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MS NANCY BIRDSALL, CHIEF, POLICY AND RESEARCH DIVISION, PHN DEPARTMENT
WORLD BANK, WASHINGTON

AGENDA

WORLD BANK / WORLD HEALTH ORGANIZATION

MEETING ON HEALTH POLICY

AND COLLABORATION

* * *

3 - 4 SEPTEMBER 1986, GENEVA

Purpose: It was agreed between the World Bank and WHO to hold a joint meeting of two days in Geneva in order to discuss relevant health policies determining action in the health sector and ways of improving complementarity of the two organizations in countries.

Agenda: The attached, jointly agreed Annotated Agenda will serve as a guide for discussion.

Style of Meeting: It is understood that the Meeting will be informal and of a "brainstorming", open nature.

Participants: A provisional list of World Bank/WHO participants is attached.

Place of Meeting: The meeting will be held in Meeting Room 2 at the Headquarters of the World Council of Churches. The address is:

Centre Oecuménique
150, route de Ferney
1218 Grand-Saconnex
Telephone: 91 61 11

Time of Meeting: The meeting is scheduled to start on Wednesday, 3 September, at 9:30 a.m. A joint lunch is planned for 3 September in the restaurant of the Centre.

WHO/COR - 12.8.86

DRAFT ANNOTATED AGENDA

1. District Health Systems -

- **Concretizing health systems based on Primary Health Care at the district level.**

As a corollary of its policy to commit major resources into building up health infrastructures, WHO is now concentrating on supporting countries in developing their **district health systems based on primary health care** for effective application of the scientific and technical tools of health development.. This involves the planning and organization of the system as a whole, based on replications of the fundamental building block - the district. It includes the strengthening of community health care, training requirements, and the logistical and referral system. It offers the means for **concretizing the health system based on primary health care at the district level**, and for dealing with the political and administrative problems that arise. The district focus is a useful way to organize policy, strategic, managerial, technical and financial support to developing countries in health. The role of the private sector as well as domestic and international NGOs can usefully be examined in this connexion. This topic will provide a useful opportunity to share experiences and views, including the importance the Bank attaches to a "systems approach to investment", of which hardware is only a part.

2. Financing Health for All:

- **Facing the political and economic challenges for the attainment of health for all -- nationally and internationally.**

One of the weaknesses revealed by the recent evaluation of the strategies for health for all is the area of financing. This involves both

macro- and micro-economic analysis based on reasonable costing of strategies and their component parts: infrastructure and technology. Also involved are such aspects as programme budgeting, recurrent cost implications of investment, identification of realistic sources of financing, including cost recovery systems. Facing the political and economic challenge to match our vision with the actual attainment of health for all - at national and international levels - may mean that promises to provide free health care have to be politically swallowed.

3. **Strengthening management capacities in health systems, including monitoring, evaluation and information support:**

- **The Bank's role in supporting development and strengthening of national managerial capabilities.**

WHO has gained some experience in applying a common approach to strengthening the managerial process for national health development. That experience includes having set in motion a process of monitoring and evaluation, including the necessary information support, undertaken by Member States for the assessment of progress in achieving the objectives of national strategies of health for all. It will be useful to examine possible courses of future action by WHO and the Bank to ensure progress in this area.

4. **Review of the Research Agendas of the two Organizations:**

productivity effects of adjustment policies

- **Comparing policies governing decisions on research priorities.**

The opportunities and challenges in health research continue to expand. This is the case in tropical diseases and human reproduction, in the development of drugs and vaccines, and also in the social application of health technology. There may be possibilities for new, complementary action and joint studies in research if the agendas of the

two organizations could be compared.

5. **Bank Financing of International Health Efforts:**

- **Identifying additional research areas for Bank financing.**

One useful and appropriate application of Bank financing has been the support provided for research and training activities in programmes such as **TDR** and **HRP**. WHO has had a crucial role in facilitating such collaboration among a variety of international partners. It may be useful to examine the prospects for other similar efforts or similar approaches for joint planning and financing.

6. **WHO/Bank Collaboration and Communication:**

- **Increasing complementarity of action in countries.**

There are many points at which the policies and programmes of the Bank and WHO converge in the health sector. This meeting might explore the potential for and limits to **complementarity** on the operational side, and how the two organizations could work more closely together in the future on health sector analysis, information exchange, project preparation, project implementation and donor coordination.

7. **Other Matters:**

7.1 The Effects of Adjustment Policies on Health and Nutritional Status

- Both Organizations should exchange views on this issue, recently brought forward to the Bank and to WHO by Dr A. Horwitz, Chairman of the UN/ACC Sub-Committee on Nutrition.

8. **Concluding Observations for Future Action.**

Participants:

Participating for the **World Bank**:

Mr John North, Director of Population, Health and Nutrition Department
Ms Nancy Birdsall, Chief, Policy and Research Division, PHN Department
Mr Stephen Denning, Chief, Division I (S Asia, E^n & S^n Africa), PHN Dept.
Ms Ishrat Husain, Chief, Division II, (E Asia, Pacific, W Africa), PHN Dept.
Dr Anthony Measham, Health Adviser, Office of Director, PHN Department
Mr Emmerich Schebeck, Chief, Division III, (Lat. America, Carib., Europe, Middle East), PHN Department

Participating for the **World Health Organization**:

Mrs Ingar Brüggemann, Director, Programme for External Coordination
Dr Joshua Cohen, Director, Senior Adviser on Health Policy, Office of the Director-General
Mr Andrew Creese, Economist, Strengthening Health Services
Dr Michel Jancloes, Medical Officer, Health for All Strategy Coordination
Dr Stuart Kingma, Chief, Health Resources Mobilization, Programme for External Coordination

WHO/COR - 12.8.86

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PHN
December 4, 1985
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PHN LENDING

WORLD BANK
POPULATION, HEALTH AND NUTRITION (PHN) DEPARTMENT

REVIEW OF P.H.N. SECTOR WORK AND LENDING IN HEALTH, 1980 - 1985

by Anthony R. Measham
March 1986
[PHN Technical Note 86-14]

[Note: What follows is a slightly abbreviated version of the Bank's summary of this PHN document. Highlighting of the text is mine. Beginning on page 6 are some points in the main text of the document which are of particular interest to WHO.]

