable to integrate this unit with WAPWS' RWS "nucleus" team (Annex 2, para 5), which is presently actively involved in Projects in Mali, and Niger with future programmed activities for Cameroon, Ivory Coast, and possibly other countries. That way a coherent and effective approach towards the sector throughout the Region could be pursued more efficiently, and also communication with TWD's UNDP- Handpump-testing unit, as well as with PHN would be better coordinated.

15. On the basis of our estimates of the resource implications to deal adequately with the RWS components of Agricultural Projects (paras. 9, 13) as

well as the WAPWS' RWS program, about 5 to 6 staff years of resources would be needed initially, with subsequent growth and staffing to be determined by future demand. To insure the continued availability of such expertise when needed and to provide continuity of our input into the RWS activities, a core group of 3-4 specialists would need to be provided as staff positions which could be supplemented by consultant resources in line with the work program.

16. Obviously the needed levels of resources are currently not spent by either the Agricultural Divisions or by WAPWS. Hence, a simple reallocation of staff resources at the observed levels would not appear to provide a satisfactory answer. Furthermore, due to the scattered nature of resource allocation under the present set-up, (para. 9(ii)) it has not been possible to concentrate resources at a sufficient level to permit recruitment of RWS sector specialists to perform the tasks at hand.

17. The above issue notwithstanding, we believe a modest beginning should be made by establishing a nucleus of a "RWS" team of 3 specialists in the WAPWS Division. We would propose that resources equivalent of 2 staff years be reallocated to WAPWS from the Agriculture divisions to permit the recruitment of 2 RWS specialists (either as regular staff or as long-term consultants). Meantime, WAPWS would reorient the work assignments of one of its staff currently involved in RWS activities to expand his input into such activities and to enhance his expertise through additional training. A detailed work program for the "RWS team" covering the priority RWS activities of Agriculture and WAPWS could then be established and agreed upon with the Agriculture divisions. Additional resources required for the reamining RWS activities would then be considered during the mid-term FY84 review.

ANNEX 1

Resource Requirements to Process
the Rural Water Supply Component
of the FY83-84 WAN Agricultural Lending Program

1. In the limited time-frame available, it has not been possible to accurately assess the actual staff resource requirements based on the lending pipeline for the agricultural sector.

2. As a quick approach, therefore, the FY83-87 WAN lending program as of June 14, 1982, has been used as the point of departure. Those projects which could have a Rural Water Supply (RWS) component were listed with the IBRD/IDA contribution provided for in the lending program (see attachment I). Assuming that up to 15% of the total Bank/IDA lending amount could be attributed to the RWS components, the annual lending amount for RWS activities could range anywhere from US$13 million (FY83) to US$71 million (FY86). In terms of staff resource requirements, that might be even higher than indicated by the numbers of projects, as for the purpose of this exercise the reserve programs have not been reflected.

3. (a) Excluding free-standing RWS projects, and supervision requirements for Projects approved prior to FY83 and (b) assuming a constant level in the numbers and type of agricultural projects after FY87, an attempt has been made to quantify the staff needs to process the potential RWS components in the agricultural lending program FY84-87 plus supervision for FY83 projects (Attachment II). Under these assumptions, the resource requirements implied would evolve from around 140 sw in FY84 to 200 sw in FY86.

IBRD/IDA Amount in Lending Program
($ million)
(Projects with potential RWS components) 1/

FY83	TOG	Rural Develop. II	23.5	
		Notse (IFAD)	0.0	
	IVC	Rubber IV	33.0	
	BEN	RDP III (Zou)	20.0	
		Atacora RDP (IFAD)	0.0	
	CAR	RDP	10.4	
		6 projects	86.9	of which 15% = $13 million
FY84	NIR	Kaduna ADP	105.0	
	CAM	Western Province RD	22.0	
		FSAR II	20.0	
	SEN	Eastern Senegal RD	18.5	
	MLI	Mali Sud II	25.9	
	SIL	Agric. Sector I	17.0	
	LIB	Bong ADP II	10.7	
	GAM	ADP II	8.0	
		8 projects	227.1	of which 15% = $34 million
FY85 S	NIR	Southern Borno ADP	82.0	
S	EQG	RDP	10.6	
	CAM	Hevecam	30.0	
	MTA	Livestock II	10.0	
S	MLI	Mali ADP	20.0	
	GHA	OIL PALM II	20.0	
		6 projects	172.6	of which 15% = $26 million

S = Standby

1/ Excludes: Forestry, Irrigation, Agricultural Credit and Extension, Agro-Industry, Fertilizer, Feeder Roads, Agricultural Research.

FY86		NIR	Livestock II	80.0	
	S		Agric. Dev. Fund	150.0	
		TOG	RDP III	15.0	
	S	IVC	RDP III	40.0	
		GUI	Rice II	15.0	
		COB	Agric.	10.0	
		CAR	ADP II	20.0	
		CAM	Northern Prov. RDP	50.0	
			Centre Sud RDP	30.0	
		SEN	Small Rural Op.	25.0	
		MLI	Office du Niger II	35.0	
			11 projects	470.0	of which 15% = $71 million
FY87		NIR	ADP	150.0	
	S	GUI	AGRIC.	31.0	
	S	CAM	AGRIC	40.0	
		SEN	AGRIC	50.0	
	S	UPV	Livestock II	15.0	
		SIL	AGIRIC. Sector II	13.0	
		GHA	Oil Palm III	20.0	
		GHA	Cocoa III	20.0	
			8 projects	319.0	of which 15% = $48 million

RESOURCE IMPLICATIONS TO PROCESS POTENTIAL RWS COMPONENTS
OF FY83 - 87 WAM AGRICULTURAL PROJECTS

Activities in FY	Activity Code	PROJECT PIPELINE 1/ (Lending Program)								Total No.of Projects	Staff weeks Required 2/	Total Staff-week Requirem
		FY 83	FY 84	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90			
		(6 projects)	(8 Projects)	(6 Projects)	(11 Projects)	(8 Projects)	(8 Projects)	(8 Projects)	(8 Projects)			
84	PRE	-	-	2	8	2	-	-	-	12	48	
	APR		4	4	-	-	-	-	-	8	48	
	SPN	6	4	-	-	-	-	-	-	10	40	136
85	PRE	-	-	-	3	6	2	-	-	11	44	
	APR	-	-	2	8	-	-	-	-	10	60	
	SPN	6	8	4	-	-	-	-	-	18	72	176
86	PRE	-	-	-	-	2	6	2	-	10	40	
	APR	-	-	-	3	6	-	-	-	9	54	
	SPN	6	8	6	8	-	-	-	-	28	112	206
87	PRE	-	-	-	-	-	2	6	2	10	40	
	APR	-	-	-	-	2	6	-	-	8	48	
	SPN	6	8	6	11	6	-	-	-	37	148	236

1/ For Lending Program FY83 - FY87 from Attachment I. For FY88 and after, assuming constant FY87 level.

2/ Assuming: PRE = 4 staff-weeks/project
APR = 6 staff-weeks/project
SPN = 4 staff-weeks/project

Attachr
II

-17-

Rural Water Supply

WAPWS Activities

1. In the past WAPWS staff have tried to provide support to the Agricultural Divisions on a rather informal (personal) basis, mainly due to the initiative of one engineer who in the meantime has left the Division. With the increased number of requests for review and comments by WAPAs, these are increasingly channeled through the WAPWS Division Chief. In the last 12 months, WAPWS has in one way or the other been consulted for 6 or 7 projects, however with mixed results as all too often:

(i) WAPWS enters into the picture at too late a stage to affect Project design, say for Yellow Cover Review of SARs; and

(ii) WAPAs would not be able to effectively absorb WAPWS suggestions in the absence of WAPWS mission participation, due to staff, time and budget constraints.

2. WAPWS has traditionally been oriented more towards activities in the urban water supply sub-sector through projects stressing the institutional development of water utilities and relevant government agencies, and the staff profile has reflected the expertise require in that sector. Experience in RWS has gradually been gained through the preparation of the first free standing RWS project in the Region (Mali), and active collection and exchange of information from WAN countries, and with other donor agencies (notably FED,

Helvetas) and experienced consultants. As a result WAPWS now has established a nucleus of a RWS team (engineer and economist) who are being consulted on an increasingly regular basis. Parallely, RWS components are also being included more frequently into WAPWS' projects.

