Reid, P.A. – Articles and Speeches (1961 – 1966)

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(Mr Reid left for Mexico 8/20/61)

Remarks by P. A. Reid on

"The Contribution of Foreign and Indigenous Capital to Economic Development" by A. K. Cairncross

I am very happy to be attending this International Conference of Agricultural Economists and feel it a very special privilege to be directing my remarks to a paper presented by A. K. Cairncross. I am delighted to have this early opportunity of congratulating Professor Cairncross on a most excellent review of the role of capital investment in economic development. The concise coverage and soundness of the views put forward over such a broad field is masterly, and my only wish is that the latter sections of the paper dealing with investment in agriculture had been further expanded.

My task would be easier if my congratulations were less sincere, because discussion in the absence of disagreement is more difficult. Since this is the case, I propose to devote my remarks towards elaboration of some aspects of foreign investment in agricultural development. In view of the role of the International Bank for Reconstruction and Development in this field and, as a staff member of that institution, it would seem appropriate for my remarks to be illustrated from experience of the Bank's operations in agricultural development.

First, let me make it clear that my experience endorses Cairncross's general views and conclusions. His paper makes several references to the World Bank's lendings for agriculture so let me set the order of their magnitude. As at the end of June last, 55 loans had been made

directly for agriculture to 27 different countries for a total of about 500 million dollars equivalent. In addition, loans for some 400 million dollars had been made for road and railway construction mainly to improve transportation for agriculture, and for agricultural processing and fertilizer plants.

The rate of agricultural lending has been increasing recently and the Bank's direct agricultural loans have approximated 200 million dollars over the last two years. However, a recent estimate by a Dutch economist, in a paper not yet published, is that the amount of public investment in Africa, Latin America and southwest Asia necessary to expand agricultural production at an annual rate of 2.3 per cent over the next 20 years would be an annual rate of foreign investment of over 2 billion dollars, together with indigenous investment of nearly 5 billion dollars. The Bank, even at the recent rate of agricultural lending, is making but a small contribution to the investment needs of agriculture.

The Bank's direct loans for agriculture represent less than 10 per cent of total loans made. This is not because of any lack of interest in agriculture or lack of recognition that "stagnation of the agricultural sector may act as a brake on the growth of the countries' entire economy." Let us, therefore, examine some of the reasons:

1. Bank loans must be for productive purposes and to finance the foreign exchange component of specific projects.
2. We must be satisfied that the projects are sound, that they will be executed effectively, and that they will result in benefits which will justify the investment and strengthen the countries' economy.

3. Thirdly, the Bank is obliged under its charter to pay due regard to the prospects that the borrowing country will be in a position to meet its obligation under the loan. Further, it is implicit in the concept of the Bank as a continuing institution, designed to operate on a sound business basis and with funds borrowed on world markets, that it should make loans on commercial terms and only where there are reasonable prospects of repayment.

This third requirement for Bank lending has been alleviated in the case of our affiliate, the International Development Association, which was established last year. IDA credits granted to date, which have included finance for agricultural development, have been made free of interest and repayable over 50 years. This should go a long way towards solving the transfer problems involved in loan repayment emphasized by Cairncross. However, while the field over which projects may be financed has been widened, it is not IDA's intention to finance unsound projects. We must still be equally satisfied that the technical aspects are sound, that the project will be executed effectively, and that the resulting benefits will be sufficient to justify the investment.

The resources available to the Bank, and at least for some time ahead available to IDA, have not set any limit to the scale of our lending for agriculture. The limiting factor has been the effective demand for investment in sound productive projects. Although there are other considerations, this, I believe, is basically due to institutional and administrative

problems which must be alleviated in most under-developed countries to widen opportunities for agricultural development. I fully support Cairncross's conclusion concerning the need for the investment of additional resources "in new forms of social organization, new habits and attitudes, personal experience, knowledge and skills, that is a precondition of continuing development."

The experience of the Bank illustrates how financing institutions can give some assistance in this regard. As part of our technical assistance work, we are frequently asked by member countries to organize a top-level mission to make a thorough review of the economy and work out a program of economic development. This, of course, includes the agricultural sector, and measures over the broad field of agrarian reform considered necessary for the sound expansion of agricultural production are recommended to the Government. These measures are discussed with the Government and usually agreement is reached. The mission also makes recommendations concerning fiscal and trade policies necessary to improve the balance of payments situation and the mobilization of domestic savings. In addition, the mission's report indicates sector priorities for investment and we are frequently able to assist further, either in the preparation of specific projects (often through the U. N. Special Fund) or in their financing.

I would like also to give you three or four examples of opportunities financing institutions have, through lending operations, for assistance beyond finance itself:

Livestock production in Uruguay has been relatively stagnant for many years although the physical potential is broadly equivalent to that before New Zealand and southern Australia thirty years ago. The introduction of pasture legumes, together with phosphatic fertilizers and improved grazing management, could more than double the productive capacity of Uruguayan pastures. The limiting factor to development of this potential has been the lack of "know-how" and foreign exchange for the investments necessary.

By working with the Government and FAO over a number of years, sufficient research was undertaken for reasonably firm conclusions to be made concerning the techniques of pasture improvement which would be successful and the economics of farm development. Assistance was concurrently given in working out the details of a specific project with the Government. This provided for the establishment of a Commission with adequate powers, which would not only finance the livestock development program but also provide the technical staff necessary to work out detailed farm development plans with each of some 600 farmers and supervise the execution of these plans. The technical staff is headed by a foreigner but the remainder are local agronomists, mainly on loan from the Department of Agriculture. The project has, therefore, provided foreign "know-how", an administrative setting for the effective use of technical services and the credit necessary to execute the development program.

Another example of Cairncross's institutional barriers which frustrate investment was met in recent irrigation loan to a mid-eastern country. Existing legislation and custom precluded the proper operation of major irrigation schemes and the farming system was feudal. A few families owned all the land which was farmed by share-cropping tenants who were moved to another plot each year so that they would not acquire any root rights. The success of the project would depend on improved techniques of farming, including soil building rotations and the growing of two instead of one crop each year. We were not satisfied that this could be done under the present system and refused to finance a major project to cover 120,000 hectares. We did, however, continue to work with the Government and later financed a pilot scheme covering 20,000 hectares. Meanwhile, the Government has introduced progressive legislation which will enable the Irrigation Authority to operate the project properly and substantially to control land use and improve the situation of the farmers. Fully adequate local research and extension and credit services are also built into the pilot project and the chances of its success are now favorable. If so, this should have a much wider impact on the country's irrigation development and it has been pleasing to find that the same approach is already being applied to other irrigation projects.

Cairncross has also referred to the possibility of feeding in agricultural credit through some financial intermediary enjoying government support to private farmers for investment capital. Some of the problems of this approach were encountered in a recent loan to an agricultural bank in a small South American country. This was the only institution providing investment credit to farmers, which was badly needed. The bank, which

had been established a few years previously, had been badly managed and had a record of frozen resources and loss of capital in delinquent loans. We worked with the Government over two years while the bank and its operating procedures and management were re-organized. We are now confident that the channeling of our loan, and the local currency resources of this bank, for development loans to farmers will be soundly administered. In this way, instead of capital attrition, the resources available for re-lending for agriculture should continue to expand.

Our experience supports Cairncross's view that investment in transport to provide a stimulus to agricultural development is a relatively easy way of absorbing foreign capital but, of course, more than finance is involved. A recent loan in Central America is for the construction of roads to give access to agricultural areas as yet mainly unoccupied. We reviewed with the Government the supporting measures necessary for the proper settlement and development of these lands. The first requirement is the enactment of a more progressive Agrarian Code and we have given technical advice and comment on the draft legislation now before Parliament. When it is passed, we expect to give more positive technical assistance in the planning and execution of the settlement program. Apart from direct settlement aspects, this will include, in Cairncross's words, "agriculture extension services, improvements in marketing and better credit services." We hope to be working closely with our friends of the Inter-American Bank in this latter regard.

Let me make two general comments about the Bank's influence, through its projects, on the institutional problems of agricultural development:

i) Although restricted in breadth, our efforts are more often than not effective. We find that the local technicians concerned with a project usually know just what should be done. If the project is in trouble, it is because they have been unable to persuade their superiors, or their Treasury, to take corrective measures. We are frequently in a position to have red-tape cut and bottlenecks opened up.

ii) This type of work is so painstaking and time consuming that our direct impact on the general problems of agrarian reform is necessarily small indeed.

I would like to end my remarks with two personal suggestions which support Professor Cairncross's conclusion that more attention must be given to lowering the institutional barriers that too often frustrate capital investment in agricultural development.

The first suggestion is that technical assistance missions stationed in under-developed countries should more clearly define their long-term objective as the strengthening of the country's local technical resources for the administration of agriculture, of agricultural land, and of agricultural credit and marketing facilities.

I have seen cases where the fault is with the country itself - the agriculture department officials are not willing to accept the foreign specialists who work more or less in isolation on particular programs. More often, however, the problem is that the foreign assistance is channeled in co-operation with the Government through a "Servicio" or Agricultural Institute outside the Department of Agriculture. This enables many of the frustrations of the public service to be sidestepped and is an effective means of providing technical services over the short term.

Frequently, however, little contact is maintained with the Department and "empire building" sets in, and the Servicios are maintained indefinitely with little or no strengthening of local administration and servicing of agriculture. In the case of our livestock project in Uruguay, we certainly hope that the technical services of the Commission will eventually be taken over by the Department of Agriculture.

A further need is to make sure that local technicians work within foreign groups or consultant firms engaged in the study and preparation of specific projects.

Apart from technical training and personnel, budgetary problems and too small appropriations for agriculture are usually the limiting factor to strengthening of agricultural administration. The aiding countries find it perfectly proper to provide free technical assistance, but are often reluctant to finance annual expenditures required for the strengthening of

local technical services. While it would be difficult for financing institutions like our own, which are restricted under their charters to direct productive investments, I suggest that a great deal of foreign investment in agriculture could be more beneficially channeled in production-promoting expenditures in agricultural administration and services which are conventionally classified as "current" rather than "capital."

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APPRAISAL OF IRRIGATION PROJECTS IN UNDERDEVELOPED COUNTRIES

by P. A. Reid*

INTRODUCTION

A London fishmonger once observed to his customer, the publisher of the Times, "My business is wrapped up in your business". I shall not hazard any other similarities in this exchange beyond the fact that in the appraisal of irrigation projects my business is closely bound to the business of many of you. As an agriculturist of the World Bank, my business is largely concerned with the appraisal of agricultural projects with a view to their financing. I welcome this opportunity of discussing the appraisal of irrigation projects with you who are so concerned with their feasibility study and execution.

The World Bank and its affiliate, the International Development Association, make loans only for projects which are technically and economically sound; that is, for projects which, in their judgment, can be effectively executed and operated and will result in benefits which will justify the investment and strengthen the economy of the particular country.

During the last two years we have reviewed well over 50 irrigation projects and selected 26 of them for field appraisal. Of those appraised, 14 have been, or are to be, recommended for approval. Consideration of seven projects has been deferred until we receive further feasibility data and are able to complete our appraisal. The remaining five projects have been rejected.

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* Chief, Agriculture Division, International Bank for Reconstruction and Development, Washington, D.C. May 7, 1962.

We require a feasibility report before undertaking field appraisal. Some of the feasibility studies are undertaken by the local irrigation authorities and the remainder by consulting firms.

As an agriculturalist I have no intention of discussing, except in a general way, the adequacy of the engineering aspects of these reports. I can say, however, that there has been no case where we have been satisfied with their coverage of the agricultural, economic and administrative aspects. In point of fact, the treatment of these aspects in the majority of cases has been seriously inadequate.

The question naturally arises as to why the non-engineering aspects are so poorly covered. It occurs to me that one of the sage remarks of Sir Oliver Lodge provides a bit of a clue, "The last thing in the world that a deepsea fish could be expected to discover is salt water". Almost invariably, engineers have primary responsibility for the feasibility studies. It may be that they have often been so closely concerned with the works of the project that they have concentrated on these to the exclusion of other factors. In other words, their attention has been focussed on the means of achieving the purpose of the project instead of on the purpose itself. There seems to have been a tendency in the preparation of feasibility studies to overlook that an irrigation project is the irrigation and productive use of the land, rather than the construction of a dam and of a distribution and drainage system.

This means, of course, that engineers, agriculturalists and agricultural economists should all be associated in the feasibility study. Even when all of these skills are available and utilized, there still remains the problem of coordination of the various evaluations. An agriculturalist,

just as an economist or an engineer, tends to look at a project too much from his own viewpoint. For feasibility studies, just as for appraisal, it is necessary for these viewpoints to be coordinated so that the project can be assessed as an entity.

There is a further reason for the inadequate coverage of non-engineering aspects of feasibility reports. This is undoubtedly the difficulty of obtaining adequate agricultural and related data under the conditions of the underdeveloped countries with which we are concerned. Seldom are there reliable statistics from which to assess the present agricultural situation and production of the project area or the production of similar areas already developed under irrigation. It is unusual for there to be adequate data regarding soils, agronomy, water duties, and so on, and it is most exceptional to find any worthwhile information concerning the economics of farm production. Finally, and perhaps most important, there are frequently serious human and institutional problems which are most difficult to evaluate, but which must be solved or alleviated if reasonable standards of agricultural production are to be attained.