1. The Bank began lending directly for health in 1980. This paper reviews the first five years of sector and project work in health.

2. It encompasses **19** health projects and **55** sector reports, **22** of those in sub-Saharan Africa. Three quarters of the sector studies were comprehensive (covering PH & N), the rest were single topic or part of public investment review.

3. Over the 5 years, the sector work increased in comprehensiveness, depth of analysis, and overall quality. Several areas received increasing attention:

- health costs and financing,
- the hospital sub-sector,
- pharmaceuticals, and
- nutrition.

4. The conclusions of the **1980 Health Sector Policy Paper** about problems within the health sector were basically confirmed:

- lack of access to health services
- emphasis on curative and hospital care
- insufficient and inappropriate training of health personnel
- lack of essential drugs and supplies
- and, above all, weak management.

<u>These findings emerged from the five year review:</u>

a. HEALTH COSTS AND FINANCING

i) Expanding PHC will be possible in many countries only if the disproportionate share of resources currently absorbed by hospitals, many of them urban, can be ***reallocated*** to PHC, prevention and district hospitals;

ii) Publicly financed health programs in most developing countries ***will have to*** **shift more of the financing burden, especially for curative care, on** ***to recipients through cost recovery***;

iii) Duplication of effort by health service providers (esp. by Ministry of Health and social security agencies in Latin America) often wastes scarce resources;

iv) **Substantial benefits are likely in many settings from increased pluralism in health service delivery**, with MOH, social security agencies, NGOs and the private sector sharing the responsibility in coordinated fashion.

b. HOSPITAL SUB-SECTOR

i) The **critical role of hospitals** in referral, training and supervision (in addition to resource consumption) requires that they **receive greater attention in sector and project work**;

ii) **Weak management**, especially financial management, of hospitals is **a key sector problem**.

c. URBAN HEALTH SERVICES

i) Appalling health conditions in many cities, *and the need to increase cost-efficiency everywhere*, call for attention to **urban health services** in many settings;

ii) Urban health services can be delivered at *relatively low cost* and can provide *an appropriate vehicle for expanding family planning services* where demand is strongest.

d. CHRONIC DISEASES

Substantial morbidity and mortality from heart disease, cancer, stroke and other **non-infectious disease** is evident even in the poorest countries and **requires immediate attention**, especially where low cost preventive measures are known, e.g., anti-smoking measures.

e. SUPPORT SYSTEMS

Public health and clinical **laboratories**, plant and equipment **maintenance**, and **drug and vaccine quality control**, are important areas that **deserve more attention** in selected cases.

5. Over time, **PHN has moved** away from a very strong rural primary health care focus **towards a more pragmatic view of the sector**, which is reflected in *increasing attention to areas such as health costs and financing, pharmaceuticals and urban health systems, including hospitals.*

6. PHN's heavy investment in sector work has paid dividends in sector knowledge and experience, in increased credibility, and in increased lending. It has contributed to a more favourable stance on population and family planning in several countries (Malawi, Cameroon, Jordan), been a factor in major policy decisions (Brazil, China) and facilitated communication with other donors. Delays in sector work usually due to lack of clear agreement with governments regarding objectives, lack of critical expertise on sector mission, or the complexities of managing multi-donor missions.

7. Mean elapsed time from sector mission to discussions with government was 12 months (range 5-27 months).

8. **DIRECTIONS FOR FUTURE SECTOR WORK**

a. Since most likely PHN borrowing countries have been surveyed, second generation sector work should **concentrate on key issues, such as health costs and financing, health manpower (especially physician education) and pharmaceuticals.**

b. PHN should increase the proportion of sector reports that reach the "green cover" stage, try to shorten time to discussion with governments to 6-8 months.

c. **Greater national involvement in sector work recommended in order to maximize efficiency and country commitment** to findings. PHN staff will have to play less direct, more facilitating role.

d. PHN give high priority to participation in public investment reviews.

e. **Periodic broad sector reviews, perhaps every 3-5 years, are recommended for major borrowing countries.**

f. Sector work should continue to enjoy priority and provide essential basis for sound investment.

Lending for Health

9. Bank is **largest lender for health** since 1983; loans or credits total over $100 million every year. PHN lending was 1.6% total Bank lending in 1984, 1.3% in 1985. In FY1985, 19 loans or credits for health projects were aproved for total of $410 million. Only USA and Japan provide as much, but mainly as grants.

10. **Lending in health increases opportunities to dialogue on population issues and provide support for strengthening family planning services.** Four other factors have contributed to increased lending in the sector:

- doubling of regular staff
- increased volume of sector work
- improved credibility with the Regions
- demand for health loans.