Main Constraints

3. These can be classified into two categories:

(i) leverage: for WAPWS to provide effective project design consultation and pursue sub-sector policy dialogue with Governments; and

(ii) resources: staff, time and budget constraints to arrive at achieving (i).

Leverage

4. The "mixed" results of WAPWS consultation have been mentioned earlier (para. 1). At issue is further the point as to what extent WAPAs have been willing to accept WAPWS' suggestions in the absence also of workable/applicable models provided by the latter (in the case of WAPWS advice to WAPUR it is much easier). While this may change in the future with the implementation of free-standing RWS projects, the question then remains as to what extent WAPWS can establish consistent RWS sub-sector dialogues with Governments when the Projects with RWS components are managed by other divisions responsible for a wide-range of components.

Resources

5. As mentioned in para. 1, demands on support by WAPWS concerning RWS project components have steadily increased. It is estimated that the current "nucleus" team could deal during a fiscal year with one fully-pledged RWS project and may be one or two RSW components as in-house consultants for the Agricultural Divisions in addition to the other normal WAPWS workload. At an estimated demand of about eight projects by the Agricultural Divisions during a fiscal year the resource gap is even more serious. It is evident that sufficient resource allocation in order to meet the mandate concerning RWS conferred to WAPWS would need to be effected before we can even seriously envisage engaging in policy dialogues with our borrowers.

~~191~~ 191 Cancelled + put into file 18

3/28/83

WA

Stowar

Problems the same in all the countries.

Not only AHP.

Stop the masses

$ 80000 $/Ha

1×10^6 Ha in NA will benefit plot irrigation

→ 1000 $/Ha

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. F. Hotes, Room N-1147 DATE: January 28, 1983

FROM: C. des Bouvrie, Irrigation Engineer, WAPAl

SUBJECT: Proposal for Increased Groundwater Development in Africa (Paper by Messrs. D. Gear & G.C. Neden (TAMS/NZA)

1. This is in reply to your request for comments on the above paper. I have carefully reviewed the proposals made by Messrs. Gear and Neden, which I cannot support. In fact I must assume that these are but personal views expressed by the authors, since I hesitate to believe that they would have been endorsed by TAMS, consultants of considerable international standing and repute. Admittedly some of their ideas are good and in line with what we are trying to do in West Africa, others are the result of poorly researched and misguided attempts at transfer of technology from other parts of the world, where conditions are quite different. I shall attempt to address the various issues, albeit in a different order than followed by the paper in question, referring mainly to the situation as I know it in West Africa.

2. Hydrogeology. The water carrying capacity of the so called African Basement Complex has been extensively researched, most notably by the BRGM under the aegis of the CIEH in Ougadougou 1/. The generally accepted conclusion is that tubewell yields in these rocks rarely exceed 1,000 1/hr and a yield of 15,000 1/hr would be very exceptional. Our large-scale drilling operations (for rural water supply) in northern Nigeria confirm this. I am therefore surprised to learn that such high yields (25% over 15 m^3/hr) can be obtained in the granites of Zimbabwe. Water-tables in West Africa are also much deeper than the 15 meter referred to in Zimbabwe or Maharashtra.

3. Soil Irrigability and Landuse. The West African upland soils are also not particularly suitable for irrigation; they are sandy and often shallow and underlain by extensive laterite hardpans. The vast majority of farmers use this land either for rainfed crop production under shifting cultivation of for extensive grazing; only the lucky few who have access to well watered valley bottom or riverain lands will grow irrigated crops on small plots of 0.1-0.2 ha.

4. Sociological Aspects. Irrigated agriculture is not a tradition here, neither is the landuse management (including soil and water conservation) which the writers deem necessary for increased groundwater control and recharge. Those who do irrigate, however do it well, using run-off the river water or shallow alluvial groundwater but they are very much a minority. To mobilize the African upland farmers to become smallholder irrigators along the Maharashtran model would imply a very fundamental change in land-use for which the African farmers with their abundance of agricultural land and peculiar landuse system, would a priori see little need. The writers are correct in saying that "their proposals require the introduction of non-traditional techniques to a conservative rural population" but surely

1/ Reference FAC/BRGM L'Afrique Sahelienne productivite des Nappes Apitude des eaux a l'irrigation.

a sociological study would not overcome this. In fact it would here have been of interest if the writers had explained under which conditions the 7,000 ha, tubewell irrigated land, in Zimbabwe had come about and how they would justify its 30 fold extension to 2,000,000 ha. Was it caused by land pressure, the promotion of this technology by white Rhodesian settler farmers, of course coupled to the exceptionally favorable local hydrogeological conditions? Some interesting sociological questions, it would seem, have not been addressed.

5. Technological Aspects. The writers propose to introduce the use of the "indian well," which I understand, is a 10 meter wide hole dug to a depth of 15 meters. I do not understand why in the writer's opinion such an Indian well would last one thousand years, or more, against a tubewell 5-30 years. I do know that generations of African villagers have labored hard to find water, digging and redigging wells, which if they were lucky, yield just enough drinking water to carry them and their stock through the dry season. Again, the wells that yield more (enough to irrigate one ha) are in the majority of cases sited in colluvial material on the slope of the upland terrace or in the seasonally flooded valley bottomlands, also known as Fadamas. If there would be more water in the granitic uplands within 15 meter depth or even more, the Africans would have found it. The best solution remains the boreholes drilled with down-the-hole hammer rigs, introduced 15 years ago. They cost around $15,000 each, and are almost exclusively suited for use as rural (drinking) supply points.

Correct !!

6. As regards waterlifting devices it is not clear what would be recommended. Mention is made of the use of electrical pumps switched to rural electrical mains or solar Voltaic panels. Rural electricity is a luxury, which Africa, apart from South Africa and perhaps Zimbabwe, generally cannot yet afford, where power failures still occur daily in the urban grid, sometimes of dismal proportions. As for solar pumps costing indeed some $10,000/ha, the "Harmattan," dust laden sunlight filtering winds from the Sahara cover much of West Africa during the dry season, sometimes for weeks on end, making this type of energy source an unattractive proposition. Animal traction, apart from the absense of suitable waterlifting devices, would likewise be excluded in many parts because of tse-tse infestation.

Correct !!!

7. Economic aspects have not been given much thought, but knowing that the average "fadama" farmer growing high value crops as a rule cannot afford much more than $500-600 per ha seasonal costs (including depreciation and running expenses) it would seem that much of the proposed system would have to be heavily subsidized. The economics of it all, the writers admit, would still be subject of follow-up feasibility studies.

Correct !!

8. Constraints. Turning finally to the suggested list of constraints, it would seem that what has been presented as an innovative new idea, is also recognized to have such major flaws and unknowns as to render it almost non-operational. Yet, the writers optimistically believe that partial or complete solutions to most or all of these problems are available. Personally I have grave doubts, which the present paper and proposed studies are not likely to dispel.

madness.

The Proposed Studies

9. The studies which would last 3 years (234 manmonths) and cost some $5 million would involve field work in mainly Zambia and Zimbabwe but also some "regional surveys." The report is not clear on the latter point. It does however suggest that its findings could in the end be applicable to much of Africa, south of the Sahara (one half to one quarter of its territory). The link-up has been left to the reader's imagination. This is still a very sketchy proposal which provides little detail as to its plan of operations and phasing, and how the $5.0 million is to be spent. Apart from those inadequacies and serious underestimates in project costs, its stated objectives are too vague to justify serious consideration. I, therefore, do not recommend we support this work, if, at all, we were asked to do so.