Apart from institutional problems and paucity of data, economic conditions in these countries are also vastly different. For example, there is frequently a serious imbalance in resource use. Under-used resources usually include unskilled labor and, often, land and water; but know-how, managerial experience and capital are usually scarce resources.

Our appraisals have always been preceded by an economic survey to establish the scope and needs for developmental expenditures and their priority between sectors of the economy. Before appraisal, the Bank will already have satisfied itself that investment in the agricultural sector is warranted and

that irrigation investment warrants priority within the agricultural sector.

The economic conditions of the country must be taken into account in the assessment of inputs and benefits during appraisal.

The objectives of the remaining portion of this paper are twofold. The first, which is frankly selfish, arises from the hope that it will have some influence on the coverage and quality of feasibility reports on projects we may be appraising in future. To this end, the paper indicates the extent and type of data which from our experience can reasonably be expected from a properly undertaken feasibility study in an underdeveloped country. They represent the minimum data from which reasonably sound judgments can be made.

The second objective is to outline how we have found it necessary from experience to adapt the principles of project appraisal to the conditions of underdeveloped countries. I hope that this will prove of some value to the authorities and consulting firms concerned with feasibility studies in these countries.

I realize that much of what follows will be already well-known to many of you. I hope, however, that you will find that the step-by-step approach enables the merits of a project to be judged in relation to its purpose - the productive use of the land under irrigation.

Although no two irrigation projects are completely similar, the study and appraisal of all projects can be considered under four broad headings:

1. Technical soundness;
2. Organization and management;
3. Financial aspects; and
4. Assessment of benefits and economic justification.

TECHNICAL SOUNDNESS

Water, Land and Climate. The key to the performance of an irrigation project is the compatibility of water, land and people. The world has many abandoned irrigation projects, due primarily to inadequate consideration of the combined use of these resources.

Of physical resources, water is the first consideration. In appraisal of hydrology, we need, of course, to be satisfied concerning the quantity, quality and reliability of the water supply. We expect these aspects to have been thoroughly examined during project preparation and during our appraisal we require access to the basic data from which judgments have been made. We are often concerned with projects where hydrological records or rainfall records for the watershed area are quite inadequate for accurate estimates. In these cases, we must review the evidence for the assumptions made and be satisfied that water availabilities have been conservatively estimated and that the chances of shortages in dry years have been clearly indicated. If hold-over irrigation storage is involved or if the project includes power production, we must have appropriate reservoir operational studies. We need reliable estimates of conveyance losses to arrive at diversion availabilities at the farm field. We find that a breakdown of availabilities by months throughout the growing season is usually sufficient for our purposes.

In assessment of land resources, we must be satisfied that the project lands are capable of sustained production during the life of the project with at least an adequate return to the farmer. Such an assurance should be based on adequate soil, topographic, drainage and agronomic data.

If sufficient data are not available, soil surveys, and/or land classification surveys are normally required before project appraisals may proceed. Ordinarily, we require a soil survey or land classification made to semi-detailed standards or feasibility grade for appraisal purposes. We much prefer land classification type surveys - assuming the specifications of such a survey are properly prepared beforehand. If we are in a position to recommend the type of survey to be employed for the feasibility report, we suggest a land classification survey similar to that developed and successfully used by the U. S. Bureau of Reclamation.

In circumstances where the soils are particularly uniform and clearly suitable for irrigation, we feel that these requirements for soil data can be relaxed. As an example, during a recent appraisal, available soils data were limited to information from a very rough reconnaissance soil survey. However, the area had a history of 80 years irrigation farming, and after a review of soils, topographic and drainage conditions in the field, it was concluded by the appraisal mission that additional soil or land classification surveys would be unwarranted.

Drainage information is extremely important in any type of agricultural undertaking but, of course, it is normally much more critical under irrigated conditions, and we need to have information concerning both surface and sub-surface conditions.

We also need sufficient climatic data to establish the amount, distribution and reliability of rainfall in the project area and the likelihood of occurrence of frost or other climatic hazards which could be critical to the cropping system proposed.

Engineering. As I have previously indicated, my remarks concerning engineering must be cursory.

We first want to be satisfied that the proposed designs for the civil works are technically sound and would accomplish the intended purpose with reasonable operation and maintenance costs. This means that preliminary designs have been carried out in sufficient detail for their proper appraisal. We also need to know that adequate geological and topographical survey work has been undertaken. The safety of major structures is naturally of particular concern and if our engineers have doubts concerning such aspects as foundation conditions or design of dam or spillway we ask or arrange for an independent review.

We naturally look closely at designs of the main canal and distribution system, including provisions for lining where necessary and capacities for water delivery. We also examine measures for the application of water at the farm field to be satisfied that proposed water management techniques will be in accord with the skills of the operating personnel and the farmers.

We look even closer at proposals for drainage which often require special study and investigation. For example, many years ago we financed the dam and power sectors only of a multi-purpose project. The feasibility study included a report by an eminent soil chemist which was fully adequate over his special field of competence but did not deal with the suitability of the land for irrigation, including water tables and drainage requirements. Fortunately, the power and flood protection benefits proved to be sufficient to justify the full investment in the dam because just about the time that the dam and power works were completed the authorities first recognized that serious drainage problems would have to be solved before the commanded area could be developed for irrigation. Detailed studies of soils and water tables were commenced and, over four years, detailed plans for irrigation and drainage have been prepared. We have since been asked to consider a project for the development of irrigation

over a portion of the area.

Cost estimates are of course of fundamental importance. As a financing institution, we want to be quite sure that sufficient funds, including local currency to be provided by the Borrower, are available to bring the project into production. We also want to be sure that an over-run of costs will not reduce the economic justification for the project to sub-marginal level.

Our experience has been that costs are more often than not underestimated. When I recently asked a colleague, General R. A. Wheeler, for his opinion on some cost estimates, he told me the following story which I trust is not too widely known to this audience:

" Some 25 years ago the Mississippi Canalization project was completed right on the estimate of $150 million. This so excited the professional interest of engineers throughout the Valley that a dinner was organized in honor of the Divisional Engineer who had been responsible for preparing the report to Congress. When asked to explain how he had estimated the costs so accurately he replied: 'As you know, my Division has three Districts, each of which is headed by an experienced District Engineer with a large staff of engineers and estimators. The costs of the parts of the Canalization Project located in these three districts were estimated separately by each District Engineer and his staff and submitted to the Division Engineer. After careful check of these estimates in my office, they were returned to the Districts to recompute considering higher overhead and contingencies and increased prices for cement, steel and other materials. These new estimates were then returned again by the Division for revision, directing the District

Engineers to consider different types of gates and valves. These revisions resulted in further increases. Finally, when the three District estimates were totalled in the Division Office, the cost of the project amounted to about $72 million. As you know, all engineers round out their estimates, so the total cost was rounded out to $75 million. Then, all I did was to multiply by two.' "

We make generous provision for contingencies but not quite to that extent, and where we feel it necessary, we arrange for an independent review of the estimates to be undertaken.

On-Farm Works. We are also concerned with the works within farm boundaries, such as land levelling and farm ditches and farm drains, necessary to bring the land into production. In cases where these works are to be undertaken by the authorities, they must be planned in detail and should automatically be included in the cost estimates. If they are to be constructed by the farmers themselves, they must still be investigated in sufficient detail. (It is necessary to establish their estimated costs for the calculation of economic benefit, even when they can be omitted from cost estimates for the purpose of financing.)

Agriculture. The objective of appraisal can be stated quite simply as a comparison of the agricultural situation and production of the project area before and after development. The investigations necessary to reach this objective are far from simple.

We find that in most cases the project area is already under some

sort of cultivation so that a considerable array of data[1/] are necessary to assess the existing situation. Relatively seldom is much of this information available from published statistics. A search of the records of various authorities, including any marketing authorities, may help considerably. Only exceptionally have adequate land use surveys been undertaken prior to feasibility study. In most cases, these data must be obtained during feasibility study and this requires a land use and production survey. Air photographs and various sampling techniques can greatly reduce the work involved, but for peasant agriculture where no farm records are kept the empirical investigations within sample areas must extend over the full cropping season.

The future agriculture situation and production is even more difficult to assess. However, so long as the project area is already farmed and the proposed irrigation will intensify production without new settlement or major disturbance of farm distribution, reasonably reliable data on the existing situation set a relatively firm base for projections into the future.

More difficult problems are involved if there is to be new settlement and we are very much concerned with proposed arrangements which are obviously an important consideration in assessing future agricultural production.

1/ These include a) land tenure status, including any existing water rights; b) farm size (farm ownership and operating pattern); c) characteristics and number of the population of the project area, including number of farm operators and hired farm laborers; d) prevailing farming practices; e) existing technical and credit services for farmers; f) land use, including rotation systems and cropping pattern; area in current year under various crops and pasture, or not used; if already some irrigation, area irrigated and water usage; g) average crop yields and volume of agricultural production (including livestock production); h) volume of production marketed; i) description and adequacy of farm to market roads and of marketing and processing facilities; j) current prices at farm level for products; k) costs (or at least approx. cash costs, including cost of seed) of farm production.

The proposed future cropping pattern, which is, of course, of basic concern, is critically examined from the viewpoints of agronomy, water duties and availabilities, markets for products and suitability in relation to the skills of the farmers.

Having determined that the soils and climate are suitable for the crops (or types of livestock production) proposed, we next consider the proposed rotation system and its likely influence on future soil fertility levels.

The water duties for the proposed cropping pattern are next assessed and adequate data concerning soils and climate are, of course, necessary for this purpose. After adjustment for natural rainfall, we prefer to assess irrigation requirements, usually by months throughout the year, at the point of delivery to the farm field. These requirements are then reconciled with estimated availabilities by months.

The prospective market for products is often one of the most critical aspects of appraisal. This is because the return per acre varies so greatly according to the intensity of the cropping pattern. For example, the range in gross returns per acre from the lowest return crops and the highest return crops averaged one to seven for the last 13 projects which we have appraised. For one of these projects the range was one to sixteen. The range in capital costs per acre for various projects tends to vary less widely, so that the intensity of the proposed cropping pattern has a major influence on the economic justification of any project. It is far more often the availability of markets rather than agronomic factors that sets the limits of intensification of the cropping pattern.

An adequate analysis of market prospects for all major products to be grown is, therefore, essential. This must justify the forward price projections to be assumed for the various products and also specify in detail any additional marketing or processing facilities necessary for the attainment of these prices.

Our final check is to decide whether it could reasonably be expected that the farmers with their previous experience and technical skills would adopt the proposed cropping pattern. The technical services to be made available to the farmers is a major consideration in this regard.

Of next concern are the measures that farmers would have to undertake to bring their land into production. The estimated capital costs of on-farm development have already been considered, but costs of any necessary purchases of farm equipment, livestock and additional working capital and so on, must also be estimated. In addition we want to know that the farmers have the financial resources for these purposes or that adequate credit on appropriate terms will be made available.

In assessing estimates of future crop yields and livestock production, no agriculturalist can possibly be expert on all crops in all countries. Some reliance must, therefore, be placed on the views of local technicians familiar with these crops under the conditions of the region. We examine closely the technical evidence from which the estimates have been made and first reach a judgment as to the future yields that <u>should</u> be obtained. We then adjust this estimate to the level of yields which we judge <u>will</u> be obtained, taking into account most of the factors discussed above. The time lag in attaining this level of production must also be assessed.

I have deliberately dealt at some length with the problems involved in the assessment of agricultural production. Some of the component factors can and must be objectively and positively assessed. These include soils, water balance, agronomy and market opportunities for major products. The remaining factors, including the attitudes and skills of the farmers, the institutional setting of agriculture, its supporting services and forward price estimates, are much less tangible. Yet all of these factors must be taken into account in assessing future agricultural production. The point I want to emphasize is that the complexity and nature of the judgments involved in both feasibility study and appraisal call for a high degree of professional competence and experience.

A further point is that as bankers our judgements must be conservative. Hence if a project has been poorly prepared and feasibility data are unreliable, we must discount estimates of agricultural benefits more than may have been necessary if the project had been properly prepared.

ORGANIZATION AND MANAGEMENT

The Bank pays particularly close attention to the proposed organization and management for execution of the project works and for subsequent operation of the project. However, in view of the professional background of this audience, it would be unnecessary for me to deal other than briefly, with most of these aspects.

We find that in most territories there is a Government authority, such as an Irrigation Department, responsible for the planning, execution and operation of irrigation projects. Our main criterion in assessing the capacity of such organizations is their experience and past performance in undertaking these responsibilities. If the nature of the proposed works clearly falls within the demonstrated competence of the body concerned, we do not necessarily require that consulting engineers be employed for final design and supervision of construction. Where, however, past experience is lacking, perhaps only on critical aspects of the proposed works, we do require that the necessary experience is available. In most cases this means that consulting engineers are employed. If necessary, we also require that the consultant's responsibility be extended to operation and maintenance for an initial period until the organization has gained the experience to enable it to carry on without outside assistance.

We have financed several projects where there was no such established authority and it has been necessary to set up District or Regional bodies for execution and operation. In one case still under consideration, there has been no previous public irrigation project in the country and over several years we have been assisting in the development of an appropriate legal charter, organization and staffing for a District Authority. This authority must necessarily rely heavily on consultant assistance during its initial years.

We must be satisfied that the irrigation authority has the necessary powers to enter into contracts, acquire rights of way and in general to undertake construction and operation, including powers to levy water charges. If not, we usually wait until satisfactory legislation has been enacted or, at best, make the passage of such legislation a prior condition for disbursement against the loan account.