11. Health projects have common features: almost all have a strong rural focus; most seek to extend basic health service coverage; all include human resource development component; most include substantial effort to strengthen FP services; all support health facilities development, mainly at PHC level; 2/3 support sector studies; most include elements directed at improving nutritional status and strengthening pharmaceuticals development; cost recovery for drugs or services is in a good number; several include water supply/sanitation and tropical disease control.

12. Thus, most of the first generation PHN projects seek to:

a. increase coverage, efficiency and effectiveness of basic health services (including FP and nutrition), mainly in rural areas;
b. strengthen capacity to plan, implement, monitor, evaluate health services;
c. improve human resource developmnent in the health sector;
d. strengthen physical infrastructure, mainly at PHC level;
e. increase sector knowledge through studies.

13. Other project types:

- manpower development;
- institutional development;
- urban health services;
- tropical disease control;
- strengthen pharmaceuticals management;
- stress cost-efficiency.

14. Half the projects include quantified targets; most are service coverage targets; or mortality reduction targets.

15. The 19 approved projects clearly **address 5 of the 7 elements recommended in the 1980 Health Policy Paper**:

- **infrastructure development**
- **training health workers**
- **strengthening drug supply**
- **MCH and FP services**
- **development of management, supervision, evaluation systems.**

Less successful in addressing **malnutrition** (due to lack of government interest and capability, or due to desire to keep project simple) and **tropical disease control** (due to lack of Bank staff expertise and concerns about affordability).

16. After detailed study of some projects, it was concluded that **some projects may have attempted to do too much.**

17. Staff time per project diminished between 1981 and 1985.

18. With diminshing staff attention, there is reason to question whether health projects can be supervised adequately with less than 20 staff weeks. ***With limited supervision, there is limited basis on which to discuss project impact.*** Of the eleven projects with at least two supervision visits, two are relatively problem-free, seven have moderate problems, and two have severe problems. The most serious and intractable problems encountered in PHN's early health project experience relate to technical assistance components and shortages of counterpart funds, mirroring Bank experience in other sectors.

19. DIRECTIONS FOR FUTURE PROJECT WORK:

a. While there will be a continued need for the basic health services project (including FP and nutrition), **future projects should be more sharply focused on a small number or only one major problem**. Innovation in project design shold be encouraged and careful consideration given to sector and policy-based lending.

b. Efforts to **stress cost-efficient models** of health care delivery, to **minimize recurrent costs** and to **encourage pluralism** in health service providers, are distinctive features of PHN health projects that deserve continued emphasis.

c. **Nutrition and tropical disease control** appear to be **relatively neglected** in health projects and deserve greater attention.

d. More attention is necessary to the **detailed project design essential to managing health services at the periphery.** Management should encourage intensive staff effort in this area, which may require additional and more frequent preparation missions and may exert upward pressure on lending coefficients. We intend to conduct an in-depth review of project experience to date in delivering health services at the periphery.

e. **Quantified targets are desirable in all health projects** except those not involving delivery of services, e.g., some institutional development projects. Process indicators (immunization coverage, FP prevalence, etc) are usually more practical, but impact measures (reductions in age- or disease- specific mortality) should be included when feasible, e.g., in malaria control projects.

f. **Studies of health services utilization and analysis of different service delivery approaches, deserve priority in sector, project and research work.**

g. The project review process should concentrate more upstream, especially on the Project Brief and early preparation phases. Efforts to reduce project preparation time deserve emphasis.

COMMENTS OF PARTICULAR INTEREST

page 8, para 2.10

Lack of familiarity with the hospital area led to their relative neglect in early work. Gradually came to realize the need for careful analysis in order to bring about policy change in the area that absorbed half to three-quarters of all sector resources. Stress on PHC at the time tended to result in insufficient attention paid to hospitals.

page 9, para 2.16

One reason noted for early neglect of the area of costs and financing was that WHO did not assume the leadership, nor develop the expertise, in economics and financing that it provided in many other areas. Sector dominance by physicians, disinclined to concern themselves with questions of economics and finance.

page 12, para 2.25

Lending for health was originally cast in the direction of meeting basic needs and strengthening basic health services. But Alma Ata philosophy swung the pendulum too far away from concerns about urban and hospital health care, and thereby away from exerting leverage on the health sector as a whole. PHN has moved more towards a pragmatic approach that covers cost and financing questions, chronic care, hospital care, as well as support systems.

page 14, para 2.32

Delayed reports from multi-donor missions resulted from different objectives and perspectives on sector work. Inclusion of other donors or agencies seriously delays completion of report and discussion with the government. Reports from other agencies often do not meet Bank standards or arrive late. Difficult to coordinate. Several efforts to conduct sector work jointly with WHO in Africa, in Guinea for example, have encountered difficulties. All suggests that sector work should be conducted jointly only in exceptional cases, balancing extra costs in preparation time and management against expected benefits.

page 15, para 2.36

Heavy volume of current and future lending operations, and increasing portfolio of projects under supervision makes allocation of staff resources more difficult, and has several implications:

1. strong case for greater national involvement than has been norm to date. Greater country responsibility will require that PHN staff play different role, that of catalyst, facilitator, resource person, quality control and editor, rather than principal data analyst and author.
2. second generation of sector studies should be more narrowly focused on carefully selected, priority problem areas, such as health costs and financing, manpower development and pharmaceuticals. Broad reviews would continue in the sense of periodic updates on overall sector status, at least for major countries, perhaps every 3-5 years, or when country and PHN see a role for policy-based lending.