10. Concluding, these proposals have certain merits which somehow have sadly gone astray. Indeed, a very significant potential exists for smallholder irrigation in Africa, south of the Sahara. It is not, however, in the aquifers of the Basement Complex but in the shallow alluvial aquifers of West Africa's river system where this potential lies. A strong case can also be made for the transfer of technology from the Indian subcontinent in the form of small diameter shallow boreholes equipped with hand operated or engine driven pumps. This is what our irrigation trials in northern Nigeria intend to accomplish, and if we succeed, I envisage a development which could significantly boost agricultural production in the years ahead. In this respect the writers are certainly right.

cc: Messrs. Eccles, Walton, Arlosoroff

C.des Bouvrie:sk

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Irrinews

Newsletter of the International Irrigation Information Center

CANADA – P.O.Box 8500, Ottawa KIG 3H9 ISRAEL – Volcani Center P.O.Box 49, Bet Dagan

No. 26 1982

FOCUS ON
SUB-SAHARAN AFRICA: IRRIGATION'S IMPACT ON DEVELOPMENT

DISTURBING TRENDS

The last two decades have seen a deterioration in the economic development of the countries of Sub-Saharan Africa. The sluggish record of agricultural development, the most important determinant of overall economic growth in Africa, is the principal factor underlying this poor economic performance. The region is the only one in the world where per capita food production has actually declined between 1960 and 1980.



Sub-Saharan Africa
[From USDA Report, 1981]

A number of trends have evolved since the 1960s, and reflect the crisis in African agriculture:

- the growth rate of agricultural production began to decline and in the 1970s was less than the rate of population growth almost everywhere;
- agricultural exports stagnated, and African share in world trade declined for many commodities;
- commercial imports of food grains grew more than three times as fast as population, and food aid increased substantially;
- more of the population shifted its consumption from maize, roots, tubers, and pulses to wheat and rice (as evidenced by the soaring imports of these food-grains), which increased food dependency and created in many countries a mismatch between local production possibilities and consumer demand.

REASONS FOR CRISIS

Reasons for the present rural crisis include disruptions caused by war and civil strife, drought and unfavorable rainfall patterns during the 1970s, and rapid population growth which pushed cultivation into less productive areas. Furthermore, agriculture was neglected for a long time not only by development theorists but also by governments and donors. Investment was unwisely allocated, with an excessive emphasis on large-scale government-operated schemes. Agricultural and economic policies and institutional frameworks were not conducive to increasing output: official prices were too low; marketing systems were too uncertain, inefficient, and uncompetitive; input supplies were too irregular; and participation of farmers in rural affairs was too limited.

ABSENCE OF THE GREEN REVOLUTION

The present downward trends in African food production were seen in Asian countries 20 to 30 years ago. In Asia, these trends were reversed by the now well-known Green Revolution which has been conspicuously absent from virtually all the countries of the Sub-Saharan region. The reasons for this are complex, and touch on factors such as climate, soil structure, plant disease, and cultural practices. More than anything else, however, it is the problems associated with water supply which have precluded the transplanting of the Asian food revolution to Africa.

In Asia the Green Revolution was made possible by a favorable set of circumstances, notably, by the existence of an irrigation infrastructure and a farming community with experience in water management. Other contributing factors included a major breakthrough in the development of high-yielding varieties of rice and wheat, and a commercialized agricultural system with reasonable transportation networks.

The large-scale development of water resources which took place in Asia in the 1950s and 1960s, including the sinking of thousands of tubewells to tap the water from shallow aquifers, cannot be reproduced under African conditions. Indeed, the geology of much of the African continent makes water control difficult to achieve by any method.

The International Irrigation Information Center is a non-profit corporation, whose activities are supported by the State of Israel and the International Development Research Centre, Canada.

AGENDA FOR ACTION: THE DECADE OF THE 1980s

The following article is based on two recent reports – one by the World Bank and the other by the U.S. Department of Agriculture – which examine in depth the situation in Sub-Saharan Africa and recommend proposals for action.

PRESENT ROLE OF IRRIGATION

Both reports devote considerable space to the impact of irrigation on agricultural production in Sub-Saharan Africa and its importance as a means of increasing future food production.

Estimates of irrigation development in Africa differ because of the lack of a generally accepted definition of "irrigated cultivation," but by any measure irrigated agriculture still plays a relatively small role in the economics of African countries. The total irrigated area (counting only formal schemes with full water control) is estimated at 2.5 million hectares, of which 65% is in Sudan and 15% in Madagascar – 75% and 50% of cultivated areas in these two countries, respectively. In all other African countries, irrigated land represents less than 10%, and in most cases less than 5%, of the cultivated area.

Although the proportion of irrigated land in Africa is small (1.8% as compared to 28.0% in Asia and 6.1% in South America), it has actually expanded much more rapidly over the last two decades than the total area of arable land. Nevertheless, its overall impact on total agricultural production has remained modest everywhere except in Sudan and Madagascar. Apart from the predominance of irrigated cotton in Sudan, and sugar schemes scattered all over the continent, existing irrigation schemes are used mainly for rice cultivation.

IRRIGATION PERFORMANCE

The poor overall performance of irrigation schemes may be attributed to poor water management, insufficient leveling of land, soil problems, input supply bottlenecks, use of varieties not adapted to local needs and, above all, the lack of suitable economic incentives. Moreover, farmers have had only weak back-up support from agencies operating the irrigation schemes, particularly with respect to input supplies and training of extension staff. The result has been inadequate guidance of farmers, most of whom found themselves participating in relatively sophisticated irrigation schemes without prior training or experience.

Poor water management, due partly to deficiencies in the infrastructure but also to lack of expertise and management control, sometimes gave rise to irregularities in water supply. This increased the farmers' risk and undermined their willingness to cultivate intensively, while at the same time arousing their resentment at having to pay for maintaining the system.

Large-Scale Irrigation

People in poor countries dependent on dryland farming tend to see in irrigation the brightest hope for agricultural development, and in particular the answer to problems of lagging food production. They tend, moreover, to perceive the irrigation solution in large-scale terms. However, the World Bank team points to recent experience and economic analyses suggesting that large-scale water control can lead to food security and agricultural expansion only after the groundwork has been carefully prepared and sound policies and programs have been consistently applied.

Large-scale irrigation through the development of river basins has been popular in many Sub-Saharan countries since the early 1970s. Mali, Mauritania, and Senegal are preparing to develop the Senegal valley at a cost of about $890 million for two dams (excluding cost of irrigation infrastructure); the Kandadji dam is planned for the Niger valley in Niger; for the Sahel countries as a whole, the Comité-Inter-Etat de Lutte contre la Sécheresse dans le Sahel (CILSS) has set a target of 550,000 hectares to be developed by the year 2000, with major schemes planned in Tanzania, Somalia and Nigeria.

River basin development has been attractive to governments and donors alike in resource-poor and arid countries. However, such development schemes can be criticized on financial grounds. Assuming efficient production, a ton of rice produced in a modern irrigation scheme developed at $10,000 per hectare is estimated to cost not less than $600 per ton. But, in 1980, imported high quality rice cost $400-$450 per ton in coastal countries of Africa; the rice imported in Senegal, Gambia, and Mauritania – the largest rice-consuming area in Africa outside of Madagascar – is 40% cheaper. Thus, unless consumer prices of wheat and rice are raised by a very substantial margin, production would have to be heavily subsidized.

Large-Scale Irrigation and Food Production

Because of the emphasis on large-scale irrigation schemes, the expansion of irrigated cultivation has been confined largely to plantations, estates and state farms and has bypassed the vast majority of farm families who constitute about two thirds of the populations of most African countries. From the point of view of food production, this omission is critical because subsistence farmers, whose capital investment is often no more than $6.50 per farm, account for the bulk of the food production in Africa. This fact is often overlooked because the products of subsistence farming are generally confined to local use due to inadequate transportation and other reasons.

The benefit to food production of large irrigation schemes is also questioned on the grounds that with most of these schemes there is strong pressure to replace staple food crops by higher value cash crops (such as cotton in West Africa and the Gezira and sugar cane in East Africa), in order to recoup the heavy initial investments and high running costs.

Large-scale irrigation schemes pose yet another threat to food production because the large labor force employed in their construction and maintenance draws on manpower that would otherwise be engaged in dryland subsistence farming; local food production is diminished correspondingly.