A further important requirement is that goods and services required for the project are purchased to the best advantage. This normally means that arrangements should provide for effective competition between potential suppliers or contractors. Although there are exceptions according to the conditions of the country and the nature of the works, we prefer that major works are undertaken by contract, let under international competitive bidding. We require that imported equipment and materials financed under the loan are purchased under international competitive bidding.

With respect to organization, we are not only concerned with the agency immediately responsible for the project, but also with the various auxiliary services essential for the proposed agricultural development. Agricultural research, farm extension services, farm credit and marketing services are usually the responsibilities of separate Government departments, which are not directly related to the organization of the project. Hence, it is more difficult to make specific arrangements for their provision and frequently we must rely on general undertakings from the Government. In some cases, where the Government administration of these services is clearly inadequate, we do arrange for special services to be provided directly under the project. In one case, where a new regional operating authority is being assisted by foreign consultants during an initial period, the project estimates provide for the establishment of research, extension and credit

services, and for the training of staff for these purposes. I might add, that even before the project works have been completed, these services have substantially improved agricultural practices within the project area.

We also must be satisfied that the farmers themselves welcome the project and are prepared to participate willingly. One test, of course, is whether the expected farm benefits will be sufficient to cover water charges, land betterment levies and any other farmer-borne costs of project operation, repay the farmer's own investment for development of his land and leave him with sufficient reward for his additional effort. In some countries, where we have financed projects, irrigation laws include a provision, common in more developed countries, that a majority of farmers within the area should vote in favor of the project before construction can be authorized. We await the outcome of this vote before concluding the loan. In other cases, where landowners have been faced with a substantial private investment for on-farm development, we have required, before the public works commence, that they agree formally with the operating authorities to undertake these private works. In one case, there was a landlord tenant system of farming on a crop sharing basis and we were not satisfied that the tenants would have sufficient incentive for additional efforts required. We were therefore pleased when the Government agreed to incorporate some measure of agrarian reform for the project area in the legal charter of the operating authority. The landowners have willingly accepted this provision and we expect that the tenants will find sufficient reward for their efforts.

In addition, we have found from experience that special attention must be paid to legislative and administrative arrangements for new settlement, if that is involved in the project. A critical review must first be made of legislation relating to the allocation of land, including proposed conditions

of land tenure. The appropriateness of the proposed size of holding for the conditions of farming must be decided. The characteristics and experience of the new settlers must also be considered; for example, nomadic herdsmen cannot generally be expected to make good cultivators. There should be some system of selection according to experience and suitability for irrigation farming. We want to be sure that after the settlers have been allocated holdings, it will be within their capacity to develop them fully. This may be possible with their own labor. If not, they must command the financial resources required which may be either from their own funds, or from adequate credit facilities. Finally, we want to know that they will be given sufficient technical guidance to bring their farms to full production.

The considerations outlined briefly above, cover the essential administrative requirements for any land settlement proposal. We made one mistake some years ago in not ensuring that administrative requirements were understood and established at the time of making the loan and are still struggling to correct delays and deficiencies in the progress of settlement. We hope not to make the same mistake again.

FINANCIAL ASPECTS

As a financing institution we naturally want to be sure that sufficient funds will be available for completion of the works and for their operation. Interruption of construction because of shortage of funds results in economic losses which underdeveloped countries can ill afford.

Cost estimates must be realistically assessed and include ample contingencies to take care of risks of inflation, escalation and unforeseen engineering difficulties. Our next step is to ensure, before the loan is signed

that firm arrangements have been made for the provision of all the funds, in addition to the proceeds of the proposed loan, necessary to complete the project. In case there should prove to be an over-run in costs, we also require an undertaking from the Government that any funds necessary to complete the project will be provided promptly as required.

The availability of funds for project operation and the operating accounts of the Authority are also examined during appraisal. Estimates of costs of operation and maintenance seldom give much difficulty but we find many problems relating to proposed water charges and other farmer payments towards the cost of the project. The Bank's general policy with regard to revenue producing projects is that the organizations responsible for such projects should earn revenues sufficient to meet all their operating costs (including depreciation), and earn an adequate return on the funds invested. We recognize, however, that because of government policies towards agriculture, many irrigation projects are not set up on a revenue producing basis, and our approach is more flexible than in the case of power or industrial projects.

We consider, as a matter of principle, that the farmers should contribute reasonably towards the cost of providing the benefits they receive. If the project is good, the benefits should be such that an adequate water charge is within the payment capacity of the beneficiaries. However, we recognize that in many cases such charges cannot be levied for economic or social and political reasons. One reason is that peasants may be so unaccustomed to cash expenses that a substantial water charge may frighten them away from using project water; e.g. no increase in production, and no economic benefits. Concessional rates during the first years of operation can be some solution to this problem. The social and political reasons may be related to the poverty

of the peasants but more frequently relate to government policies of subsidization of agriculture and to the resistance to change of the agricultural sector, where there may be long established traditions and rights to land and water.

Nevertheless, we always press for water charges to be set as high as practicable in the circumstances.

For about one quarter of the projects we have financed, water charges have been set at levels sufficient to make the project self-liquidating. In other cases, the level of charges has been sufficient to cover costs of operation and maintenance and depreciation while, in others, a charge sufficient to cover direct costs of operation and maintenance has been all that was practicable. In exceptional cases, there has been no direct water charge but there have been other revenues to the government resulting from the project, which would much more than cover annual project costs.

There was one interesting case, when the government undertook during negotiations that legislation for the operating authority would include provision for an appropriate water charge. There was, however, some existing irrigation in the area and the Parliament simply refused to countenance any charge for water up to the existing rights. This was overcome by legislation which established that there would be no charge for water up to existing use but that there would be a charge for "other expenses" (defined elsewhere as Operation and Maintenance), and a surcharge for additional water used which covered depreciation and a return on the investment.

ASSESSMENT OF BENEFITS AND ECONOMIC JUSTIFICATION

In underdeveloped countries the data which can reasonably be expected to be available are seldom adequate enough or reliable enough to warrant involved economic treatment. In most cases it would be unrealistic to apply more than rather crude tests. We have found measurements of various benefit/investment relationships to be more practicable than the standard annual cost/benefit ratio. We seldom attempt to quantify indirect benefits. If appropriate however, we estimate the influence of the project on the country's balance of trade, employment situation, and so on.

Costs. In regard to public investments, we already have an estimate of the expenditures to be made during the construction period by the executing agency. This estimate may require adjustment for economic evaluation. For instance, the project cost estimates made from the viewpoint of financing may include the full cost of equipment which would have salvage value on completion of construction. Conversely, the project estimates may not include supplementary public investments necessary for full development such as improved farm to market roads to carry the increase in production. We usually include such costs for economic evaluation but not the costs of social overheads in education and so on. Again, interest during construction may have been calculated on the basis of a rate charged by a central government to the executing agency, and this rate may not reflect the true cost of capital. In cases where there is a clear difference between the official rate and the "free market" rate, the latter may have to be used. With respect to labor cost, a correction in the opposite direction might be appropriate in certain cases (e.g. in countries where official wages may be higher than the economic cost of labor), but for

practical reasons we do not apply any such correction to labor costs in estimates of public investments.

Next, private investments. These include costs of any on-farm works by the farmers themselves. In most cases, investments in the form of farm family labor are omitted and only cash expenditures are included in the evaluation (in view of the large degree of under-employment in underdeveloped areas, the economic cost of labor is often close to zero). The sum of these private and public costs is taken as the investment in the project. Any investment in farm machinery, etc. is treated on an annual basis under costs of production.

We usually obtain reasonably reliable estimates of costs of project operation and maintenance, but estimates of costs of farm production are particularly difficult. Farm budget studies to obtain these data are essential if the type of agriculture is on a cash rather than subsistence basis. In some cases, these studies can be undertaken in similar areas already developed under irrigation. In other cases, data obtained during the land use and production survey can serve as the base for estimates of increases in farm costs when the land comes under irrigation.

More usually, however, we are concerned with a peasant type of agriculture developing from subsistence towards commercial production. If the existing agricultural production takes care of the subsistence needs of the farm families we do not treat products consumed on the farm as a cost against the increase in production from the project. Here again, we concentrate on increases in cash costs, including seed, fertilizers and other farm requisites. Depreciation and interest on farm equipment, etc. is included if appropriate, which is rarely the case with peasant agriculture. The cost of hired labor is

usually included (although it may be omitted for calculations of benefits to the economy as a whole where there are no alternative opportunities for employment). The cost of farm family labor is not included (except in those few cases where there are clearly alternative labor opportunities for the farm family). Any interest paid by the farmer on investment in on-farm development is also excluded because an estimate of his full capital costs for developing his land has been included in the project cost estimates.

Farm Benefits. The project is treated as a whole in estimation of agricultural benefits which we call "farm benefits" because they are calculated at farm prices for products. The future annual gross value of agricultural production is calculated from the expected cropping pattern, estimated crop yields and estimates of future prices at the farm for these products. The estimated annual gross value of production from the project area without the project is then deducted to give the estimated gross farm benefit from the project.

The gross farm benefit less estimated annual costs of production gives the estimated net farm benefit. (Costs of production are the increase in farm costs of production above pre-project costs, plus direct costs of operation and maintenance of the project works.)

A side check should next be made of the ability of farmers to meet their cash obligations and retain sufficient reward to encourage their participation. Data are seldom sufficient for pro-forma farm budgets representative of major size groups and types of farming and usually only very simple checks can be made. Actual water and other charges and any interest he must pay should of course be included as cash obligations since these are tests of the farmer's viability.

Benefit/Investment Relationships. The first measure we employ is the gross farm benefit/investment ratio expressed as a percentage. This, of course, takes no account of costs of production. Given consistency of method, however, it does provide a crude yardstick useful for comparative purposes, particularly if conditions of agricultural production are similar. Since this measure is only of value for comparative purposes you may find the estimated ratios for the last 11 projects we have appraised to be of interest. These have been:

Percent		
103	74	40
96	50	40
85	44	40
80	42	

The net farm benefit for the project as a whole is then set against the total investment to give the net farm benefit/investment ratio which is again expressed as a percentage. The benefits accrue over the lifetime of the project but there is usually a development period after completion of the project works before the full benefits are obtained. They must therefore be discounted to a common point of time for comparison of benefits with investment. The range in net farm benefit/investment ratios for the projects cited above has been from 9% to 45%.

In some cases, we find it necessary to adjust net benefits at farm level to represent more closely benefits to the economy. For example, if major products are for export and the farmer price is subject to major government intervention, we may have to recalculate on the basis of export parity.

CONCLUSIONS

Appraisal of an irrigation project must include the appraisal of the future performance of water, land and people. Insufficient attention is given to agricultural, economic and institutional aspects in most feasibility reports on irrigation projects. Agricultural and economic data available at the time of appraisal are seldom adequate although it is practicable during a properly conducted feasibility study to obtain the data required.

Even the most reliable data that can reasonably be expected do not warrant involved techniques of economic treatment. Quantitative assessment of direct economic benefits must, however, be made. We find that the most realistic approach is to measure various benefit/investment relationships.

Bearing in mind Samuel Butler's observation "that the art of living is in forming adequate conclusions from inadequate evidence", both the feasibility study and the appraisal of irrigation projects in underdeveloped countries call for experienced judgment. This judgment must be based on a high degree of professional competence not only in engineering but also in agriculture and agricultural economics.

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE

COMMISSION INTERNATIONALE DES IRRIGATIONS ET DU DRAINAGE

FIFTH CONGRESS R. 17

CINQUIEME CONGRES QUESTION 15

APPRAISAL OF IRRIGATION PROJECTS IN UNDERDEVELOPED COUNTRIES*

P. A. REID†

ABSTRACT

In a discussion based on experience gained in the appraisal of irrigation projects with a view to their financing by the World Bank, the author points out that while the treatment of engineering aspects in feasibility studies of projects is in general satisfactory, the treatment of the agricultural, economic and administrative aspects is seldom adequate. The paper outlines an approach to appraisal of irrigation projects in underdeveloped countries and sets out the nature and scope of data which can reasonably be expected from properly prepared feasibility studies. Emphasis is directed to the need for strengthening and integrating professional agricultural, economic, and engineering judgments.

The key to the performance of an irrigation project is seen as the measure of the compatibility of the water, land and people. Assessment of all projects during both feasibility study and appraisal must cover technical soundness; organization and management; financial aspects; and benefits and economic justification.

Of the physical resources, the study of land is usually the least satisfactory, and land classification survey to semi-detailed standard is usually required for appraisal. In assessment of engineering aspects, particular attention is given to adequacy and safety of major structures, to drainage and to cost estimates. The appraisal of agricultural aspects involves detailed comparison of the agricultural situation and production of the project area before and after development. In addition to the proposed organization for

* Estimation des projets d'irrigation dans les pays sous-développés.

† Chief, Agriculture Division, International Bank for Reconstruction and Development, Washington, D.C.

execution and operation of the works, attention must be given to measures for supporting services to farmers and for any land settlement. Financial aspects include not only the adequacy of the financing plan for the works but also proposed arrangements for payment for the costs of the project by beneficiaries. Even the most reliable data that can reasonably be expected do not warrant involved techniques of economic treatment. A realistic approach is to measure various benefit/investment ratios.