page 21, para 3.01

Bank became largest lender for health in FY83, and since then have had health projects totalling over $ 100 million approved each year. Only the US and Japan also provide an average of $ 100 million per year for health, largely in form of grants. Next largest donors, each averaging $ 40 million or less per year are the FRG, African Development Bank, Asian Development Bank, Inter-American Development Bank, Sweden, Netherlands, France, EEC, Denmark. (Figures do not include water and sanitation investments, nor health components of non-health projects.)

page 23, para 3.05

The clear trend is for sup-Saharan African projects to have an important focus on population/family planning, for example, in Burkina Faso, Ivory Coast, Zimbabwe and Rwanda. The ability to lend for health clearly was an important factor in facilitating the population policy dialogue.

page 23, para 3.06

Interesting fourth element adduced to explain increased and accelerated rhythm of lending in the sector is the fact that there was demand for health but not for population loans and credits, except in Asia where a rhythm of linding for population had already been established. Moreover, population grant funds were available from other sources, especially for Africa. However, many governments were not interested in

population projects for a veriety of political, cultural and religious reasons.

page 26, para 3.14

One common feature of health projects was strengthening pharmaceuticals management. Shortages of drugs and supplies, and inefficient procurement, storage and distribution systems are major constraints in most coutries where PHN has sector and/or project work. In ten cases, including six in sub-Saharan Africa, strengtheining pharmaceuticals management and, in some cases, production, is a major goal. Appraisal reports in a number of countries agrued that projected savings on pharmaceuticals would largely, or completely, offset the incremental recurrent costs generated by other project investments. The prospect of simultaneously dealing with two major healthsystem constraints - poor supply and management of pharmaceuticals and inability to finance additional recurrent costs - is a powerful justification for these components.

page 30, para 3.25

Three other considerations argue for more sharply focused projects. First, the public sector clearly will not be able to carry out its mandate as the predominant service provider in many of the poorest countries. Indeed, the limited coverage of the public sector may well decline in some settings. Thus, there is an urgent need to explore alternative roles for health ministries in such settings, with larger roles in service provision for NGOs and the private sector, while emphasizing both wasteful duplication of infrastructure and lack of coordination that characterizes many health systems.

Précis by S.J. Kingma,
COR/HRM/WHO
August 1986

FINANCING H.S.

WORLD BANK
POPULATION, HEALTH AND NUTRITION (PHN) DEPARTMENT

FINANCING HEALTH SERVICES

May 1986
[PHN Draft Document]

[Note: What follows is the Summary of this Draft Paper. It is a restricted document and not for quotation.]

1. Summary

Health care must be paid for, by one means or another. Yet the methods that countries currently rely on are failing many of them. The ramifications are damaging not just for the health sector, but for the pace of development generally, through effects on the amounts of resources that health services draw away from other possible uses, on the efficiency and equity of resource allocation and benefit distribution, on the prospects for progress in related areas (such as population), and on people's general productivity and wellbeing (because health status affects living standards directly).

Countries are seeking new solutions. This paper tries to suggest some ideas, principles, alternatives, and priorities that might help. Its main conclusions are presented below, followed by remarks on the problem, the options, and possible approaches to finding solutions.

1.1 Main Conclusions

Present policies need to be substantially reoriented in many countries. The dominant pattern now is to try to finance health care as much as possible from public revenue sources. Public agencies own and

run large systems of health facilities, or heavily subsidize quasi-public systems.[2] Users of the services are charged little or no fee. Alternative sources of care, through private sector providers, are looked upon unfavorably by policymakers (although in fact household spending on such sources as medicine retailers, traditional practitioners, missionary facilities, and modern practitioners often far exceeds government health spending). Risk coverage is not widely available, except in a few areas, and little is done to encourage its growth.[3]

These approaches have been widely unsuccessful. The precepts underlying them need to be vigorously challenged. Yet the opposite extreme --of sweeping privatization and full cost recovery from users for all health services--is not likely to be optimal either, given most societies' multiple objectives. New policies are required that allow for the intrinsic differences among different types of services (immunizations, for instance, will normally warrant a drastically different method of financing than, say, elective cosmetic surgery). Mixed financing approaches, with

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2/ "Quasi-public" here refers to health care providers that, while technically part of the public sector are autonomous or at least partly so. Examples are facilities belonging to social insurance schemes and parastatal enterprises (e.g., a government owned mining firm).

3/ "Risk coverage" as used here encompasses all mechanisms by which people pay for health care other than through use-dependent charges, general taxes, or loans. Private insurance is one form of risk coverage; others include government-run "social insurance" schemes, community-based or cooperative-based health provision groups, employer-provided health care, health maintenance organizations, and non-HMO prepaid schemes. People pay some non-use-dependent charge to obtain a right to get health care when it is needed: in effect they "cover" themselves against the "risk" of becoming ill or hurt. "Risk coverage" is thus roughly equivalent to the terms "risk sharing" or "risk pooling," as used in other studies; but precisely interpreted is slightly broader in that it also includes certain types of employer plans that would not conventionally be thought of as similar to insurance.

somewhat greater roles for private providers, user charges, and risk coverage than at present but with continuation of an important role for the public sector, and usually with less than total cost recovery from users, will often be the best practical approach.

An essential aspect of the new approaches should be to have users bear a larger share of health care costs--not for every service, but in general. Certain fees at government health facilities should be raised, frequently by a large amount, and any barrier to the charging of cost recovery level fees by other (private and quasi-public) providers should be examined and in most cases removed. Paradoxically, fees for certain other services should be kept at the same levels or even lowered.