Irrigation Rehabilitation

In light of the above problems in irrigated agriculture, together with the urgent need for quick-yielding programs and the need to make proper preparation for future large-scale irrigation efforts, the World Bank team suggests giving priority to raising the production in existing schemes to levels that would justify the present substantial investments in irrigation. Such investments can amount to $10,000-$20,000 per hectare, and are warranted only if close to 6 tons of cereals per hectare can be grown annually.

Proposed rehabilitation and consolidation measures include:

- improving the operation of existing projects with respect to water management and agricultural services, and closer study of soil conditions;
- improving economic incentives for farmers and increasing their participation in operating and maintaining the irrigation schemes;

- rehabilitating infrastructure (drainage, water distribution, land leveling);
- reducing the size of holdings where they are too large to be cultivated intensively, and introducing double-cropping where feasible;
- increasing the rate of cost recovery.

Rehabilitation programs initiated in the 1970s are behind schedule. These, and the rehabilitation of existing projects, are not expected to yield significant results until the late 1980s; thus their contribution to irrigated agriculture, although valuable, can only be felt in the long-term.

An important side-benefit of rehabilitation programs is the opportunity they provide for the training of government staff and farmers, some of whom can then function as key personnel in future schemes.

Small-Scale Irrigation

An encouraging trend seen in many countries is the vigorous growth of informal small-scale irrigation schemes in flood plains and swamps. In Nigeria, for example, the irrigated area has more than quadrupled between the late 1950s and 1970s. Similar developments have occurred in Ivory Coast, Liberia, Senegal, Sierra Leone, and other countries. The informal schemes have made a much larger contribution to food production, for instance in Nigeria, than the formal irrigation schemes. In Madagascar they are the predominant form of production. The main types are seasonally inundated depressions, shallow swamps, and river valley bottomlands. Most of these lands have been developed by the farming population with little, if any, government help.

There is still enormous potential for such schemes in many African countries. In Nigeria alone, for instance, an estimated 2 million hectares could be thus exploited, and many schemes in the existing 800,000 hectares could benefit from structural improvements and intensification.

This type of traditional small-scale irrigation depends on readily available water resources in the form of rainfall, runoff, and natural storage, which is carried over into the dry season. Irrigation systems may range from simple water diversion and redistribution works to blocking runoff by contour ridging or bunding for water conservation. All are low-investment improvements which, with appropriate extension advice, can be undertaken by the farmers themselves. Special attention should be given to the organization of effective maintenance services with farmers' participation, because this is still the critical element in pump-based, smallholder irrigation.



Smallholder irrigating his sugar-cane, Dwangwa Delta, Malawi.
[Photo from CDC's *Report and Accounts*, 1981]

Several countries offer the scope for small-scale irrigation based on groundwater development through pumping, using either hand-operated or small-motor pumps. In Nigeria, where farmer response has been positive, the government is shifting the emphasis of its irrigation policy from the large-scale schemes favored in the 1970s to support for small-scale ones.

IRRIGATION POTENTIAL

In spite of the difficulties and the high costs involved, the expansion of irrigated agriculture is essential for alleviating the serious food situation in the region.

The irrigation potential of the Sub-Saharan African countries, as assessed by the USDA team from various reports, is summarized as follows:

Region and country	*Estimated newly irrigable area (hectares)*
The Sahel:	
Chad	311,000–322,000
Gambia, Gambia River	60,000
Mali, Sélingué Dam	62,000
Mali and Niger, Tossaye Dam	800,000
Senegal	390,000
Upper Volta, White, Black and Red Volta Rivers	50,000–65,000
West Africa:	
Cameroon, Pendé	8,000
Ghana, Lake Volta	25,000
East Africa:	
Kenya	190,000
Sudan, Gezira and other	[1] up to 652,000
Tanzania	16,000
Southern Africa:	
Mozambique	1,000,000 plus

[1] Calculated on the basis of 1959 Nile Water Sharing Agreement with Egypt, completion of Jonglei Canal, and estimated increased efficiency of water management.

SCENARIO: 1990

It is beyond the scope of this article to describe the Bank's recommendations or the USDA model for 1990 with its predictions and scenarios. In all of these, the role of irrigation in agricultural development is considered not in isolation but as one of the numerous contributing factors, and it would thus be of little value to reproduce conclusions relating to irrigation out of their proper context.

Those interested in short-term and medium-term economic planning for the Sub-Saharan region can obtain relevant and valuable information from:

1) *Accelerated Development in Sub-Saharan Africa: Agenda for Action*, African Strategy Review Group, The World Bank, 1981
2) *Food Problems and Prospects in Sub-Saharan Africa: The Decade of the 1980's*, Africa and Middle East Branch, International Economics Division, Economic Research Service, U.S. Department of Agriculture. Foreign Agricultural Economic Report No. 166, 1981.

BOOK REVIEWS

International Institute for Land Reclamation and Improvement. *Land Reclamation and Water Management: Developments, Problems and Challenges,* ILRI Publication 27, ILRI, P.O.Box 45, 6700 AA Wageningen, The Netherlands, 1980, 191 p. (English)

This special publication marks the Silver Jubilee of the International Institute for Land Reclamation and Improvement (ILRI), Wageningen, The Netherlands, and focuses on the activities in which ILRI is involved: the improvement of land and water use for agriculture, with emphasis on the developing countries.

The collection of 13 articles covers the following topics: Land and water development in the Third World; From soil survey interpretation to land evaluation; Problem soils: their reclamation and management; Groundwater resources management research; Methods and models in surface water hydrology; Developments in planning of irrigation projects; Rice cultivation and water control; Factors affecting the viability of small-holders' irrigation; Crop response to water under irrigated conditions; The use of saline water for irrigation; The study of effects of drainage on agriculture; Developments in subsurface drainage techniques; and Scientific information: transfer and retrieval.

Each article contains a concise description of the state-of-the-art and the future outlook. The book is attractively illustrated with figures, tables and photographs. Of particular interest is the article on problem soils, which contains maps of the world distribution of various soil restrictions such as vertisol, saline and sodic soils, and acid soils.

American Society of Civil Engineers. *Legal, Institutional and Social Aspects of Irrigation and Drainage and Water Resources Planning and Management,* Proceedings of the ASCE Irrigation and Drainage Division and ASCE Water Resources Planning and Management Division Specialty Conference, Donaldson Brown Center for Continuing Education, Virginia Polytechnic Institute and State University, July 26-28, 1978. ASCE, 345 East 47th Street, New York, NY 10017, USA, 1979, 905 p., $40.00 (English)

The purpose of this conference was to bring both engineers and nonengineering specialists together to consider the numerous and complex legal, institutional and social problems which attend the development and management of vital water resources. In addition to engineers, participants included attorneys, economists, planners and sociologists.

Sixty-nine papers were presented in thirteen sessions covering the following topics: A View of Eastern Water Law; Interesting Aspects of Western Water Law; Water Law, Policy, and the Federal Government; Water Law and Technology; Legal Aspects of Conjunctive Use; Institutions in Water Policy; Institutions for Management; Water Resources Management; Water Allocation and/or Water Use Efficiency; New Constraints on Irrigation and Drainage; Models as a Viable Management Tool; "208" Studies; Institutional and Legal Constraints; and Water Management in Developing Countries.

A timely topic related to many of the papers and the discussion was National Water Policy. The final session concerned the input and position that ASCE should take on this policy through its Water Policy Committee.

Carr, M.K.V., ed. *Irrigation: The Way Ahead,* U.K. Irrigation Association Publication No. 1, National College of Agricultural Engineering Occasional Paper No. 10, Silsoe, Bedford, England, 1981, 91 p., £3.50 (English)

These proceedings of the Inaugural Conference of the United Kingdom Irrigation Association contain five papers covering various aspects of international irrigation. The titles are: Irrigation for tomorrow; Developments in irrigation systems in Europe; 'A watered garden' – present day irrigation practice and current developments in Israel; Development in on-farm water management practices in the United States of America; Irrigation in Britain: the way ahead.

The papers, presented by internationally known experts in irrigation science and technology, give comprehensive and up-to-date descriptions of present technology and future trends. The publication should be of interest to all who follow the progress of irrigation in the world to help solve the increasingly urgent food problem.