Both feasibility study and appraisal call for experienced judgment which must be based on a high degree of professional competence in agriculture and agricultural economics as well as in engineering.

SOMMAIRE

Dans une discussion basée sur l'expérience acquise dans l'estimation des projets d'irrigation en vue de leur financement par la Banque Mondiale, l'auteur fait ressortir qu'alors que le traitement des aspects techniques dans les études de praticabilité des projets est en général satisfaisant, le traitement des aspects agricoles, économiques et administratifs est rarement adéquate. Le rapport expose une approche de l'estimation des projets d'irrigation dans les pays sous-developpés et présente la nature et l'étendue des données qui peuvent être raisonnablement attendues des études de praticabilité convenablement préparées. Il est insisté sur le besoin de renforcer et intégrer les jugements professionnels agricoles, économiques et techniques.

La clef du rendement d'un projet d'irrigation est vu comme la mesure de la compatibilité entre l'eau, la terre et le peuple. L'évaluation de tous les projets, à la fois durant l'étude de praticabilité et durant l'estimation, doit couvrir : le bon état technique, l'organisation et la direction, les aspects financiers, et les bénéfices et la justification économique.

Des ressources physiques, l'étude du terrain est généralement la moins satisfaisante, et une enquête de classification du terrain dans un standard semi-détaillé est généralement requise pour l'estimation. Dans l'évaluation des aspects techniques, une attention particulière est donnée à l'efficacité et la sûreté des principales structures, au drainage et au montant des devis. L'estimation des aspects agricoles comprend une comparaison détaillée de la situation agricole et de la production de la région du projet, avant et après le développement. En addition à l'organisation proposée pour l'exécution et l'exploitation des ouvrages, l'attention doit être donnée aux mesures pour établir les Services accessoires pour les fermiers et pour tout établissement agraire. Les aspects financiers comprennent non seulement l'efficacité du plan financier pour les ouvrages, mais aussi les arrangements proposés pour le paiement des coûts du projet par les bénéficiaires. Même les données les plus sûres qui peuvent être

raisonnablement attendues, ne justifient pas les techniques engagées du traitement économique. Un abord réaliste est de mesurer les différents coefficients bénéfices/investissements.

L'étude de praticabilité et l'estimation, toutes deux demandent un jugement expériencé qui doit être basé sur un haut degré de compétence professionnelle en agriculture et économie agricole aussi bien qu'en technique.

INTRODUCTION

A London fishmonger once observed to his customer, the publisher of the Times, "My business is wrapped up in your business". I shall not hazard any other similarities in this exchange beyond the fact that in the appraisal of irrigation projects my business is closely bound to the business of many of you. As an agriculturist of the World Bank, my business is largely concerned with the appraisal of agricultural projects with a view to their financing. I welcome this opportunity of discussing the appraisal of irrigation projects with you who are so concerned with their feasibility study and execution.

The World Bank and its affiliate, the International Development Association, make loans only for projects which are technically and economically sound; that is, for project which, in their judgment, can be effectively executed and operated and will result in benefits which will justify the investment and strengthen the economy of the particular country.

During the last two years we have reviewed well over 50 irrigation projects and selected 26 of them for field appraisal. Of those appraised, 14 have been, or are to be, recommended for approval. Consideration of seven projects has been deferred until we receive further feasibility data and are able to complete our appraisal. The remaining five projects have been rejected.

We require a feasibility report before undertaking field appraisal. Some of the feasibility studies are undertaken by the local irrigation authorities and the remainder by consulting firms.

As an agriculturalist I have no intention of discussing, except in a general way, the adequacy of the engineering aspects of these reports. I can say, however, that there has been no case where we have been satisfied with their coverage of the agricultural, economic and administrative aspects. In point of fact, the treatment of these aspects in the majority of cases has been seriously inadequate.

The question naturally arises as to why the non-engineering aspects are so poorly covered. It occurs to me that one of the sage remarks of Sir Oliver Lodge provides a bit of a clue, "The last thing in the world that a deep sea fish could be expected to discover is salt

water." Almost invariably, engineers have primary responsibility for the feasibility studies. It may be that they have often been so closely concerned with the works of the project that they have concentrated on these to the exclusion of other factors. In other words, their attention has been focused on the means of achieving the purpose of the project instead of on the purpose itself. There seems to have been a tendency in the preparation of feasibility studies to overlook that an irrigation project is the irrigation and productive use of the land, rather than the construction of a dam and of a distribution and drainage system.

This means, of course, that engineers, agriculturalists and agricultural economists should all be associated in the feasibility study. Even when all of these skills are available and utilized, there still remains the problem of coordination of the various evaluations. An agriculturalist, just as an economist or an engineer, tends to look at a project too much from his own viewpoint. For feasibility studies, just as for appraisal, it is necessary for these viewpoints to be coordinated so that the project can be assessed as an entity.

There is a further reason for the inadequate coverage of non-engineering aspects of feasibility reports. This is undoubtedly the difficulty of obtaining adequate agricultural and related data under the conditions of the underdeveloped countries with which we are concerned. Seldom are there reliable statistics from which to assess the present agricultural situation and production of the project area or the production of similar areas already developed under irrigation. It is unusual for there to be adequate data regarding soils, agronomy, water duties, and so on, and it is most exceptional to find any worthwhile information concerning the economics of farm production. Finally, and perhaps most important, there are frequently serious human and institutional problems which are most difficult to evaluate, but which must be solved or alleviated if reasonable standards of agricultural production are to be attained.

Apart from institutional problems and paucity of data, economic conditions in these countries are also vastly different. For example, there is frequently a serious imbalance in resource-use. Under-used resources usually include unskilled labor and, often, land and water; but know-how, managerial experience and capital are usually scarce resources.

Our appraisals have always been preceded by an economic survey to establish the scope and needs for developmental expenditures and their priority between sectors of the economy. Before appraisal, the Bank will already have satisfied itself that investment in the agricultural sector is warranted and that irrigation investment warrants priority within the agricultural sector.

The economic conditions of the country must be taken into account in the assessment of inputs and benefits during appraisal.

The objectives of the remaining portion of this paper are two-fold. The first, which is frankly selfish, arises from the hope that it will have some influence on the coverage and quality of feasibility reports on projects we may be appraising in future. To this end, the paper indicates the extent and type of data which from our experience can reasonably be expected from a properly undertaken feasibility study in an underdeveloped country. They represent the minimum data from which reasonably sound judgments can be made.

The second objective is to outline how we have found it necessary from experience to adapt the principles of project-appraisal to the conditions of underdeveloped countries. I hope that this will prove of some value to the authorities and consulting firms concerned with feasibility studies in these countries.

I realize that much of what follows will be already well-known to many of you. I hope, however, that you will find that the step-by-step approach enables the merits of a project to be judged in relation to its purpose—the productive use of the land under irrigation.

Although no two irrigation projects are completely similar, the study and appraisal of all projects can be considered under four broad headings:

1. Technical soundness;
2. Organization and management;
3. Financial aspects; and
4. Assessment of benefits and economic justification.

TECHNICAL SOUNDNESS

Water, Land and Climate. The key to the performance of an irrigation project is the compatibility of water, land and people. The world has many abandoned irrigation projects, due primarily to inadequate consideration of the combined use of these resources.

Of physical resources, water is the first consideration. In appraisal of hydrology, we need, of course, to be satisfied concerning the quantity, quality and reliability of the water supply. We expect these aspects to have been thoroughly examined during project preparation and during our appraisal we require access to the basic data from which judgments have been made. We are often concerned with projects where hydrological records or rainfall records for the watershed area are quite inadequate for accurate estimates. In these cases, we must review the evidence for the assumptions made and be satisfied that water availabilities have been conservatively estimated and that the chances of shortages in dry years have been clearly indicated. If hold-over irrigation storage is involved or if the project includes power production, we must have appropriate reservoir operational studies. We need reliable estimates of conveyance losses to arrive at diversion availabilities at the farm field. We find that a

breakdown of availabilities by months throughout the growing season is usually sufficient for our purposes.

In assessment of land resources, we must be satisfied that the project lands are capable of sustained production during the life of the project with at least an adequate return to the farmer. Such an assurance should be based on adequate soil, topographic, drainage and agronomic data. If sufficient data are not available, soil surveys, and/or land classification surveys are normally required before project appraisals may proceed. Ordinarily, we require a soil survey or land classification made to semi-detailed standards or feasibility grade for appraisal purposes. We much prefer land classification type surveys —assuming the specifications of such a survey are properly prepared beforehand. If we are in a position to recommend the type of survey to be employed for the feasibility report, we suggest a land classification survey similar to that developed and successfully used by the U.S. Bureau of Reclamation.

In circumstances where the soils are particularly uniform and clearly suitable for irrigation, we feel that these requirements for soil data can be relaxed. As an example, during a recent appraisal, available soils data were limited to information from a very rough reconnaissance soil survey. However, the area had a history of 80 years irrigation farming, and after a review of soils, topographic and drainage conditions in the field, it was concluded by the appraisal mission that additional soil or land classification surveys would be unwarranted.

Drainage information is extremly important in any type of agricultural undertaking but, of course, it is normally much more critical under irrigated conditions, and we need to have information concerning both surface and sub-surface conditions.

We also need sufficient climatic data to establish the amount, distribution and reliability of rainfall in the project area and the likelihood of occurrence of frost or other climatic hazards which could be critical to the cropping system proposed.

Engineering. As previously indicated, the author's remarks concerning engineering must be cursory.

We first want to be satisfied that the proposed designs for the civil works are technically sound and would accomplish the intended purpose with reasonable operation and maintenance costs. This means that preliminary designs have been carried out in sufficient detail for their proper appraisal. We also need to know that adequate geological and topographical survey work has been undertaken. The safety of major structures is naturally of particular concern and if our engineers have doubts concerning such aspects as foundation conditions or design of dam or spillway we ask or arrange for an independent review.

We naturally look closely at designs of the main canal and distribution system, including provisions for lining where necessary and capacities for water delivery. We also examine measures for the application of water at the farm field to be satisfied that proposed water management techniques will be in accord with the skills of the operating personnel and the farmers.

We look even closer at proposals for drainage which often require special study and investigation. For example, many years ago we financed the dam and power sectors only of a multi-purpose project. The feasibility study included a report by an eminent soil chemist which was fully adequate over his special field of competence but did not deal with the suitability of the land for irrigation, including water tables and drainage requirements. Fortunately, the power and flood protection benefits proved to be sufficient to justify the full investment in the dam because just about the time that the dam and power works were completed the authorities first recognized that serious drainage problems would have to be solved before the commanded area could be developed for irrigation. Detailed studies of soils and water tables were commenced and, over four years, detailed plans for irrigation and drainage have been prepared. We have since been asked to consider a project for the development of irrigation over a portion of the area.

Cost estimates are, of course, of fundamental importance. As a financing institution, we want to be quite sure that sufficient funds, including local currency to be provided by the Borrower, are available to bring the project into production. We also want to be sure that an over-run of costs will not reduce the economic justification for the project to sub-marginal level.

Our experience has been that costs are more often than not under estimated. When I recently asked a colleague, General R.A. Wheeler, for his opinion on some cost estimates, he told me the following story which I trust is not too widely known to this audience :

> "Some 25 years ago the Mississippi Canalization project was completed right on the estimate of $150 million. This so excited the professional interest of engineers throughout the Valley that a dinner was organized in honor of the Divisional Engineer who had been responsible for preparing the report to Congress. When asked to explain how he had estimated the costs so accurately, he replied : 'As you know, my Division has three Districts, each of which is headed by an experienced District Engineer with a large staff of engineers and estimators. The costs of the parts of the Canalization Project located in these three districts were estimated separately by each District Engineer and his staff and submitted to the Divisional Engineer. After careful check of these estimates in my office, they were returned to the Districts to recompute considering higher overhead and contingencies and increased

prices for cement, steel and other materials. These new estimates were then returned again by the Division for revision, directing the District Engineers to consider different types of gates and valves. These revisions resulted in further increases. Finally, when the three District estimates were totalled in the Division Office, the cost of the project amounted to about $72 million. As you know, all engineers round out their estimates, so the total cost was rounded out to $75 million. Then, all I did was to multiply by two."

We make generous provision for contingencies but not quite to that extent, and where we feel it necessary, we arrange for an independent review of the estimates to be undertaken.

On-Farm Works. We are also concerned with the works within farm boundaries, such as land levelling and farm ditches and farm drains, necessary to bring the land into production. In cases where these works are to be undertaken by the authorities, they must be planned in detail and should automatically be included in the cost estimates. If they are to be constructed by the farmers themselves, they must still be investigated in sufficient detail. (It is necessary to establish their estimated costs for the calculation of economic benefit, even when they can be omitted from cost estimates for the purpose of financing.)

Agriculture. The objective of apprasial can be stated quite simply as a comparison of the agricultural situation and production of the project area before and after development. The investigations necessary to reach this objective are far from simple.