Outpatient curative services will normally present the most clearcut case for higher fees. They, together with inpatient curative care, account for 70 to 85 percent of all developing country health expenditure. Preventive services generally should be priced well below full cost; in a few cases, zero fees or even negative fees (incentive payments to users) should be the long-run objective. The primary long-term goal for countries in determining fee levels is that price should be equal to marginal social cost except where there is a compelling case for a lower price (the possible reasons relate to externalities, merit goods users' lack of full information, the free rider problem, and important failures in other markets).

To ease the financial hardship of higher fees and to help address equity concerns (how will the poor cope?), two other actions are needed.

One is to promote risk coverage, and the other is to design fee policies to incorporate differential pricing, through which the poorest would be charged smaller fees than others (perhaps even zero in some cases). Differentiation is possible by location (e.g., one fee for poor rural areas, another for other areas), provider discretion, certification of poor households by local community leaders or some other method. Related options should be explored for charging users more when they elect costly extras--e.g., a semi-private room when there is a general ward bed available, or a direct consultation at a hospital when the normal procedure is to go to a lower level facility first and be referred to the hospital when necessary.

Promoting risk coverage also can help in another way: it is another means, besides user fees, of having users bear a larger share of health care costs (insofar, that is, as the alternative would be continued dependency on tax revenue). Risk coverage schemes, ranging from large formal social insurance to small, informal community plans, have substantial and as yet largely untapped potential to assist in resolving financing policy dilemmas, particularly in (i) mobilizing considerable amounts of revenue (often much more than in practice can be generated from user fees alone) and (ii) spreading health care costs from the sick to the non-sick and from the poor to the rich. However, theory and evidence both suggest that most forms of risk coverage undermine incentives for efficiency. In general, therefore, the goal for poorer countries to pursue on risk coverage should be to keep the extent of coverage to the minimum amount needed to satisfy objectives on equity and on protecting individuals

against having to choose between financial ruin from health care costs or going without needed care; and to do this with the minimum necessary interference with market forces.

Often this will mean promoting a high degree of co-payment, designed if possible so as to have a "major medical only" focus, or to only pay for services above a relatively high deductible (catastrophic coverage).[4/] Under these two types of plans, covered households that accumulate only modest health expenses in any given year would bear most or all of the total themselves; those with a large amount would be protected. In addition, the choices of plans available should be made as numerous as possible: for users, choices among alternative sources of coverage and/or alternative coverage plans from each source; and for institutions that run or finance coverage schemes, choices among alternative health care providers.

Private sector provision of health care should be channelled constructively, rather than ignored or restricted. The various kinds of payments and other subsidies that governments make both to its own and to quasi-public and private providers should be re-assessed. Besides the levels of these subsidies, their basis also is important--that is, whether institutions are paid for actual reported cost, for estimated reasonable cost, on the basis of a capitation formula, or in some other way.

4/ "Co-payment" exists where covered users pay a user fee (although usually smaller than what uncovered users would pay) in addition to the non-use-dependent charge they pay to belong to the scheme. They and the scheme thus "co-pay" together. Co-payment can be designed to produce a "major medical only" focus by setting the deductible, the co-payment rate, and the maximum payment limit as high as possible, consistent with other objectives. Simpler variants also are possible.

Also, government's role in providing of services should be re-examined. Unquestionably there are compelling reasons for government to remain a primary provider where private markets cannot suffice: for example, for disease control programs, for certain other preventive services, and for curative services in cases where private providers might never step in (remote, poor areas) or where a lengthy transition period will be required before private providers become well established. But for curative services where these stipulations do not apply, the arguments for public provision do not, on close inspection, stand up well. In general, more countries should begin to think about having government do less direct providing of care and more indirect financing and regulating of other providers.

Not only should government make use of and encourage the private sector, but it also should take actions to increase the efficiency of governmental health providers. To the extent legally possible, funds collected from fees should be allowed to be kept and spent by the collecting unit. This decentralization of the control of funds would provide incentives for the units both to collect fees and to use the funds wisely. Facilities collecting more revenues than spent in a given year would be able to invest the surplus in both expansion and improvement of the quality of services. The signaling mechanism of a price system would become operative, and the efficiency of resource allocation would be improved, both in the short and long terms.

Even though the evidence available on the some of the topics discussed here is limited, the basic arguments are not intrinsically different from those used for other sectors, where similar data constraints exist. The economic principles appealed to are well known. A case can be made for more research, but this should not deter country officials from taking immediate action where warranted. Much progress is reforming fee schedules, introducing or reforming risk coverage systems, decentralizing the public sector and increasing the value of the private sector is possible, with current evidence. The initial incremental steps in such reforms can help generate valuable additional information needed in designing subsequent measures.

The rest of this Summary elaborates on the conclusions just outlined.

1.2 The Problem

The current ill health of third world health financing policies has efficiency, equity, and revenue generation dimensions. Existing health services often are chronically underfunded by large orders of magnitude, and the result is low quality care and wasted investments, plans for improving services which cannot be realized, and frequent financial "crises" among public and quasi-public providers. Inappropriate pricing of services contributes to gross misallocations of resources; perverse incentives are perpetuated, with the result that neither providers nor

patients have incentives to minimize waste; and dependency on tax revenue, where taxation policies are distortionary, hinders the achievement of efficiency goals. Huge disparities in the distribution of health services are exacerbated, favoring the advantaged at the expense of the disadvantaged: attempts to offer "free care to all" often turn into "some care for a few and little for the rest," and unfortunately "the rest" are disproportionately poor.