CONFERENCES & COURSES

November 29-December 5, 1982

Regional Workshop on Limnology and Water Resources Management in Developing Countries of Asia and the Pacific
Kuala Lumpur, Malaysia

The theme of this workshop is *Sustainable Clean Water,* and its aim is to formulate a synthesis of the science of inland water resources and their management in the tropical Asian-Pacific region. Among the many topics covered will be agricultural drainage and irrigation, and river basin management.

Further information from the Organizing Committee, Regional Water Workshop 1982, c/- Department of Zoology, University of Malaya, Kuala Lumpur, Malaysia.

December 5-17, 1982

Irrigation Water: Production Function
Utah, USA

Further details on this course, which is offered in English and Spanish, can be obtained from the Admission Committee, International Irrigation Center, Department of Agricultural and Irrigation Engineering, UMC 41, Utah State University, Logan, Utah 84322, USA (Tel. (801) 750-2800).

December 14-16, 1982

Irrigation: Principles & Practices
National College of Agricultural Engineering,
Bedford, England

Details of this short course are available from Mrs. Pam Cook, Short Course Secretary, National College of Agricultural Engineering, Silsoe, Bedford, MK45 4DT, England.

10-30-87

Financing of Infrastructure
in Sub-Saharan Africa

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Information for this paper has been compiled by Ms. E. Hewitt and Mr. T. Skytta from staff papers within the Africa Region of The World Bank.

Financing of Infrastructure in Sub-Saharan Africa

Introduction

Since their independence around 1960, many African countries have directed a large portion of their available resources to major expansion of the physical infrastructure. Most of this expansion was externally financed, and was not always well-coordinated. Neither had it made adequate provisions for the growth and proper strengthening of sector institutions. The result has been that these institutions lack the capacity to properly manage the facilities, leaving maintenance to fall behind. Furthermore, there has not always been enough political will to develop sector policies to keep the institutions financially viable.

The critical importance of infrastructure facilities as necessary support to growth is being increasingly recognized. There is a major need for maintenance and rehabilitation of the existing facilities which do not deliver the services they were intended to provide. At the same time, many African countries are in the process of implementing structural adjustments expected to continue over the next five years or so. During this period, only limited new infrastructure investments will be possible. This period should be wisely used to implement the above mentioned rehabilitation and upgrading and to support the necessary policy changes and institutional reforms. The strengthened institutions will then be better prepared to face the challenge when the time is right (perhaps already during the first half of 1990) to catch up with the deferred investments for expanding the physical infrastructure services. It is hoped that the structural adjustment efforts, over the next few years, will help strengthen the African economies and sector institutions, so that their capacity for operating and maintaining the new capital assets will be enhanced.

This paper discusses the trend and types of investments that the World Bank has made in the sector; it further presents some policy issues that the World Bank is presently addressing in its sector operations, as well as the cofinancing opportunities that exist in the infrastructure sector. Finally, some thoughts are given to future strategies.

World Bank Lending for Infrastructure in Africa

In the 1970s the World Bank contributed an annual average of US$323 million to finance infrastructure projects in Sub-Saharan Africa. During 1980 to 1984, the annual average share of the World Bank to the sector rose to US$438 million; the lending volume peaked in 1985 to US$602 million but dropped sharply the following year to US$366 million, rising modestly to US$419 million in fiscal year 1987. These figures do not fully reflect the true scale of the flow of Bank funds to the sector as, for example, the rural roads and water and sanitation components of integrated rural development projects are not included in these totals. While the probability of expanding its lending to the infrastructure sector remains low, indications are that the World Bank's direct contribution to sector operations in Africa will continue, at least, at current levels over the

next few years. A sectoral distribution of World Bank lending in Africa is presented in Annex 1 and an overall global picture is presented in Annex 2.

The lending instruments that the Bank applies have evolved rapidly during the past decade, shifting from funding specific investment projects to providing more intensive support to policy reform and institutional changes through subsector, sector and structural adjustment lending. This evolution is mostly indicative of the Bank's attempts to adapt its operations to the new economic environment following the worldwide economic shock of the 1970s and early 1980s which had a severe impact on the African economies.

Current lending operations reflect an array of lending instruments illustrated in the table below and explained in Annex 3. The Bank continues to supply about 45% of its funds through specific investment loans although a declining trend is evident.

Distribution of World Bank Loans & Credits by Lending Instrument (percent of commitments)

	FY80	FY83	FY84	FY85	FY86
1. Specific Investment Projects	60.5	39.4	41.4	49.6	45.2
2. Sector Operations	33.0	49.6	48.2	46.9	45.4
(a) Sector Investments	16.9	24.6	26.4	27.0	19.0
(b) Fin. Intermediary 1/	15.4	20.6	13.3	9.6	12.4
(c) Sector Adjustment	0.7	4.4	8.5	10.3	14.0
3. Structural Adjustment & Program Loan	3.1	9.6	8.4	1.1	5.0
4. Technical Assistance	1.1	1.2	2.1	1.4	1.4
5. Emergency Assistance	2.3	0.2	0.3	1.4	3.1
6. TOTAL	100.0	100.0	100.0	100.0	100.0
US$ (in millions)	11,482.0	14,477.0	15,522.3	14,386.3	16,318.7

1/ Lines of credit to Development Finance Institutions.

Within the category of specific investments, there has also been a marked shift away from hardware types of investments (e.g. road construction, expansion of water distribution networks) towards sectorwide investment (program lending) emphasizing maintenance and rehabilitation of the existing capacity. This shift reflects the continuing stress on alleviating key medium-term constraints on development objectives and on the critical relationship between improved operations and maintenance, the overall management of the sector, and the optimal use of investment resources.

Within this framework, the Bank continues to be concerned with the distribution of the benefits of economic growth. Past experience shows that traditional investment projects alone cannot support the growth in an adequate manner on a long term basis, if the policy and institutional context is not consistent with the development objectives. Since 1980, when adjustment lending was sanctioned by the Bank's Board, there has been a significant increase in sector adjustment loans. As illustrated in the table above, this type of loans has increased from 0.7% in 1980 to 14% of total commitments in 1986. The main objective of sector adjustment loans is to support comprehensive policy changes and institutional reforms within a specific sector. The emphasis on policy reform means that policy components are today an essential feature, and perhaps the central purpose of most project and sector operations.

The structural adjustment lending has been designed to help the developing countries to carry out the difficult process of macro-economic policy and institutional reforms that are necessary for their successful adjustment to unfavorable external shocks. Structural adjustment loans, broader in scope than sector adjustment loans, focus on major macro-economic issues as well as major sectoral issues that cut across several sectors (for example,pricing policies of public enterprises, trade policy, and reduction in public sector deficits).

Early structural adjustment operations included very few infrastructure policy components. From the mid 1980s, however, such components became a regular feature of adjustment operations and are now being used when dealing with some of the most intractable policy issues which could not be resolved at the investment project or sector level (e.g privatization of public enterprises, reduction of deficits of municipal authorities, water utilities and public transport companies).

Policy Reforms

Some typical policy reforms which are being addressed through sector adjustment loans in the infrastructure field are discussed below. The main themes that underlie the required policy reforms include the following:

(i) population/beneficiaries must shoulder more of the cost of the services they receive than they have in the past;

(ii) appropriate technologies must be used;

(iii) the over-extended public sector/parastatals must be cut back, and the underdeveloped private sector must be encouraged;

(iv) the limited resources available to public authorities must be directed more to help the growing number of poor; and

(v) urban populations must not receive favored treatment in access to resources.

Within the context specified above, attention is now being paid to the following points in designing new policies:

Urban Development

(i) The design standards used by local authorities in planning urban infrastructure and housing projects are still very high in most African cities, relative to what the bulk of their populations can afford to pay.

(ii) When users pay little or nothing, utilities do not have sufficient resources to maintain existing systems adequately, or to expand them to unserved areas. The subsidies that are required to meet the costs not covered by user payments, draw resources away from vital other uses, leading to a distortion of the economic growth and impeding an efficient allocation of resources. Reforms that reduce subsidies help assure that only approaches that are affordable and replicable are adopted.