We find that in most cases the project area is already under some sort of cultivation so that a considerable array of data* are necessary to assess the existing situation. Relatively seldom is much of this information available from published statistics. A search of the records of various authorities, including any marketing authorities, may help considerably. Only exceptionally have adequate land use surveys been undertaken prior to feasibility study. In most cases, these data must be obtained during feasibility study and this requires a land use and production survey. Air Photographs and various sampling techniques can greatly reduce the work involved, but for peasant agriculture where no farm records are kept the empirical

* These include (*a*) land tenure status, including any existing water rights ; (*b*) farm size (farm ownership and operating pattern) ; (*c*) characteristics and number of the population of the project area, including number of farm operators and hired farm laborers ; (*d*) prevailing farming practices ; (*e*) existing technical and credit services for farmers ; (*f*) land use, including rotation systems and cropping pattern ; area in current year under various crops and pasture, or not used ; if already some irrigation, area irrigated and water usage ; (*g*) average crop yields and volume of agricultural production (including livestock production) ; (*h*) volume of production marketed ; (*i*) description and adequacy of farm to market roads and of marketing and processing facilities ; (*j*) current prices at farm level for products, (*k*) costs (or at least approx. cash costs, including cost of seed) of farm production.

investigations within sample areas must extend over the full cropping season.

The future agriculture situation and production is even more difficult to assess. However, so long as the project area is already farmed and the proposed irrigation will intensify production without new settlement or major disturbance of farm distribution, reasonably reliable data on the existing situation set a relatively firm base for projections into the future.

More difficult problems are involved if there is to be new settlement and we are very much concerned with proposed arrangements which are obviously an important consideration in assessing future agricultural production.

The proposed future cropping pattern, which is, of course, of basic concern, is critically examined from the viewpoints of agronomy, water duties and availabilities, markets for products and suitability in relation to the skills of the farmers.

Having determined that the soils and climate are suitable for the crops (or types of livestock production) proposed, we next consider the proposed rotation system and its likely influence on future soil fertility levels.

The water duties for the proposed cropping pattern are next assessed and adequate data concerning soils and climate are, of course, necessary for this purpose. After adjustment for natural rainfall, we prefer to assess irrigation requirements, usually by months throughout the year, at the point of delivery to the farm field. These requirements are then reconciled with estimated availabilities by months.

The prospective market for products is often one of the most critical aspects of appraisal. This is because the return per acre varies so greatly according to the intensity of the cropping pattern. For example, the range in gross returns per acre from the lowest return crops and the highest return crops averaged one to seven for the last 13 projects which we have appraised. For one of these projects the range was one to sixteen. The range in capital costs per acre for various projects tends to vary less widely, so that the intensity of the proposed cropping pattern has a major influence on the economic justification of any project. It is far more often the availability of markets rather than agronomic factors that sets the limits of intensification of the cropping pattern.

An adequate analysis of market prospects for all major products to be grown is, therefore, essential. This must justify the forward price projections to be assumed for the various products and also specify in detail any additional marketing or processing facilities necessary for the attainment of these prices.

Our final check is to decide whether it could reasonably by expected that the farmers with their previous experience and technical

skills would adopt the proposed cropping pattern. The technical services to be made available to the farmers is a major consideration in this regard.

Of next concern are the measures that farmers would have to undertake to bring their land into production. The estimated capital costs of on-farm development have already been considered, but costs of any necessary purchases of farm equipment, livestock and additional working capital and so on, must also be estimated. In addition, we want to know that the farmers have the financial resources for these purposes or that adequate credit on appropriate terms will be made available.

In assessing estimates of future crop yields and livestock production, no agriculturalist can possibly be expert on all crops in all countries. Some reliance must, therefore, be placed on the views of local technicians familiar with these crops under the conditions of the region. We examine closely the technical evidence from which the estimates have been made and first reach a judgment as to the future yields that *should* be obtained. We then adjust this estimate to the level of yields which we judge *will* be obtained, taking into account most of the factors discussed above. The time-lag in attaining this level of production must also be assessed.

I have deliberately dealt at some length with the problems involved in the assessment of agricultural production. Some of the component factors can and must be objectively and positively assessed. These include soils, water balance, agronomy and market opportunities for major products. The remaining factors, including the attitudes and skills of the farmers, the institutional setting of agriculture, its supporting services and forward price estimates, are much less tangible. Yet all of these factors must be taken into account in assessing future agricultural production. The point I want to emphasize is that the complexity and nature of the judgments involved in both feasibility study and appraisal call for a high degree of professional competence and experience.

A further point is that as bankers our judgments must be conservative. Hence if a project has been poorly prepared and feasibility data are unreliable, we must discount estimates of agricultural benefits more than may have been necessary if the project had been properly prepared.

ORGANIZATION AND MANAGEMENT

The Bank pays particularly close attention to the proposed organization and management for execution of the project works and for subsequent operation of the project. However, in view of the professional background of this audience, it would be necessary for me to deal other than briefly, with most of these aspects.

We find that in most territories there is a Government authority, such as an Irrigation Department, responsible for the planning,

execution and operation of irrigation projects. Our main criterion in assessing the capacity of such organizations is their experience and past performance in undertaking these responsibilities. If the nature of the proposed works clearly falls within the demonstrated competence of the body concerned, we do not necessarily require that consulting engineers be employed for final design and supervision of construction. Where, however, past experience is lacking, perhaps only on critical aspects of the proposed works, we do require that the necessary experience is available. In most cases this means that consulting engineers are employed. If necessary, we also require that the consultant's responsibility be extended to operation and maintenance for an initial period until the organization has gained the experience to enable it to carry on without outside assistance.

We have financed several projects where there was no such established authority and it has been necessary to set up District or Regional bodies for execution and operation. In one case still under consideration, there has been no previous public irrigation project in the country and over several years we have been assisting in the development of an appropriate legal charter, organization and staffing for a District Authority. This authority must necessarily rely heavily on consultant assistance during its initial years.

We must be satisfied that the irrigation authority has the necessary powers to enter into contracts, acquire rights of way and in general to undertake construction and operation, including powers to levy water charges. If not, we usually wait until satisfactory legislation has been enacted or, at best, make the passage of such legislation a prior condition for disbursement against the loan account.

A further important requirement is that goods and services required for the project are purchased to the best advantage. This normally means that arrangements should provide for effective competition between potential suppliers or contractors. Although there are exceptions according to the conditions of the country and the nature of the works, we prefer that major works are undertaken by contract, let under international competitive bidding. We require that imported equipment and materials financed under the loan are purchased under international competitive bidding.

With respect to organization, we are not only concerned with the agency immediately responsible for the project, but also with the various auxiliary services essential for the proposed agricultural development. Agricultural research, farm extension services, farm credit and marketing services are usually the responsibilities of separate Government departments, which are not directly related to the organization of the project. Hence, it is more difficult to make specific arrangements for their provision and frequently we must rely on general undertakings from the Government. In some cases, where the Government administration of these services is clearly inadequate, we do arrange for special services to be provided directly under the

project. In one case, where a new regional operating authority is being assisted by foreign consultants during an initial period, the project estimates provide for the establishment of research, extension and credit services, and for the training of staff for these purposes. I might add, that even before the project works have been completed, these services have substantially improved agricultural practices within the project area.

We also must be satisfied that the farmers themselves welcome the prjoect and are prepared to participate willingly. One test, of course, is whether the expected farm benefits will be sufficient to cover water charges, land betterment levies and any other farmer-borne costs of project operation, repay the farmer's own investment for development of his land and leave him with sufficient reward for his additional effort. In some countries, where we have financed projects, irrigation laws include a provision, common in more developed countries, that a majority of farmers within the area should vote in favor of the project before construction can be authorized. We await the outcome of this vote before concluding the loan. In other cases, where landowners have been faced with a substantial private investment for on-farm development, we have required, before the public works commence, that they agree formally with the operating authorities to undertake these private works. In one case, there was a landlord tenant system of farming on a crop-sharing basis and we were not satisfied that the tenants would have sufficient incentive for additional efforts required. We were, therefore, pleased when the Government agreed to incorporate some measure of agrarian reform for the project area in the legal charter of the operating authority. The landowners have willingly accepted this provision and we expect that the tenants will find sufficient reward for their efforts.

In addition, we have found from experience that special attention must be paid to legislative and administrative arrangements for new settlement, if that is involved in the project. A critical review must first be made of legislation relating to the allocation of land, including proposed conditions of land tenure. The appropriateness of the proposed size of holding for the conditions of farming must be decided. The characteristics and experience of the new settlers must also be considered ; for example, nomadic herdsmen connot generally be expected to make good cultivators. There should be some system of selection according to experience and suitability for irrigation farming. We want to be sure that after the settlers have been allocated holdings, it will be within their capacity to develop them fully. This may be possible with their own labor. If not, they must command the financial resources required which may be either their own funds, or from adequate credit facilities. Finally, we want to know that they will be given sufficient technical guidance to bring their farms to full production.

The considerations outlined briefly above, cover the essential administrative requirements for any land settlement proposal. We

made one mistake some years ago in not ensuring that administrative requirements were understood and established at the time of making the loan and are still struggling to correct delays and deficiencies in the progress of settlement. We hope not to make the same mistake again.

FINANCIAL ASPECTS

As a financing institution, we naturally want to be sure that sufficient funds will be available for completion of the works and for their operation. Interruption of construction because of shortage of funds results in economic losses which underdeveloped countries can ill afford.

Cost estimates must be realistically assessed and include ample contingencies to take care of risks of inflation, escalation and unforeseen engineering difficulties. Our next step is to ensure, before the loan is signed that firm arrangements have been made for the provision of all the funds, in addition to the proceeds of the proposed loan, necessary to complete the project. In case there should prove to be an over-run in costs, we also require an undertaking from the Government that any funds necessary to complete the project will be provided promptly as required.

The availability of funds for project operation and the operating accounts of the Authority are also examined during appraisal. Estimates of costs of operation and maintenance seldom give much difficulty but we find many problems relating to proposed water charges and other farmer payments towards the cost of the project. The Bank's general policy with regard to revenue-producing projects is that the organizations responsible for such projects should earn revenues sufficient to meet all their operating costs (including depreciation), and earn an adequate return on the funds invested. We recognize, however, that because of government policies towards agriculture, many irrigation projects are not set up on a revenue producing basis, and our approach is more flexible than in the case of power or industrial projects.

We consider, as a matter of principle, that the farmers should contribute reasonably towards the cost of providing the benefits they receive. If the project is good, the benefits should be such that an adequate water charge is within the payment capacity of the beneficiaries. However, we recognize that in many cases such charges cannot be levied for economic or social and political reasons. One reason is that peasants may be so unaccustomed to cash expenses that a substantial water charge may frighten them away from using project water ; *e.g.*, no increase in production, and no economic benefits. Concessional rates during the first years of operation can be some solution to this problem. The social and political reasons may be related to the poverty of the peasants but more frequently relate to government policies of subsidization of

agriculture and to the resistance to change of the agricultural sector, where there may be long established traditions and rights to land and water.

Nevertheless, we always press for water charges to be set as high as practicable in the circumstances.

For about one quarter of the projects we have financed, water charges have been set at levels sufficient to make the project self-liquidating. In other cases, the level of charges has been sufficient to cover costs of operation and maintenance and depreciation while, in others, a charge sufficient to cover direct costs of operation and maintenance has been all that was practicable. In exceptional cases, there has been no direct water charge but there have been other revenues to the government resulting from the project, which would much more than cover annual project costs.

There was one interesting case, when the government undertook during negotiations that legislation for the operating authority would include provision for an appropriate water charge. There was, however, some existing irrigation in the area and the Parliament simply refused to countenance any charge for water up to the existing rights. This was overcome by legislation which established that there would be no charge for water up to existing use but that there would be a charge for "other expenses" (defined elsewhere as Operation and Maintenance), and a surcharge for additional water used which covered depreciation and a return on the investment.

ASSESSMENT OF BENEFITS AND ECONOMIC JUSTIFICATION

In underdeveloped countries the data which can reasonably be expected to be available are seldom adequate enough or reliable enough to warrant involved economic treatment. In most cases it would be unrealistic to apply more than rather crude tests. We have found measurements of various benefit/investment relationships to be more practicable than the standard annual cost/benefit ratio. We seldom attempt to quantify indirect benefits. If appropriate however, we estimate the influence of the project on the country's balance of trade, employment situation, and so on.

Costs. In regard to public investments, we already have an estimate of the expenditures to be made during the construction period by the executing agency. This estimate may require adjustment for economic evaluation. For instance, the project cost estimates made from the viewpoint of financing may include the full cost of equipment which would have salvage value on completion of construction. Conversely, the project estimates may not include supplementary public investments necessary for full development such as improved farm to market roads to carry the increase in production. We usually include such costs for economic evaluation but not the costs

of social overheads in education and so on. Again, interest during construction may have been calculated on the basis of a rate charged by a central government to the executing agency, and this rate may not reflect the true cost of capital. In cases where there is a clear difference between the official rate and the "free market" rate, the latter may have to be used. With respect to labor cost, a correction in the opposite direction might be appropriate in certain cases (*e.g.*, in countries where official wages may be higher than the economic cost of labor), but for practical reasons we do not apply any such correction to labor costs in estimates of public investments.

Next, private investments. These include costs of any on-farm works by the farmers themselves. In most cases, investments in the form of farm family labor are omitted and only cash expenditures are included in the evaluation (in view of the large degree of underemployment in underdeveloped areas, the economic cost of labor is often close to zero). The sum of these private and public costs is taken as the investment in the project. Any investment in farm machinery, *etc.* is treated on an annual basis under costs of production.

We usually obtain reasonably reliable estimates of costs of project operation and maintenance, but estimates of costs of farm production are particularly difficult. Farm budget studies to obtain these data are essential if the type of agriculture is on a cash rather than subsistence basis. In some cases, these studies can be undertaken in similar areas already developed under irrigation. In other cases, data obtained during the land use and production survey can serve as the base for estimates of increases in farm costs when the land comes under irrigation.