The damage that these problems cause both inside and outside the health sector will, if nothing is done, go from bad to worse in the two decades ahead--and beyond as well. Health services now account for about 5 percent of total public expenditure in developing countries and for some 2 to 4 percent of gross national product on average--not trivial sums for countries with limited choices for fiscal policy maneuver. Yet more importantly, the sector will be under strong pressure to expand rapidly in the future as income levels and expectations rise. If the pattern followed by the industrialized countries is any guide, the expansion could ultimately lead to a doubling of health's share of GNP. In the short run, the pace of change may be trouble enough: as per capita incomes rise, health spending has typically risen faster (income elasticities have been above one). Countries that do not begin to alleviate the problems caused by present health financing arrangements can only expect the problems to worsen overtime.

1.3 The Options

A list of the options available to countries to improve matters might include the possibilities of changing:

- the pricing of services
- policies on risk coverage
- the organization of the public sector and the size and structure of public subsidies
- the importance of the private sector in providing for total health needs
- the efficiency with which the resources already available to the health sector are used (e.g., improve the allocation of resources and strengthen institutions)
- activities in other sectors that affect health conditions (e.g., increase investment in water supply and sanitation in lieu of or in addition to extending health facilities)
- Reorient health sector goals, reoriented so as to conform to resource limitations (e.g., reduce targets for facility construction).

As countries determine what mix of measures is best for them, the broad objective they should strive toward is the same as in any other sector: each activity--whether in the supply and consumption of health services, risk coverage, factor inputs (staff, etc.), or whatever--should be increased to the point at which the benefit to the society of any

further growth in that activity would be less than the value of the resources required, if these resources were used for their most valuable alternative purposes (i.e. increase the scope of any activity when the marginal social benefit of the increase exceeds the marginal social cost).

The practical problem that must be faced is how to stimulate suppliers and consumers to move toward that economic efficiency goal.

Pricing of Services

If conditions in the health sector approximated the requirements of economists' notion of perfectly competitive markets, then the optimal strategy would be to: (i) let prices fall where they may, since market forces would in that case lead to optimal efficiency, and (ii) make unrestricted resource transfers to particular groups where needed to provide for equity and financial viability.

The health sector in fact does display some of the characteristics of the competitive markets paradigm, but it does not do so in all respects. One problem is that there is usually one large and powerful supplier of health care--government--that is at least partly immune to market forces. Another problem is that the types and amounts of services that consumers want and that suppliers are willing to provide cannot automatically be assumed in this case to be the types and amounts that are best for society (because of externalities and other causes of market failure in health markets).

Nevertheless, prices should play a central role in the health sector in determining how well or poorly a country does in achieving its objectives. Consequently, policymakers should seek to combine (i) the power of price signals to bring about desired changes, with (ii) the use of public policy to assure that prices are appropriate. Policy interventions that can help "get prices right" in this sense may entail not only reforms in user fees, but also deeper structural changes as well, relating to the extent of government's regulatory role in the sector, the incentives and obstacles to development of private sector health care generally, the spreading of risk coverage schemes, and conditions in markets both for credit (to borrow for expanding or improving facilities) and for other factor inputs.

Charging fees for health care currently is viewed with disfavor in the official policies of many countries. Nevertheless, fees are far more common in developing country health systems than is generally recognized. At government facilities, they exist in at least 68 of the 94 low and middle income countries in the 1984 World Development Report. And, of course, they are standard among private sector providers, who in most countries provide the majority of health services.

Public sector fees are mostly small, relative both to the costs of providing services and to the purchasing power of the population served. Few charges are currently more than a modest fraction--e.g., 10 to

25 percent--of the provider's actual cost of supplying the service.5/ The revenue actually generated typically recovers less than 15 percent of total public expenditure on health. Moreover, a user of government facilities can often obtain an outpatient consultation for less than the wage paid for half a day of agricultural labor, or an inpatient stay for less than two days' labor.

Nevertheless, because private fees and the revenue they generate are higher than their public counterparts, public and private fees together are the source of over half of all funds spent on health care in the developing world.

Development of improved pricing policies requires that policymakers examine each type of health service individually. The recommended procedure is to:

- use marginal cost to determine an initial benchmark for the price of each service;
- assess whether--and if so by how much and for whom--prices below marginal cost are warranted;
- use differential pricing (including even free services for the very poor) to make allowances for disadvantaged groups;

5/ That is, average cost. But this statement may also be approximately correct for long run marginal cost, according to available information on scale economies and diseconomies.

- consider how much additional funding from other sources (e.g., public subsidies) will be needed to cover costs, and if necessary make further adjustments to prices and/or alter pre-existing subsidies;
- recognize that where government is a major provider, efforts to set correct prices may have to be supplemented by initiatives to assure appropriate supply responses within the public sector.

The possible reasons a price below marginal cost may be warranted are discussed at length in the text. In each specific country setting, these issues will need to be assessed afresh, because the applicability of each possible reason for lower prices for each specific type of service will differ according to the specific situation in each country.

For inpatient curative services, the long run goal should be to raise baseline prices to marginal cost, but a lengthy transition period (5 to 10 years or more) may often be required. The transition period would allow complementary reforms to be undertaken and to take effect.

A further issue that must be considered is how fees and fee reforms might affect (i) utilization of health services and (ii) health status. The extant evidence is consistent with the proposition that for all but exceptionally large fee increases, substantial numbers of people would be able and willing to pay higher fees than prevail at present, and that the effects on health services utilization, health status, and other consumption would be minimal.