(iii) Inadequate maintenance continues to be a serious problem throughout Africa in virtually all facets of urban infrastructure, including streets, transport services, water supply, sewerage, telecommunications, electricity and social services. When, in addition, new investments are being made while old ones are poorly looked after, the waste of resources is inevitable.

Transportation

(i) In the case of the highway network, it has become apparent that increased road maintenance is imperative, and in many cases, more labor-intensive methods, using less foreign exchange can be applied.

(ii) Because of the shorter life span of roads built in the

1970s, a number of African countries are now facing an enormous build-up of road rehabilitation needs, and at a time when their own resources are extremely limited.

(iii) Public agencies responsible for operating and maintaining transport and communication services should be given the means to exercise these functions effectively, both financially and technically. The poor financial performance of many railway and road maintenance authorities is, to a large degree, traceable to lack of managerial autonomy.

(iv) All sectoral rehabilitation objectives in the transportation sector (as in other sectors, for that matter) must be seen and implemented in parallel with structural adjustment programs at the national level.

(v) The overriding institutional problem is the lack of management capacity and, more broadly, the scarcity of administrative and technical skills. This is the result of the lack of a long term perspective for manpower development, inadequate financial autonomy and responsibility of the agencies concerned. One solution, of course, is the strengthening, through technical assistance, of the institutions responsible for the construction and maintenance of infrastructure.

Water Supply and Sanitation

(i) One serious constraint in the water sector is the lack of effective institutions coupled with the scarcity of trained manpower. The caliber of management and technical staff of water supply entities is generally lower than that of organizations in most other sectors. The sector does not attract the more capable managers or technicians, who seem to prefer jobs in the private sector where incentives are generally better.

(ii) The consequences of poor management, and the lack of trained staff and skilled manpower, are very apparent in the operational and financial performances of most water entities;

- "unaccounted-for-water", in many cases exceeds 50%,
- large arrears in uncollected bills are common,
- inadequate tariffs, the corrections of which are long overdue,
- neglect of preventive maintenance leads to deterioration of services,
- inadequate records of consumer connections, distribution systems and water meters are commonplace.

(iii) A serious constraint affecting the finances of water entities is the severe shortage of foreign exchange funds to meet operating and maintenance costs. Under the strict foreign currency controls exercised by most governments, allocations for the operation and maintenance of water supply facilities are given low priority.

(iv) Identifying systems that will reliably serve rural communities and that can be constructed, operated and maintained at low cost and at the village level, is a difficult, but achievable objective.

Cofinancing

The World Bank involves many external sources of assistance to increase the flow of funds to the developing countries; in the case of Sub-Saharan Africa assistance on concessional terms is particularly important. Increased levels of official development assistance are needed to leverage and sustain the policy directions and reforms required to reverse the declining trends and to achieve growth. The World Bank encourages the mobilization and channelling of external concessional resources especially during the upstream phase of the project cycle, when policy reform efforts are essential. Consequently, past levels of cofinancing have been instrumental in achieving development results in the infrastructure sector, particularly in the transportation sub-sector (as indicated in Annex 4).

Infrastructure projects approved in fiscal year 1985, for example, provided for a total volume of cofinancing of over US$ 200 million for twelve projects from nineteen different funding sources. By 1987, the total annual cofinancing amounts rose to over US$275 million. Cofinancing with official development agencies represented the largest source, and not surprisingly, since they provide development-oriented lending, highly concessional terms, and long maturity. Cofinancing is thus critical for the poorest debt-ridden countries of Sub-Saharan Africa which are adversely affected by a combination of macro-economic difficulties, slow growth in concessional flows and recent limitations in the World Bank concessional IDA credits.

By associating donors and potential co-lenders as early as possible in the project cycle, cofinancing can be instrumental in allowing donors to become involved in the essential policy dialogue. Through their collaborative efforts, cofinanciers gain a wider exposure to the challenges of the sector This may, in turn, lead to direct collaboration between donor institutions and entities in Africa. Attempts continue to be made by the World Bank to increase and diversify its recourses to various cofinancing instruments by increasing, whenever possible, the use of export credits and financing by commercial banks for development projects.

Strategy Framework for Future

The problems of the sector are now widely recognized and are being addressed in Consultative Group or Round Table discussions among donors, generally under World Bank or UNDP leadership in many African countries. The World Bank also undertakes public expenditure reviews (PER) periodically in an increasing number of countries. In these reviews, so-called "White Elephant" projects are identified, and rejected, and realistic and sustainable investment programs are established. Efforts are also being made to involve other donors to discuss such programs in order to arrive at an agreement on the overall policy framework.

In order to better understand the policy and institutional reforms required, and to develop suitable support operations to effect these reforms, the World Bank's Africa Region has initiated a number of Africa specific studies, as follows:

(i) Urban Services and Regional Development. While most of the strategic thinking on African development has been focussed on macro-economic adjustment, trade, agriculture and environment, the importance of urban services as an expression of development and as necessary support to growth deserves increased attention. Development of monetization of agricultural production and the provision of basic services to rural population are critically dependent on access to markets and linkage with urban centers. The development and upkeep of the rural infrastructure would in the future have to rely much more on decentralized organizations, capable of mobilizing local resources and structured to ensure a higher degree of local accountability. The elaboration of related strategies would require increased attention to local administration and regional planning. The following studies will be carried out:

- Urban/Rural Linkage Study
- Urban Sector Strategy Review
- Strategy Brief on Housing Finance

(ii) Transportation. Over the last few years, the focus and scope of the Region's operations in support of transportation have been systematically re-oriented toward maintenance and rehabilitation, and have been broadened to encompass overall sector expenditure programs and to address policy issues and institutional reforms affecting efficiency and financial viability. The study program addresses issues of resource mobilization for rural roads possibly under the framework of a broader effort concerning rural infrastructure. Special studies will be carried out on the Great Lakes Corridor and the Sahel Corridor.

(iii) Water Supply and Sanitation. Water supply and sanitation will require increased support. Coverage in Africa is lagging, and existing capacities are falling into disrepair. Safe supply of, and easy access to, water is a major factor for improved health and productivity; it is particularly relevant to women. The objective of the regional study program is to show ways for a substantial expansion of Bank assistance for rural water supply and sanitation, spearheaded by the World Bank-UNDP Water and Sanitation Program, in particular, the Sector Development Teams operating out of Nairobi and Abidjan. A regional Strategy for Water Supply and Sanitation is now being developed.

In addition to cofinancing of projects, already an active area of collaboration between the World Bank and other donors, arrangements have been made with some donors to second staff to the Bank to carry out discrete activities e.g. to undertake joint public expenditure review missions and to participate in regional studies. These assignments are generally of a one- to two-year duration. Another practical example of collaboration at the operational level is the work of the Sector Development Teams (for water supply and sanitation) in Nairobi and Abidjan. Several donors have supported this activity by assigning staff to work with these teams in the areas of investment planning and project preparation.

World Bank Lending
Africa
Infrastructure and Other Sectors 1981-87
[Amounts in current US$million]

	1981		1982		1983		1984		1985		1986		1987	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Infrastructure	426.1	24	410.7	23	430.3	24	580.6	25	601.9	38	365.8	18	419.0	20
Transportation	397.1	22	198.7	11	266.1	15	463.7	20	409.9	26	193.3	9	226.7	11
Urban Development	15.0	1	61.0	3	69.0	4	84.0	4	42.0	3	153.0	7	130.5	6
Water Supply & Sewerage	14.0	1	151.0	8	95.2	5	32.9	1	150.0	9	19.5	2	61.8	3
Agriculture & Rural Dev.	664.1	37	466.5	26	420.2	23	670.3	28	350.0	22	434.7	21	519.2	25
Education	183.6	10	80.7	4	137.3	8	24.9	1	119.0	7	114.7	6	104.9	5
Energy	87.0	5	277.5	15	235.5	13	323.6	14	84.3	5	220.1	11	104.3	5
Industry	9.7	1	24.0	1	49.0	3	96.9	4	6.4	-	193.9	9	-	0
Pop., Health & Nutrition	0	0	23.0	1	21.8	1	30.5	1	64.1	4	81.1	4	30.8	1
Telecommunications	15.2	1	109.7	6	22.0	1	0	-	72.6	5	46.5	2	27.8	1
Other a/	426.7	24	409.4	23	477.9	27	641.5	29	299.0	19	589.7	29	891.7	43
TOTAL	1812.4	100	1801.5	100	1794.0	100	2368.3	100	1597.3	100	2046.5	100	2097.7	100

a/ Includes lending for non-project assistance, Small-scale Enterprises, technical assistance, and development finance companies.