More usually, however, we are concerned with a peasant type of agriculture developing from subsistence towards commercial production. If the existing agricultural production takes care of the subsistence needs of the farm families, we do not treat products consumed on the farm as a cost against the increase in production from the project. Here again, we concentrate on increases in cash costs, including seed, fertilizers and other farm requisites. Depreciation and interest on farm equipment, *etc.* is included if appropriate, which is rarely the case with peasant agriculture. The cost of hired labor is usually included (although it may be omitted for calculations of benefits to the economy as a whole where there are no alternative opportunities for employment). The cost of farm family labor is not included (except in those few cases where there are clearly alternative labor opportunities for the farm family). Any interest paid by the farmer on investment in on-farm development is also excluded because an estimate of his full capital costs for developing his land has been included in the project cost estimates.

Farm Benefits. The project is treated as a whole in estimation of agricultural benefits which we call "farm benefits" because they are

calculated at farm prices for products. The future annual gross value of agricultural production is calculated from the expected cropping pattern, estimated crop yields and estimates of future prices at the farm for these products. The estimated annual gross value of production from the project area without the project is then deducted to give the estimated gross farm benefit from the project.

The gross farm benefit less estimated annual costs of production gives the estimated net farm benefit. (Costs of production are the increase in farm costs of production above pre-project costs, plus direct costs of operation and maintenance of the project works.)

A side-check should next be made of the ability of farmers to meet their cash obligations and retain sufficient reward to encourage their participation. Data are seldom sufficient for pro-forma farm budgets representative of major-size groups and types of farming and usually only very simple checks can be made. Actual water and other charges and any interest he must pay should, of course, be included as cash obligations since these are tests of the farmer's viability.

Benefit/Investment Relationships. The first measure we employ is the gross farm benefit/investment ratio expressed as a percentage. This, of course, takes no account of costs of production. Given consistency of method, however, it does provide a crude yardstick useful for comparative purposes, particularly if conditions of agricultural production are similar. Since this measure is only of value for comparative purposes you may find the estimated ratios for the last 11 projects we have appraised to be of interest. These have been :

Per cent

103	74	40
96	50	40
85	44	40
80	42	

The net farm benefit for the project as a whole is then set against the total investment to give the net farm benefit/investment ratio which is again expressed as a percentage. The benefits accrue over the lifetime of the project but there is usually a development period after completion of the project works before the full benefits are obtained. They, must, therefore, be discounted to a common point of time for comparison of benefits with investment. The range in net farm benefit/investment ratios for the projects cited above has been from 9% to 45%.

In some cases, we find it necessary to adjust net benefits at farm level to represent more closely benefits to the economy. For example, if major products are for export and the farmer price is subject to major government intervention, we may have to recalculate on the basis of export parity.

CONCLUSIONS

Appraisal of an irrigation project must include the appraisal of the future performance of water, land and people. Insufficient attention is given to agricultural, economic and institutional aspects in most feasibility reports on irrigation projects. Agricultural and economic data available at the time of appraisal are seldom adequate although it is practicable during a properly-conducted feasibility study to obtain the data required.

Even the most reliable data that can reasonably be expected do not warrant involved techniques of economic treatment. Quantitative assessment of direct economic benefits must, however, be made. We find that the most realistic approach is to measure various benefit/investment relationships.

Bearing in mind Samuel Butler's observation "that the art of living is in forming adequate conclusions from inadequate evidence", both the feasibility study and the appraisal of irrigation projects in underdeveloped countries call for experienced judgment. This judgment must be based on a high degree of professional competence not only in engineering but also in agriculture and agricultural economics.

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THE PROVISION OF CAPITAL FOR AGRICULTURE IN DEVELOPING COUNTRIES

BY

P.A. REID

Introduction

Like the angels who are fearful where they tread, I am aware of the hazards in my subject today. I have undertaken to explore not only some of the highways and byways but also some of the uncharted tracks and trails leading to the provision of capital for agriculture in developing countries. To cope with the labyrinth of issues, I have grouped my remarks into several main categories: first, the use of capital as one of the several elements in agricultural development; secondly, the nature of capital investments in agriculture and the requirements for meeting targets of expansion; thirdly, the supply and sources of capital; and finally, the technical assistance available to governments for improving the climate for agricultural investment.

The Use of Capital in Agricultural Development

The rate of a country's economic development is closely linked to the rate of expansion of its agricultural sector. A country's industrial working force can increase only as fast as new demands for food are met. Conversely, agriculture is unlikely to expand significantly while other sectors of the economy are lagging. Agricultural development must be approached as an integral part of balanced economic growth. As the developing countries achieve economic growth, the demand for food will increase, but a smaller proportion of the national labor force will be employed in agriculture. Consequently, each agricultural labor unit will have to

produce more food for more people. For more food to be produced, capital must be used to increase the cultivated land and its productive capacity. Capital must also be applied to improve the effectiveness of the labor factor of production.

But the provision of capital is not all that is required to bring about a substantial increase in food production. Capital is only one of the elements of development, and it can be applied only as effectively as the other elements of the agrarian structure permit. There are often in-built resistances to changes in the institutional setting of agriculture itself. Before development objectives can be met, however, it is often essential that improvements be made across any or all of the broad fields covered by the term "agrarian reform". Land reform, improvement of tenure conditions, and other changes in land policies may or may not be a prerequisite. In most cases, however, there is need to strengthen or introduce the other aspects of agrarian reform such as agricultural administration, research and extension services, the supply of farm requisites, and market opportunities. Under the category of market opportunities, there may be need to provide not only better marketing facilities but access thereto as well as changes in governmental pricing and marketing policies. Shortcomings in any of these aspects preclude the proper use of farm credit, the capital element of the agrarian structure at farm level. In fact, the provision of credit, where other agrarian elements are seriously lacking, can do more harm than good.

Many countries cannot effectively absorb capital for agriculture although the agricultural output may be losing the race with the population growth or at most keeping barely abreast with it. To take irrigation as the example,

all too common are projects not giving reasonable yields or not leading to significant intensification of production or not leading to multiple cropping. The explanation is clear. Irrigation itself is age-old, and it does not necessarily require change from traditional to modern farming practices. Such a change becomes essential only for new cash crops, intensification and/or multiple cropping. Multiple cropping, in particular, may require a series of changes including early maturing varieties, timely performance of field work through mechanization, application of fertilizers, use of pesticides, efficient marketing, and adequate credit. In initiating an over-all transfer in farming practices, the knowledge of farmers becomes the limiting factor. This, in turn, is largely conditioned by availability of adequate professional staff organized into efficient agricultural services.

In other words, the provision of capital must be coupled with agricultural policies and actions that extend far beyond finance. There must be agricultural administrations able to plan development programs and projects. Where changes in policies are required, there must be administrations able to formulate these new policies and governments prepared to introduce them. There must also be administrations capable of carrying out the actions required, including the necessary strengthening of supporting agricultural services and facilities.

I would like to give two examples of the many cases in which the preconditions for investment have been met and where the injection of capital has led to spectacular increases in production. The first is a case with which you, Lord Howick, and others of this audience are familiar. The program of land consolidation within the former African areas of Kenya

provides a classic example of the integrated approach necessary for the successful application of agrarian reform.

Before the early fifties, these lands were farmed under the tribal system. From time to time, the chiefs allocated parcels of land to individuals. The tribal members had no security of tenure or incentive to husband the soil or improve their temporary and often scattered holdings. A first step taken by the Government to remedy the situation was to enlist the co-operation of the tribal authorities in the permanent allocation of holdings to individuals. This was done by means of consolidation and demarcation of holdings and registration of titles. The next step was to provide technical services to prepare development plans for each holding and to guide the farmers towards the use of new techniques. Adequate water supplies were provided along with other farm requisites. Feeder roads were constructed or improved and market outlets were developed, largely through marketing cooperatives. The role of farmer credit during the early stages of the program was on a relatively minor scale. The major part of the work was to place the farmer in a productive agricultural setting in which he could, in the succeeding years, make efficient and intelligent use of credit.

These principles were applied in Kenya under the Swynnerton Plan commencing around 1955, or at about the same time that similar approaches were commenced in the former Belgian Congo and in Southern Rhodesia. My own association with the Swynnerton Plan commenced in 1959 when the World Bank made a loan to help finance the next three years of the work. By the end of 1962, some $2\frac{1}{2}$ million acres of land had been consolidated into registered holdings and some quarter of a million farm families were in a position to farm much more effectively.

Up to 1963, the agrarian reform measures had been carried out by an experienced British administration. However, I was pleased to find during a visit to Konya earlier this year that the Government is affording top priority to continuation of land consolidation and supporting measures in the African farming areas not yet covered. Many of the tribes, who had previously resisted the approach, are now clamouring for land consolidation. This work is being successfully continued, mainly by Africans, along the lines laid down so well by Mr. Swynnerton and his staff.

Incidentally, I saw a most striking example of the change in farmer attitudes that can be engendered through improvements in the institutional setting of agriculture. My visit to Chepkario, where land had been consolidated some years before, coincided with the arrival of the motor-mounted agencies of two commercial banks. There were long lines of farmers awaiting their turn to lodge deposits so that they could command the resources to buy more land. These same farmers had been eking out a subsistence existence not many years ago.

The second example covers a vastly different institutional setting, a project for pasture improvement and expansion of livestock production in Uruguay. Natural conditions in Uruguay are very favourable for pasture improvement by the introduction of legumes and the application of phosphatic fertilizers. Indeed, they are as favourable as those of New Zealand and Southern Australia where pasture improvement has more than doubled livestock production over the last thirty years. Yet in Uruguay, production had been stagnant during the forties and fifties. Apart from technical knowledge and credit for the introduction of improved techniques, the other elements

of the agrarian structure were favourable for pastoral development. A World Bank loan, which commenced in 1960, provided the necessary credit. It also provided for the establishment of a Livestock Commission with adequate powers and sufficient technical staff to prepare development plans for participating estancias and to supervise the execution of the plans. The Australian Mercantile Land and Finance Company seconded their top pasture expert to head the Commission's technical staff. The level of pasture technology available to the estancieros is now exceptionally high.

The adoption of new farming practices always takes time, but to date some 1400 properties in Uruguay have improved pastures. Production from the land treated has already increased threefold, and To maintain the momentum, a second World Bank loan of $13 million was made this year. Trade interests in Britain can look forward to a major increase in Uruguay's pastoral output during the coming decade.

The Nature of Capital Investment in Agriculture

To move from the discussion of the various elements which must be considered along with capital in agricultural development, let us now examine the nature of capital investment in agriculture, both public and private. There are two categories of public investment, investment in infrastructure and investment in land improvement. Infrastructure investment in roads, railways, ports and electrification are for the benefit of all sectors of the economy but not least to the agricultural sector. For example, many of the heavy investments in transportation are essential to the marketing and distribution of the farmers' products. Other investments finance the construction of access roads which make new land available for production. In addition, infrastructure investment in the capital needs of social overheads such as research, education and extension is essential to provide the climate of receptivity

to new methods. Public investments in land improvement are usually concerned with irrigation and drainage works, land reclamation, and land clearance.

Private capital investment is largely directed towards improving the production of oxistingly used lands. On-farm investments include all types of farm improvements such as land levelling, pasture improvement, farm buildings and other structures, water supplies, etcetera. The purchase of agricultural machinery or tools and other farm requisites is an important category. Working capital may also be required for the purchase of annual in-puts of fertilizer, labor, and so on. The farmer normally must turn to credit institutions for financing at least part of these private investments.

The basic public investment program gives the farmers the physical area and infrastructure support they need to expand their production. The funds that are channelled through credit institutions to meet on-farm requirements are also usually from the public sector. However, these public investments cannot be effective unless they are supported by adequate recurrent public expenditures for strengthening administrations, technical services and other elements of the agrarian structure.

Requirements of Capital

The next consideration is how much capital the developing countries need to carry through their agricultural investment programs and raise their food production to the required levels. No accurate estimates can be made, but to illustrate the order of magnitude of agricultural capital requirements, I ~~will rely~~ have relied on the 1961 estimates presented by Douwe Groenveld in his monograph "Investment for Food."[1/]

1/ Investment for Food. D. Groenveld. North Holland Publishing Co. Amsterdam, 1961

Dr. Groenveld based his projections on available national accounts, overall development plans and specific projects. He estimated that in Africa, Latin America and Asia, excluding mainland China, an average annual investment of $3.5 per hectare of agricultural land was required to achieve a 2 percent food production increase during the 1950's. He concluded that for the three continents about $7.6 billion was invested each year during the decade 1950 to 1960. Dr. Groenveld estimated that it would be necessary for the production rate in the period 1960 to 1980 to increase 10 percent faster than in the previous decade. He has suggested an annual investment of $4 per hectare of agricultural land, which would call for a total investment of about $8.6 billion per annum. Well over half the total requirement would be for public investments. By a separate route he arrived at an annual public investment figure of some $6.9 billion for the opening up and equipping of new land and the improvement of existing agricultural land.