How should countries begin this reform process in practice? Which services should they focus on first? -Marginal cost pricing of curative services probably should have first priority, not only because they account for a very large share of total health expenditure (70 to 85 percent) but also because the arguments are clearest in their case about precisely what price reforms are needed. Raising fees for curative services, relative to the excessively low levels prevalent now at public facilities, will do far more for revenue generation, efficiency and equity than changes in the much smaller preventive area. Moreover, it is among curative activities that the arguments for deviating from full marginal cost pricing tend to be least relevant.

Yet reforms in the pricing of preventive services must not be ignored completely. Where fees exist now, they should be examined to be sure they are not excessively high. Within the preventive category, however, services to patients should also be investigated as to whether fees should be initiated or increased. It can generally be assumed that other (non-patient oriented) preventive services can remain without fees; and if they are very important for society, perhaps even have subsidies provided to the users.

Risk Coverage

As a result of the raising of fees through pricing reforms the need for rapid action to provide or reform risk sharing plans will be increased. The willingness of people to pay for protection against the financial risks associated with ill health already appears to be widespread

--at least in countries where income is above the low levels still prevailing among the extremely poor, for whom other essential needs (food, shelter) take precedence. This demand appears to be somewhat elastic (or at least not completely inelastic) with respect to income: people want more risk coverage as their income rises—and not just as their income emerges from subsistence levels but at higher levels as well. Theory and the limited empirical evidence available suggest that there may therefore be strong "latent demand" for risk coverage among developing country population currently, in the sense that as real incomes rise in future, actual demand will increase significantly.

Because of the high cost of risk coverage schemes which cover most or all health costs, the wisest starting point in most low income countries will be plans that achieve the most important objective of any risk sharing plan—the prevention of financial ruin (catastrophe) due to illness. Plans should be put into place as soon as possible that cover the costs of illness only after the household's expenditures exceed some define catastrophic level (either per year or per illness). Where it is practicable the definition of the catastrophic expenditure level can be related to household income (i.e. a poorer household's required expenditures before the plan takes over the burden of payment could be lower than that for a richer household). Not only would the use of such a catastrophic insurance option greatly reduce the cost of the coverage, but in such a program the incentives to avoid the need for health care and to use it wisely would be strong.

Once countries have catastrophic coverage plans in effect they can consider increases in scope of the risk coverage scheme as resources allow. The prevention of excessive financial burdens provided by a well-designed catastrophic coverage will protect the society from extreme health care burdens and provide time for the planning of the more inclusive systems that may be desired as income levels of the country increase.

Overall, it can be concluded that expansion of risk coverage in the decades ahead:

- is extremely likely, considering trends in demand--especially as incomes rise; (Public policies therefore need to anticipate and guide future growth, in order not to allow haphazard, unsuitable solutions to become firmly entrenched.);

- will be financially feasible for some coverage packages but not all;

- could bring significant equity gains; but this is not automatic, so schemes must be designed with care;

- should be directed along lines that minimize the possible adverse effects on efficiency.

Risk coverage should be encouraged, but in ways that contain it to the minimum amount consistent with a country's equity and other objectives. The reasonable starting point would be a catastrophic coverage system.

Decentralization of the Public Health Sector

There seems little reason to delay in putting before government councils the suggestion that decentralization measures be enacted. Where regional agencies or local hospitals and clinics are capable of managing the revenues collected and making decisions about their expenditures, these powers should be given to them. Stable sources of funds, the ability to make long range plans suited to local situations, and the incentives to collect and safeguard revenues will be increased when control of revenues is pushed as far from the central government as feasible. The implications of such reform for both collection rates and operational efficiency must be emphasized. When the collecting unit does not keep the revenues collected or when the service providing unit does not keep funds saved through efficient operation and effective cost cutting, incentives for diligence in both revenue collection and cost savings are largely nonexistent. When, however, revenues either collected or saved can be freely used by the collectors and savers important incentives to efficient operation result. The possibility of restructuring some government facilities as parastatal entities (e.g. university teaching hospitals), or at least of treating the public system of health care providers as <u>like</u> a parastatal operation in revenue control policies (thus, comparing it not to other ministries but rather to other public enterprises, most of which do keep their own gross revenues) should be vigorously explored.

Utilizing the Private Sector

A similar statement of lack of reason for delay can be made concerning reforms in dealing with the private sector. Where regulations unfairly hinder private health service providers they should be removed immediately. Ways should be explored to make full use of existing private facilities and personnel. Revenue poor governments should carefully consider the possibility of facilitating the use of already in place private facilities through such mechanisms as subsidies to less wealthy patients and risk coverage schemes that allow members to use private health facilities. Often such actions will be less expensive than adding public facilities and personnel to treat the same patients. To the extent that the private sector can take over the provision of curative care the government will be able to focus more of its scarce health resources and personnel time on problems of preventive care provision and of caring for the needs of the very poor. Even the very poor, however, can in many cases (at least eventually) be well treated by the private sector if the public sector provides the needed funds to subsidize the poor. The major curative role for the public sector may in the long term be mainly in sparsely settled rural areas. In such places private alternatives may turn out to be impractical because of lack of sufficient market size.