Source: World Bank Annual Reports

ANNEX 1

Global Financing Picture
World Bank Loans and Credits
Infrastructure versus Other Sectors
(Amounts in US$ millions)

	Amount 1983	Of which Infrastruc. %	Amount 1984	Of Which Infrastruc. %	Amount 1985	Of Which Infrastruc. %	Amount 1986	Of Which Infrastruc. %	Amount 1987	Of Which Infrastruc. %
Africa	1794.0	24	2368.3	25	1597.3	38	2046.5	18	2097.7	20
Latin American and Caribbean	3459.6	27	3025.6	24	3700.2	25	4771.2	14	5152.0	18
Asia	6687.8	24	7002.6	23	6659.7	17	7196.2	25	7328.8	23
Europe, Middle East and North Africa	2535.6	12	3125.8	26	2429.2	28	2304.8	15	3095.5	36
	14477.0	23	15522.3	24	14386.3	23	16318.7	19	17674.0	23

Source: World Bank Annual Reports

ANNEX 2

Description of Lending Instruments

Instrument	*Objective*	*Focus and content*	*Use of loan proceeds*	*Disbursement period*[a]	*Commitments, 1985*[b]
Specific investment loan	To create new productive assets and economic and social infrastructures, to restore them to full capacity, or to ensure their maintenance.	Focuses on technical, financial, economic, and institutional viability of a specific investment and its maintenance, and on those aspects of the sector policy framework that bear directly upon the productivity of the investment (for example, input and output prices, operational efficiency of enterprises). Assists in the design of investments and in preparing management and training programs. Investment proposals are appraised by Bank staff. Requires agreement on viability and specifics of investments.	Preidentified equipment, materials, and services, and civil works for specific investments.	Four to nine years.	7,140.3
Sector Operations					
Sector-investment and maintenance loan	To bring sector investments in line with economic priorities and ensure they are efficiently operated and maintained.	Focuses on sector expenditures, especially balance between new investments and rehabilitation and maintenance, and on institutional capacity to plan, implement, and monitor investments. Requires agreement on well-designed sector program to meet priority development needs, as well as on specific measures to strengthen management and policies, and a sector institution capable of carrying out the program using agreed appraisal criteria for individual parts of program.	Broad categories of equipment, materials, services, and civil works related to the whole, or a time slice, of the sector program.	Three to seven years.	4,001.8
Financial intermediary loan	To provide funds for enterprises and small and medium-size farmers through an intermediary within a competitive environment.	Focuses on categories of clients, types of investments, service levels, and cost of capital. Requires agreement on criteria to select subborrowers and appraise their needs, on on-lending rates and on specific actions for institution building.	Credit for investment and working capital needs of subborrowers selected in accordance with agreed criteria.	Three to seven years.	1,598.6
Sector-adjustment loan	To support comprehensive policy changes and institutional reforms in a specific sector.	Focuses on major sectoral issues and investment programs, especially incentive framework (tariffs, prices, taxes), and institutional capability. Usually either in countries lacking administrative and political capability to formulate and implement comprehensive economywide structural-adjustment programs, or not requiring such comprehensive programs, or as follow-up to stabilization programs to deepen reforms in a sector. Requires agreement on specific monitorable action program in these areas on specific schedule and on investment programs for the sector.	Mainly imports required for sector, with actual users either preidentified or to be selected following agreed criteria.	One to four years.	1,058.1
Structural-adjustment loan	To support, through a series of loans, specific policy changes and institutional reforms to achieve efficient use of resources and contribute to a sustainable balance of payments in the medium and long term, while maintaining growth.	Focuses on major macroeconomic issues, as well as on major sectoral issues covering several sectors, especially trade policy (for example, tariff reform, import liberalization, export incentives), resource mobilization (for example, role of parastatals, budget policy, interest rates, debt management), efficient use of resources (for example, public-investment program criteria, pricing, incentive system), and institutional reforms, economywide and in specific sectors. Requires agreement on effective stabilization program with monitorable policy modifications in these areas on specific schedule.	General imports subject to negative list of prohibited imports.	One to three years.	232.8[c]
Technical-assistance loan	To strengthen local institutions concerned with (i) designing and adopting policies, strategies, and institutional approaches promoting further development in a sector or in the economy as a whole, or (ii) preparing, implementing, or operating specific investments, or to carry out specific tasks related to the preparation, implementation, or operation of investments.	Focuses on capacity (e.g., organization, management, staffing, methods, physical or financial resources) or institutions directly concerned with sector or economywide policies and strategies or with investments, and on specific gaps (studies and personnel) preventing efficient investments. Requires agreement on specific time-bound action programs to strengthen institution through technical assistance and training, on appointment of local counterparts, or on the carrying out of studies with agreed terms of reference.	Specialized consultants and services, studies, and training.	Two to six years.	206.1
Emergency reconstruction loan	To support rebuilding activities and rapid restoration of physical structures and productive activities after disasters.	Focuses mainly on restoring predisaster situations with emphasis on strengthening institutions to handle reconstruction effort and prepare them for future.	Broad positive list related to reconstruction needs.	Two to five years.	148.6

a. This is the normal range of expected disbursements. There may be a small number of exceptional cases where the disbursement period is shorter or longer than shown.
b. Fiscal year; US $ millions.
c. Includes program-loan amounts.

WORLD BANK INFRASTRUCTURE PROJECTS
INDICATIVE LEVELS OF COFINANCING (1985, 86, 87)
AMOUNTS IN US$ MILLION

Country	Project/Date Appraised	Cofinanciers	Total Project Cost	World Bank Share
I. TRANSPORTATION				
Burundi	Highways Project IV (1985)	FRG Belgium Japan OPEC Special Fund AfDB	23.9	18.1
Cameroon	Highways Project VI (1985)	Private Banks Official Aid Agencies	295.0	125.0
Ghana	Transport Rehabilitation (1985)	ADF ($18.1m) WDF ($8.1m) Japan ($2m) UNDP ($1.4m)	121.9	40.0
Ivory Coast	Highway Sector Program (1985)	AfDB ($50m) Commercial Banks (33.4m)	230.7	110.0
Seychelles	Ports Project (1985)	AfDB (5.8m) Norway (0.9m)	16.7	6.2
Swaziland	Road Rehabilitation (1985)	USAID (1.1m)	11.3	8.6
Tanzania	Port Rehabilitation (1985)	Denmark Finland Italy The Netherlands (32.0m) Norway United Kingdom	91.0	27.0
Zambia	Railway Rehabilitation (1985)	AfDB (20.0m) SIDA (5.2m) USAID (5.0m) Belgium (4.0m) FRG, Kfw (1.6m)	83.1	20.0
Gambia	Highway Maintenance II (1986)	ADF (4.5m) EEC (2.0m) UNDP (0.7m) UNSO (0.6m)	16.4	5.8
Ghana	Ports Rehabilitation (1986)	OECF (29.2m) SFD (13.2m) EEC (8.6m)	95.8	24.5
Mali	Highway V (1986)	ADF (10.8) SDC (4.0m) FAC (0.5m)	73.4	48.6