A major consideration for the developing countries will be the proportions in which this capital requirement is to be met from domestic and foreign sources. Naturally the foreign exchange component of public investments will vary with the nature of the investment and the extent to which the necessary goods and services can be procured domestically. In countries where there may be no cement, steel or machinery industries, and where there are not enough indigenous trained engineers and technicians, the foreign exchange component of an irrigation project may be well over 50 percent. The foreign exchange component of the cost of Sudan's Roseires dam is estimated as some 70 percent. On the other hand, under India's Third Five-Year Plan, less than 5 percent of the public investment in agriculture and community development will require foreign currencies and the foreign exchange component of the investment in major and medium irrigation projects will be in the region of 7 percent. The average foreign exchange component of public investment

for agriculture is probably of the order of 25 percent. Applying this figure to Dr. Groenveld's estimates one would expect that some $1.5 billion in foreign exchange would need to be invested each year in agriculture in the developing countries if food targets are to be attained.

The Supply of Capital

How is the capital requirement being met? It is often overlooked that the major share of the investments in these countries has been financed by domestic savings. Throughout the greater part of the developing world, domestic gross savings have represented some 75 percent or more of gross investments, and in most cases the level of investments has been primarily determined by a country's own performance in savings' mobilization. The increasing rates of savings in many countries point to a prospective increase in the degree of self-reliance in financing development. For example, during Pakistan's Second Five-Year Plan, 57 percent of the total development funds were mobilized by the domestic economy. For the Third Plan, the Government expects to mobilize nearly 63 percent internally.

The total capital flow into the developing countries, including aid from the Sino-Soviet bloc, was estimated by the Development Assistance Committee of the OECD at some $9 billion in 1963. Official bilateral aid provided 66 percent of this amount, about 40 percent coming from the United States. Private aid provided some 24 percent and multilateral aid about 10 percent. But by no means all of this inflow was available for investment. About one-fifth of the bilateral aid was in the form of agricultural commodities. At the same time the developing countries reimbursed to the industrial countries debt service and dividends on public and private capital amounting to between $4.5 and $5 billion. As a result the net financial transfers in 1963 were probably less than $5 billion. This represents only about 12 percent of the import expenditures for goods and services by the developing countries.

Insufficient as this net inflow may be for the needs of the developing economies, it is difficult for the flow to be increased without adding to the external debt problems of these countries. For instance, in 1963 alone, Pakistan's external debt increased by 43 percent and India's by 38 percent. Renegotiation of debt service between creditor and debtor countries is easing the balance of payments problems in some countries, but the need for ~~expanded~~ further sources of aid on concessionary terms is clearly evident.

It is virtually impossible to calculate the size of the gap between the absorptive capacity and the capital availabilities for development. For economic development as a whole, a sizeable gap does exist. However, insofar as agricultural development is concerned, this gap is a latent one. This latent need can become effective demand for capital only as farmers gain ~~the~~ greater capacity to use and benefit from investments.

There is no breakdown of the allocation to agriculture of the total capital inflow to the developing countries. However, according to OECD figures, bilateral and multilateral capital financing of projects for developing agriculture amounted in 1962 to no more than $430 million. The reason why only 5 percent of all assistance was earmarked for agricultural projects was not that more funds were not available, but that more projects suitable for financing were just not to be found.

As a means of illustrating how a proportion of the investment requirements for agricultural development are being met from multilateral sources, I should like to describe briefly what the World Bank and its affiliate, the International Development Association, are doing in this field. Perhaps I should preface this with a few remarks to remind you of the nature and function of the World Bank and IDA as it is popularly known.

The two institutions share the common purpose of providing and promoting a flow of capital into productive projects and programs. The Bank itself, of which 102 countries are now members, makes long-term loans at conventional interest rates for many kinds of projects. The bulk of Bank lending has been for infrastructure, but increasing attention is being given to agriculture. Of the total of $8.5 billion in loans granted up to March 31st 1965, about one third had been for transportation, with major benefit to agriculture. A further 10% of the amount had been loaned directly for agriculture. These agricultural loans represented, however, more than 20% of the number of all loans made. Because of the nature of agriculture, the average size of agricultural loans has been less than half of those for infrastructure.

For many years, the Bank has obtained its resources for lending by borrowing on world capital markets. The rate of interest charged by the Bank, about 5½ percent, is related to the cost of its borrowings. The Bank can command sufficient resources to cover the full effective demand for agricultural loans.

IDA lends for the same kind of projects as the Bank but deals with a rather different group of customers; its particular mission is to lend to countries not fully able to bear the burden of loans made on conventional terms, and apart from small service charges, its credits are made free of interest and repayable over 50 years.

IDA's resources for lending are provided by way of grant from donor member countries and by contribution from the Bank's current earnings. Total resources available or committed to date amount to nearly $1.5 billion. More than $1 billion has already been committed in credits approved by IDA and less than $400 million is presently available for further lending.

Most Bank and IDA lending has been to finance the foreign exchange cost of projects. However, during recent years a greater emphasis has been placed on the inclusion of finance for local currency expenditure. During

the 1964-65 fiscal year, 26 per cent of all Bank and IDA lending was for local currency expenditure.

Bank and IDA loans are confined to projects which are technically sound and economically justified. These two banking institutions believe that it is unwise to allocate capital to ventures which are not sound in the technical sense, or are unable to be executed effectively. They further believe that it is not in the best interests of their member countries to borrow funds for projects that will not yield sufficient benefits to give an adequate return on the investment or to strengthen the economy. However, despite this approach, about $850 million of Bank and IDA lending has been allocated for agricultural projects. Of that total, $140 million has been loaned during the past twelve months and the rate of lending for agriculture is definitely increasing. There are at present some 70 agricultural projects in the pipeline, ranging through support for agricultural credit institutions, livestock improvement, land settlement, grain storage, forestry and fishery development, and promotion of smallholder tree-crops to support for irrigation, drainage and flood control.

Agricultural loans often provide for financing of the recurrent costs of technical personnel for work of a development promoting nature. This financing of personnel is restricted to an initial period of project operation. On the grounds that the economic results of the experts' work should have ~~sufficiently contributed to~~ strengthened the economy, it is usually a condition that their services are subsequently retained as a charge on the national budget.

Technical Assistance in Improving the Climate for Investment-

Before any financing institution can appraise an agricultural project to decide whether a loan should be made, it is necessary for the project to have been thoroughly studied and a feasibility report prepared. Technical, financial, organization and managerial and economic aspects of the project

must be examined during appraisal and should therefore be covered during the preparation stage.

The shortage of projects for investment does not arise from any lack of physical opportunities. These are almost boundless. The shortage exists because all too few of the developing countries have agricultural administrations ~~able~~ strong enough to plan and prepare projects for consideration, or ~~able~~ to execute the projects effectively if finance is forthcoming. A number of measures are being taken within the United Nations family, and under bilateral aid in various forms, to ~~overcome the problem.~~ improve the climate for investment.

About a year ago, the World Bank and IDA reached agreement with FAO on a Cooperative Program designed to increase investments in agriculture. A special team has been established within FAO for this work, but the Program also calls on the vast accumulated knowledge of agriculture in the developing countries within other sections of FAO. The Program has responsibility for the identification of promising agricultural project opportunities, and for assistance to governments in the preparation of these projects. The Bank, for its part, is responsible for the appraisal of projects and for supervision of the loans when made.

I am pleased to tell you that the Cooperative Program is off to a good start. During little more than a year, the Program staff have participated in over 60 missions to 35 separate countries. About half of these missions were to assist governments in the identification or preparation of projects. The remainder covered participation in Bank missions for economic review or appraisal work. The third loan arising from the Program's work is at present being negotiated, and the financing of many other projects is at an earlier stage of processing.

The Bank has a similar cooperative program with UNESCO to increase its lending for education. In the long-term, this joint venture will also do much to assist agricultural development. FAO, for its part, is also concluding an agreement with the Inter-American Development Bank for project preparation work. Similar agreements with Development Banks serving other regions are also probable within the near future. The direct linkage of FAO's experience and technical services in developing countries to sources of finance must do much to lower the existing barriers to investment.

A major source of United Nations assistance in the preparation of projects for financing comes from the UN Special Fund. The Special Fund commenced operations in 1959 with the major function of helping the developing countries acquire knowledge, skills and institutions essential to a fuller use of their resources. It undertakes these tasks through basic resource and pre-investment studies and through projects for training local personnel and for strengthening of institutions, particularly research institutions.

Up to January 1965, the Fund had approved 485 operations representing a total cost to the Fund of nearly $450 million. About 195 of these Fund projects are concerned with agriculture, and are administered by FAO. Of these projects, about 60 are pre-investment studies in the sense of preparation of projects for financing. The remainder cover longer term resource studies and research and training projects.

At the present time a great deal is being done by the United Nations to assist Governments in the preparation of agricultural projects, and this is far from the whole picture. Much is also being done under the bilateral aid programs of many countries and by private institutions. There still remains, however, the question of assistance to governments in the strengthening of

agriculture administrations to implement projects when they have been financed. This must include the lowering of all the institutional barriers within the agrarian structure that frustrate the proper use of capital for development. Far more than direct administration is involved. It is also essential, to quote Professor Cairncross[1], to develop "new forms of social organization, new habits and attitudes, personal experience, knowledge and skills, that are a precondition of continuing development."

Three lines of action are likely to be involved in strengthening the institutional aspects of agriculture: the training of personnel, the improved organization of administrations and services, and the provision of recurrent funds to employ additional personnel. Some 40 of the UN Special Fund's agricultural projects administered by FAO are to establish or strengthen training institutions within the developing countries. In addition, almost all of the other Fund projects have important elements of training: on-the-job training of local counterparts by the foreign technicians and fellowships for more advanced training. The various other agencies of the UN also devote high priority to training under the Expanded Program of Technical Assistance and their regular budgets. The World Bank and IDA are making a rapidly increasing contribution to the capital requirements of education under their lending in this field. The Colombo Plan, the Organization of American States the OECD and similar organizations also give high emphasis to training.

1/ A.K. Cairncross. "The Contribution of Foreign and Indigenous Capital to Economic Development." Proceedings of the International Conference of Agricultural Economists, Mexico, 1961

Even more help is being made available under bilateral aid programs and from private institutions. In my view the facilities exist, or could shortly be provided, to enable the developing countries to meet reasonable targets for the training of the skilled manpower of all kinds necessary for the implementation of agricultural development programs.

For this skilled manpower to be used effectively for agricultural development, it must be employed within administrations, services or institutions which have the necessary legal powers and appropriate organizational structure for their tasks. Some of the newly independent countries have inherited an administrative framework that has been well built for the task ahead. In many other cases, however, it is essential for the administrative set-up to be reorganized. Ample help under the various aid programs is available to Governments for this purpose. I have already referred to the role of the Special Fund in strengthening organizations. A full Division of FAO is working on the improvement of Rural Institutions and Services, and other UN Agencies are concerned with improvements across the whole field of public administration. A great deal of the technical assistance forthcoming under bilateral and private aid is also directed towards strengthening rural institutions.

I must, at this stage, again emphasize the enormity of the task of agricultural development and the time that it will take for objectives to be met. However, the extent of technical assistance available to Governments has increased greatly during recent years. I believe that the position now holds that most of the developing countries can command the facilities necessary for the training of skilled manpower and for the improvement of their administrative structure for agriculture. Why, then, are not agricultural administrations, services and institutions being strengthened more rapidly? One reason may be the resistance of interests

within the agricultural sector which are vested in the status quo. However, at least in some cases, the answer lies largely in the inability or reluctance of the Governments to provide sufficient recurrent budgetary funds for the employment of all the necessary skilled manpower that they have available or could obtain.

Most of the sources of multilateral, bilateral and private aid provide foreign technical experts to work within local administrations. However, apart from limited grant funds and some counterpart funds, there are relatively few sources of overseas finance to supplement national budgets in the provision of recurrent funds for the employment of local technical personnel. Sound national administrations and institutions must be built before the existing gap between capital available for investment in agriculture and the absorptive capacity of the developing countries can be reduced. This goal would be reached much more rapidly if wider means could be found to supplement capital aid funds with recurrent aid funds for development promoting purposes.

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PERSPECTIVES ON LENDING FOR AGRICULTURE

By Peter A. Reid

The wide-ranging topic of lending for agriculture will be discussed from the perspective of my experience of working with the World Bank. With this setting, the topic is narrowed down to agricultural lending in the developing countries. Before examining the role of capital in agricultural development, a brief description will be given of some of the activities of the World Bank and its affiliates in the more general field of economic development.

The World Bank Group consists of the International Bank for Reconstruction and Development, known as the World Bank, the International Finance Corporation (IFC) and the International Development Association (IDA). These institutions share the common purpose of providing and promoting a flow of capital into productive projects, especially in the less developed countries of the world. Their aim is to raise living standards which, for over half the population of their member countries, are still intolerably low.

The Bank itself, of which 103 countries are now members, makes long-term loans at conventional interest rates, and while it lends for many kinds of projects, most of them have the common characteristic of being large in scale; the average Bank loan amounts to about $20 million. The Bank obtains the bulk of the resources it requires for lending by borrowing on world capital markets. The standard rate of interest charged by the Bank, now

6 per cent, is related to the cost of its borrowings.