Niger	Transport Sector (1986)	EDF (39.4m) Japan (20.0m) ADF (16.8m) CCCE (7.8m) UNDP (0.5m)	212,9	15.0
Rwanda	Highway VI (1986)	BADEA (7.6m) WFP (1.9m) UNDP (1.0m) France (0.4m)	59.1	11.0
Tanzania	Highway Rehabilitation VI (1987)	AFDB (19.4m) Norway (6.9m) Denmark (2.0m)	107.7	50.0
Benin	Infr. Rehabilitation and Maintenance (1987)	EDF (23.0m) ADF (8.6m) BOAD (6.2m) ISDB (4.6m) CCCE (2.4m) FAC (1.4m)	70.5	19.5
Chad	Highway Maintenance (1987)	ADF (7.2m) Live Aid/Band Aid Foundation (1.3m)	29.8	20.0
Guinea	Transport Sector (1987)	AFDB (30.0m) KFW (13.0m) GTZ (1.0m) FAC (1.0m)	111.5	55.0
Kenya	Second Railway (1987)	ODA (13.3)	45.5	28.0
Madagascar	Ports Rehabilitation (1987)	CCCE (10.0m) FAC (2.6m) KFW (2.3m) ODA (0.1m)	34.8	16.0
Zaire	Ports & Waterways (1987)	AGCD (9.4m) USAID (1.5m)	47.9	27.6
	Subtotal	525.3	1778.9	675.9

Country	Project/Date Appraised	Cofinanciers	Total Project Cost	World Bank Share
II. URBAN DEVELOPMENT				
Djbouti	Urban Development (1985)	USAID (5.5m) CCCE (1.0m)	15.2	5.0
Ghana	Urban Development (1985)	WFP CIDA (0.6m) ODA	26.3	22.0
Mali	Urban II (1986)	FAC (0.7m)	34.5	28.0
Nigeria	Urban II (1986)	Suppliers Credits (11.6m)	164.3	72.0
	Subtotal	19.4	240.3	127.0

Country	Project/Date Appraised	Cofinanciers	Total Project Cost	World Bank Share
III. WATER SUPPLY AND SEWERAGE				
Liberia	Technical Asst. (1985)	AfDB (4.0m) FRG, GTZ (1.2m)	12.0	5.0
Senegal	Eleven Centers W.S.	CCCE (7.6m)	36.0	24.0
Benin	Water Supply II (1986)	CCCE (10.0m) IsDB (4.5m) OPEC Special Fund (2.7m)	33.0	10.0
Gambia	Water & Electricity (1987)	ADF (4.0) IsDB (4.0m) EDF/EEC (2.6m)	19.4	7.0
Lesotho	Highlands Water Engineering (1987)	South Africa (21.8m) EDF (10.2m) EIB (3.0m) ODA (1.5m) UNDP (o.9m) CIM (0.6m) USAID (0.4m)	51.3	9.8
Malawi	Lilongwe Water Supply II (1987)	EIB (6.5m) ODA (0.7m)	30.5	20.0
Rwanda	Water Supply II (1987)	CCCE (16.0m) ADF (12.5m) Switzerland (8.3m) Badea (7.3m) Austria (7.0) UNDP (0.7m)	72.2	15.0
	Subtotal	138.0	254.4	90.8
	TOTAL	682.7	2273.6	893.7
World Bank Loans & Credits as a a percentage of Total Costs		39%		
Cofinancing as a percentage of Total Costs		30%		

X → Gunther
LARS
WB
Route to DG, AW, AS, JDG,

OFFICE MEMORANDUM

Date: May 10, 1988

To: DISTRIBUTION

From: Tauno K. Skytta, AFTIN

Extens. 34546

Subject: Rural Water Supply and Sanitation Strategy Review
Advisory Group Meeting

1. Please find enclosed a copy of the notes from the Advisory Group meeting held on April 22, 1988. May I take this opportunity to thank you all for the enthusiastic and constructive discussion in the meeting. As you will recall we also agreed to arrange a review of the consultants' draft report, within the Group, during the first week of May. Please find attached a copy of the draft report (although somewhat delayed) for your review.

2. The consultants have now returned to their home base, and are in the process of drafting the two remaining parts (sections) of the report, namely the Executive Summary and the Introduction. In the meantime, I have advised them to radically reduce the length of the body of the report; now nearly 90 pages, should be reduced to 30 pages maximum. This could be achieved by e.g. putting the bulk of the case country and project information in annexes and presenting the same in summary form in the body of the report.

3. In my preliminary review of the draft, I have also noticed that certain restructuring of the report is likely to be required. Another question to be considered is whether we should prepare this report for

wider circulation or just regard it as a background report for Phase II of the study. I would appreciate your advice on these questions.

4. As the draft report became rather voluminous, I suggest that we allow a good week for review. I would also appreciate it if you could present your comments in writing or, alternatively, hand me your marked up copy (after the next meeting). This would help me greatly in conveying all the comments to the consultants.

5. The next meeting of the Advisory Group is now scheduled to take place at 10:30 am on Thursday May 19, 1988 in Room J7-018. In this meeting, we should concentrate on the most central points coming up on the basis of the review. Thanks for your assistance.

Distribution: Locussol, Verspyck (AF1IN), Kleiner, Almassy (AF2IN), Grimes, Tenaille (AF3IN), Patterson (AF4IN), vanBeuzekom, Reedy (AF5IN), Aikins-Afful (AF6IN), Ah-Sue, Andersen, Calegari, Hewitt (AFTIN), Woods (AFTPN), Zavala, Garn, Samuelson, Wright, Boydell, Grey (INUWS), Yletyinen, Vikman (Consultants/AFTIN).

cc (memo with notes): Doyen (AFTIN), AFINF Division Chiefs, Carnemark, Ariosoroff (INUWS), Feberdy (AFTAG), vanNimmen (EDIUT).

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RURAL WATER SUPPLY AND SANITATION STRATEGY REVIEW
ADVISORY GROUP (April 22, 1988) MEETING
NOTES

Present: Messrs/Mmes Tenaille, Grimes (AF3IN), Samuelsen, Boydell (INUWS), Yletyinen, Vikman (CONS), Locussol (AF1IN), Reedy (AF5IN), Kleiner (AF2IN), Patterson (AF4IN), Aikins-Afful (AF6IN), Hewitt, Calegari, Skytta, Andersen, Ah-Sue (AFTIN)

The following points were agreed upon:

(a) a final draft would be issued within about ten days;

(b) the objectives of the study should be empirical as opposed to theoretical; the initial effort must therefore be carefully researched and data gathering should be thorough; it should reflect a clear linkage between the research construct and project experiences; it should provide preliminary indications of where to find successes and failures (from which to derive lessons) on issues such as cost recovery, community development, etc;

(c) the exercise should go beyond gathering statistics on coverage but should more importantly address issues as how to take the quantum leap from a constant level of coverage to greater coverage. There ought to be policy decisions about who should be entrusted with a lead role for this development; Government has a role to play in the implementation of rural water supply and sanitation schemes; what needs to spelled out is the division of responsibilities between all the participants involved in this subsector; it was suggested that investment priority planning should be done at the central government level and not necessarily generated among communities. Communities, on the other hand, should participate in implementation and should operate and maintain systems themselves; they should also develop and manage mechanisms for financing recurrent costs;

(e) the paper should go beyond broad policy statements and indicate the practical implications for developing different strategies e.g. for community development, project design, etc.;

(f) development of rural water supplies and sanitation is clearly a rural development issue and would benefit from integrated sectoral discussions and approaches;

(g) in line with (f) above, the integrated approach is taking hold, and sanitation and health are important elements in this approach. The following example highlights the importance of health education for sustained change in hygiene patterns: a village in Zimbabwe has reached a point in its sanitation development where pit latrines are to be replaced -- villagers must decide whether to return to their former habits or to invest in new construction;

(h) the paper needs to clarify what is meant by (i) cost recovery especially differentiating between first time capital costs, replacement costs and recurrent costs; and (ii) demand/willingness-to-pay in the rural subsector in terms of definition, and implementation;

(i) cost recovery should be viewed in the context of affordability, in other words, the capacity to pay by villagers should be determined prior to recommending strategies; it has been determined, in many instances, that villagers are able and willing to pay for reliable systems; approaches should be pragmatic; "350 years of non-payment for government services cannot be undone in one year";

(j) in the context of affordability it should be determined when it is appropriate to introduce water and sanitation systems (that are viable and capable of being sustained) into the rural development process (i.e. as opposed to other sectoral interventions);

(k) the Bank, being (possibly) the last actor in the subsector, should adopt a collegial approach in its advice to donors and countries on rural water supply and sanitation.

(l) the next meeting was tentatively scheduled for May 6.

EHewitt:md
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