Whereas the Bank may lend to either public or private borrowers, the International Finance Corporation, the oldest of its two affiliates, works exclusively in the private sector, concentrating its loans and investments in the development of industry. IDA, as the International Development Association is popularly known, lends to governments for much the same kind of projects as the Bank, but deals with a rather different group of customers. Its particular mission is to lend to countries not fully able to bear the burden of loans on conventional terms. Apart from small service charges, IDA's credits are made at very long term and free of interest. The resources for IDA's operations, to date about $1.6 billion, are provided by way of grant from donor member countries and by contribution from the Bank's current earnings. Resources so far available will be committed in the course of this year. The donor governments will soon have to decide the scale on which they want IDA to continue to meet the demand in the developing world for the type of financing it offers.

The World Bank Group by the end of 1965 had approved loans and investments in member countries to a total of $10.9 billion. During 1965 alone, the total funds granted amounted to $1.4 billion. This represented about 15 per cent of the total net capital flow during that year into the developing countries.

The total capital flow into the developing countries is currently estimated at about $9.5 billion per year. About three-quarters of this amount is from official aid sources and about one-quarter is private capital. But not all of this capital is available for investment. After allowing for

the outflow from the developing countries of over $4.5 billion for debt service and dividends, about $5 billion of overseas capital is available for investment. A recent World Bank study indicates that the developing countries could effectively invest a further $3 billion to $4 billion per year in the next five-year period. However, because of mounting debt service obligations in many countries, it would be necessary for most of the additional funds to be made available on concessional terms.

And what has been the result of this investment in economic development? For the developing countries as a whole, the rate of economic growth during 1963 and 1964 was between 4 per cent and 5 per cent. This represented a marked acceleration of the tempo of development but it was largely due to the expansion of industrial production, which increased by 7 per cent. The performance of the agricultural sector was disappointing. The rate of growth of agricultural output was between 2 and 3 per cent in 1963 and 1964. For the last decade it averaged only 2.5 per cent. During this decade agricultural production increased 29 per cent while population increased by 22 per cent. Thus, agricultural expansion is barely keeping pace with increasing populations. Despite a vast potential for increased food production, we are still confronted with the spectre of serious malnutrition and hunger in many parts of the world.

Agriculture is, in many respects, the most difficult field of development, because investment is hampered in the developing countries by a variety of structural weaknesses, both social and economic. In discussing the role of capital investment in promoting agricultural growth, I would first like to comment on the nature of capital investments, both public and

private. The second consideration is the influence of the institutional setting of agriculture on the opportunities for investment. Third, there is need to examine the requirements, supply and effective demand for capital. And finally, attention must be given to the measures which are being taken toward increasing the supply of sound investment opportunities in the developing countries.

Public and Private Investment in Agriculture

The functions of public and private investment in agriculture are, in general, complementary. Public investments are mainly concerned with financing of infrastructure and land improvement. Infrastructure investments in roads, railways, ports and electrification usually benefit the entire economy, and not the least the agricultural sector. The World Bank and IDA loans for transportation, which now exceed $3.6 billion, have improved the accessibility of enormous farming regions and have opened up new lands for settlement.

Infrastructure investment in the capital needs of social overheads -- research, education and extension -- provide the climate of receptivity to new methods. Public investments in land improvement are usually concerned with irrigation and drainage works, land reclamation and land clearance. The Bank and IDA have invested some $600 million in land improvement.

Private capital investment is largely directed toward improving the production of lands under use. On-farm investments include land leveling, pasture improvement, farm buildings, water supplies, etc. Provision of agricultural machinery and equipment falls usually in the category of

private investment. The farmer requires working capital for the purchase of annual inputs of fertilizer, labor, etc. Normally he must turn to credit institutions for financing at least part of these private investments.

The public investment program provides the lands and the infrastructure support the farmers need to expand their production. The funds that are channeled through credit institutions to meet private on-farm requirements are also usually from the public sector. To be effective, the public investments must be accompanied by adequate recurrent public expenditures for administrations and services.

The Use of Capital in Agricultural Development

But capital is not all that is required to bring about a substantial increase in agricultural production. Capital is only one of the essential elements, and it can be applied only as effectively as other elements of the agrarian structure permit. Inflexibilities in the institutional setting of agriculture have been a major deterrent. Traditional customs and practices, with their age-old resistance to innovation, have held back advances. Before new development objectives can be met, it is necessary to effect improvements across part or all of the fields covered by the broad term "agrarian reform." In some countries, the first need is to introduce land reform, improvement of tenure conditions, or other changes in land policies. Almost invariably there is need to introduce reforms in such aspects as agricultural administration, research and extension services, the supply of farm requisites, and market opportunities. There is likely to be need to provide better marketing facilities as well as

access to them. In addition, it may be necessary to effect changes in governmental pricing and marketing policies and, conceivably, foreign trade policies. Shortcomings in any of these aspects preclude the proper use of farm credit, the capital element of the agrarian structure at farm level. In fact, the provision of credit, where other agrarian elements are seriously lacking, is often more harmful than beneficial.

Many countries cannot effectively absorb capital for agriculture even though their agricultural output may be losing the race with the population growth. The provision of capital must be coupled with agricultural policies and actions that extend far beyond finance. There must be agricultural administrations able to plan development programs and projects. Where changes in policies are required, the administrations must be able to formulate the new policies, and the governments must be prepared to introduce them. Lastly, the administrations must be capable of carrying out the proposed programs or projects, including the strengthening of supporting agricultural services and facilities.

We have found in the Bank that, when the requirements for investment have been met, the injection of capital can lead to spectacular improvements. A program of land consolidation in Kenya provides a classic example of the successful application of agrarian reform through an integrated approach. Traditionally, the lands had been farmed under the tribal system; the use of the lands was allocated to the members of the tribe at the discretion of the chief. Members had no security of tenure or incentive to husband the soil and to improve their holdings.

In carrying out the reform, the government first enlisted the co-operation of the tribal authorities in the consolidation and demarcation of holdings and registration of titles. The next step was the provision of extension services to propose a farming plan for each holding and to guide the farmers in the use of new techniques. Water supplies were provided along with other farm requisites. Feeder roads were constructed or improved, and market outlets were developed, largely through marketing cooperatives. The role of farm credit during the early stages of the program was on a relatively minor scale. Emphasis was given to placing the farmer in a productive agricultural setting in which he could, in succeeding years, make efficient and intelligent use of credit.

These principles were applied in Kenya under the Swynnerton Plan, which commenced around 1955. In 1959, a World Bank loan was made to help finance the last three years of the work. By the end of 1962, some two and a half million acres of land had been consolidated into registered holdings and about a quarter of a million farm families were farming much more effectively. Since independence, this work is being successfully continued, mainly by African administrators. A second World Bank loan, which would give more emphasis to farm credit, is under consideration.

A second example of the successful injection of capital covers a vastly different institutional setting, a project for pasture improvement and expansion of livestock production in Uruguay. Natural conditions in Uruguay are ideal for the type of pasture improvement which has more than doubled livestock production in Australia and New Zealand. Yet in Uruguay, production had been stagnant. The results of research, which had established what might be done, were not being adopted by ranchers. Apart from

extension services to carry this technical knowledge to the ranchers and credit for its application, the other elements of the agrarian structure were favorable for pastoral development.

A World Bank loan, which commenced in 1960, provided the necessary credit. The loan also called for the establishment of a Livestock Commission with sufficient powers and technical staff to prepare development plans for participating ranchers and to supervise the execution of the plans. Progress since 1960 has been rapid. After five years, more than 1,400 properties have improved pastures, and production from this land has already increased threefold. A second World Bank loan of $13 million was made in 1965. A major increase in Uruguay's pastoral output is anticipated during the next decade.

Requirements, Supply and Effective Demand for Capital

Although no accurate estimates have been made, it appears probable that the developing countries would require an annual investment in agriculture of about $9 billion to meet reasonable growth targets. Somewhat more than 20 per cent of this requirement would represent foreign exchange expenditures for goods and services which cannot be procured domestically.

How are capital requirements met? The bulk of the investment has come from domestic gross savings, which have represented 75 per cent or more of gross investments in most of the developing countries. There is no breakdown of the allocation to agriculture of the total capital inflow to the developing countries. The agricultural share is certainly much less than the $2 billion in foreign exchange likely to be needed annually

for satisfactory growth. The current rate of inflow is probably only about $500 million.

For the developing countries as a whole, the limitation on investments in agriculture can not be attributed to a shortage of foreign funds. The main sources of aid finance are keen to invest more in agriculture. They have been unable to do so because of the lack of projects which are ready and suitable for financing. And these circumstances persist in countries where the physical opportunities for agricultural expansion are almost boundless.

The World Bank and IDA lend only for ventures they consider sound in the technical sense and capable of being executed effectively. They must also be satisfied that the investments will yield an adequate return and strengthen the economy. Up to the present, the Bank and IDA have invested about $950 million directly in agricultural projects, in addition to much larger investments in infrastructure of benefit to agriculture. Lending for agriculture is accelerating and is now at a rate of about $150 million a year, or about 30 per cent of all foreign investment in agriculture in the developing countries. One reason for this acceleration is that lending policies for agriculture have been liberalized and are now better adapted to the special requirements of agriculture. Another reason is that the results are now being felt of measures being undertaken in the developing countries to widen opportunities for agricultural investment.

Measures toward Improving the Climate for Agricultural Investment

The first step toward financing a project is to study the proposal thoroughly and to prepare a "feasibility" report which can form the basis of appraisal. Various measures are being taken within the United Nations family and under bilateral aid to assist governments in the preparation of agricultural projects. Of major significance is the partnership which the World Bank and IDA has formed with the United Nations Food and Agricultural Organization (FAO) to increase Bank/IDA agricultural investment.

A special team has been established within FAO headquarters for this work with the Bank. The team, now 25 strong, also calls on other FAO experts. It has, as its prime responsibility and emphasis, the identification and preparation of projects. The Bank continues its responsibility for the appraisal of projects and for the supervision of loans. Since the partnership commenced in June 1964, the FAO staff have participated in 105 missions to 49 separate countries. More than half of the missions were to assist governments in the identification or preparation of projects; the remainder covered participation in Bank missions for economic review, appraisal, or loan supervision work. Loans arising from these missions already total $130 million.

There are other cooperative endeavors which will have impact on agricultural development. FAO has concluded an agreement with the Inter-American Development Bank for project preparation work. Similar agreements with other regional development banks appear probable. This linkage of FAO's experience and technical services to sources of finance

will serve to lower the existing barriers to investment in agriculture. The Bank also has a Cooperative Program with the United Nations Educational, Scientific and Cultural Organization (Unesco) to increase Bank/IDA lending for education which, in the long run, will greatly benefit agriculture.

A major source of United Nations assistance in the preparation of projects for financing comes from what is now called the United Nations Development Programme. The Special Fund, now merged into the UN Development Programme, began operations in 1959 with the main purpose of helping the developing countries acquire knowledge, skills, and institutions essential to a fuller use of their resources. Up to February 1966, the Special Fund had approved 604 operations representing a cost to the Fund of over $580 million. FAO administers 241 of these projects which are concerned with agriculture. About 80 projects are pre-investment studies in the sense of preparation of agriculture projects for financing.

The tempo of the work in project preparation by the United Nations is rapidly increasing. This effort is augmented on a major scale under bilateral aid programs of many countries and by private institutions. Much of the actual work is being undertaken by agricultural consultant firms which are proliferating to meet new demands for services.

After project preparation, the next need for widening investment opportunities is to assist governments in strengthening their agricultural administrations. Three lines of action are likely to be involved: the training of personnel, improvements in organization of

administrations and services, and provision of recurrent funds to employ additional personnel. In these actions as well, considerable help is forthcoming from within the United Nations. Unesco devotes major attention to the grave needs for improved and wider general education. Approximately 50 Special Fund projects are designed to establish or strengthen agricultural training institutions. Almost all of the other Fund projects have important elements of training, including on-the-job training of local counterparts by foreign technicians and the award of fellowships for more advanced training. Various other agencies, including FAO, also devote high priority to training. Other international bodies such as the Colombo Plan, the Organization of American States, and the OECD give high emphasis to training of skilled manpower.

The effective use of skilled manpower within administrations, services and institutions demands that these bodies have appropriate legal powers and organizational structures. Some of the newly independent countries have inherited an administrative framework that has been well built for the task ahead. In many other cases, however, the administrative set-up must be reorganized. Ample help is available to governments for this purpose. The Special Fund is active in this area. A full Division of FAO is working on the improvement of rural institutions and services. Other UN Agencies are concerned with improvements across the whole field of public administration. Much of the technical assistance forthcoming under bilateral and private aid is also directed toward training of personnel and the strengthening of rural institutions.

Despite the breadth of technical assistance now available, agricultural administrations, services and institutions are not being strengthened with sufficient rapidity. Most of the developing countries are now in a position to command the facilities necessary to meet reasonable requirements for the training of skilled manpower and for the improvement of their administrative structures. Why, then, are they not taking fuller advantage of these opportunities? One reason could be the resistance of interests within the agricultural sector which are vested in the status quo. In other cases, the answer lies largely in the inability or reluctance of the governments to provide sufficient recurrent budgetary funds for the employment of all the necessary skilled manpower that they have available or could obtain.

Most of the sources of aid finance or provide foreign technical experts to work within local administrations. On the other hand, there are relatively few sources of foreign finance to supplement national budgets in the provision of recurrent funds for the employment of local technical personnel. The developing countries must build sound national administrations and institutions before they can reduce the existing gap between capital available for investment in agriculture and their absorptive capacity. This goal would be reached much more rapidly if wider means could be found to supplement capital aid funds with recurrent aid funds for development-promoting purposes.

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