WORK PROGRAMME 87-88

PHN POLICY GROUP

WORK PROGRAM, FY87-88

Discussion by objectives

Objective: Improve quality and effectiveness of fertility reduction programs

A large literature on the determinants of fertility is heavily focussed on so-called demand issues -- the socioeconomic characteristics of those who want and use fertility control. Much less has been done on the supply or program side, i.e. on the effects of availability and quality of fertility reduction programs and their potential for generating demand. Yet most potential policy and program interventions are on the supply side. Tasks under this objective are designed to assist borrowers to improve the supply side, and include work on the cost-effectiveness of family planning programs, including the potential and appropriate roles of nongovernmental organizations and wholly commercial programs, and on incentives for small family size. A task on adolescent fertility is geared to development of improved programs for fertility reduction among teenage women in Africa, and will be carried out in part in conjunction with a project loan, possibly in Malawi. These plus the 1987 Population Lending Review (under the management of the Population Advisor) will provide the basis for a policy paper to be completed in FY89, tentatively titled "New Initiatives in Fertility Reduction." More thorough planning for this FY89 paper, which may require additional inputs, will begin early in FY88.

Objective: Health Sector Reforms

The work under this objective is divided between two closely-related topics: financing and efficiency.

Financing

The major policy paper on health financing (to be completed in FY87), clarifies Bank views on general directions for financial policy reform in the health sector in most countries -- toward more cost recovery, more use of private sector initiatives, and more reliance on risk-sharing schemes. However, further work is needed to provide detailed guidance on the institutional arrangements needed to support and reinforce reforms. Under this objective there will be new work on risk sharing, including alternative institutional mechanisms (such as health maintenance organizations) in the public and private sector, and studies of the political and administative costs and feasibility of various reforms. The policy work will be designed to complement sector work planned in operational divisions of PHN, e.g. on health insurance in Latin America and the progress of financing reforms in Africa. This policy and sector work, along with the policy paper itself, will provide the basis for detailed guidelines on health financing reforms in developing countries directed to a technical audience, including project officers, and materials for training seminars for technical staff of health and planning ministries. Intermediate outputs discussing policy issues will also provide general guidance for operational staff.

Efficiency

A major task is directed toward increasing the internal efficiency of particular health sector programs (taking more or less as given the allocation of public resources to each program), and with increasing overall efficiency in the health sector through better allocation of resources across programs and institutions. The two approaches are not easily separated, but the distinction is a useful one.

Three individual programs, or subsectors, are receiving particular attention: pharmaceuticals, hospitals, and endemic disease control. Each of these takes up a substantial portion of overall sector resources, and each has a relatively distinct administrative or organizational institution behind it in most countries, so that it is for example a separate line item in a public health budget. In each of these areas, through coordination with WHO and other health groups, we are providing critical complementary work, generally emphasizing economic questions. For example, for the pharmaceutical and hospital subsectors, ours is the only major effort to address the issue of rationalization of public and private sector roles, the economics of regulation, and so forth.

Our work on overall resource allocation in the sector will pull together and relate to each other a large number of individual studies on cost-effectiveness of different interventions and modes of delivery sponsored over the last three years.

We hope, by FY90, to have enough material that fits together sufficiently well for a major paper on critical policy lessons in resource allocation. Ongoing or recently-completed work under the management of the Health Advisor will also be of relevance: on approaches to dealing with chronic diseases (including anti-smoking programs) and on cost-effective approaches to maternal mortality. We expect that in such an overview paper, at least one major theme will emerge (as it has on the health financing side): the need to avoid cost escalation by fostering institutions which use market signalling devices, particularly in resource-poor countries facing pressure to import costly technology and imitate inappropriate training and organizational arrangements.

Objective: Strengthen Health and Population Capability in Africa

A major policy paper on health sector management and finance will be based on a large body of PHN sector work (dealing with health sector finance and management issues in at least 15 African countries), the work described above under the health sector financing objective (much of which will focus on Africa), and work to be done on services at the periphery (under Poverty Alleviation objective), supplemented by additional effort as appropriate, e.g. detailed country case studies of reform implementation. Such a paper focussing on Africa will increase the credibility of the ongoing efforts of project staff to encourage health sector reforms, and provide detailed background specific to the African situation -- where resources are more

constrained than elsewhere, and institutional development (and rigidities) less advanced.

A second task is designed to strengthen the process of demographic and health data development in Africa. As emphasized in the Sub-Saharan Africa population report, population policy development has been poor in part because of poor demographic information and failure to exploit what data exists for policy purposes. A research project in Sierra Leone (to be undertaken only if cofinancing by UNICEF of an IDA project provides data collection funds) will provide a model for a sensible approach for demographic data collection, processing and analysis in Africa. Technical assistance will also be provided, in coordination with other donors, to encourage a new round of censuses in Africa.

Other Objectives

The three other minor objectives comprise about 20 percent of total resources, and about 12 percent of higher level staff time. A new objective entitled "Improving Demographic, Family Planning and Health Data" pulls together work on maintaining a demographic data base for Bank country economic and sector work and the annual World Development Indicators. The nutrition objective is heavily oriented to work on approaches to analyzing and where appropriate fostering inclusion of nutrition interventions in "health" projects, and is carried out largely by the Nutrition Advisor. The poverty alleviation objective includes, under the task "Services at the Periphery", a review of experience both within and outside the Bank with service delivery to poor groups far from normal service centers and synthesis of findings from a variety of recent and ongoing research projects (including LSMS studies in Peru and Ivory Coast) on access to and use of services by the poor.

Policy Papers

Summarizing from above, we expect to produce the following major policy papers:

Health Finance, FY87
Health System Finance and Management in Africa, FY88
New Initiatives in Fertility Reduction, FY89
Allocating Scarce Health Resources, FY90

Attachment

cc: Messrs. van der Tak, Walters (OPSVP), Berg, Liese (o/r), Measham, Sai (PHND), Denning (PHND1), Mahar (PHND2), Schebeck (PHND3) PHNPR Staff

NBirdsall:am (6/17/86)

JOINT MEMORANDUM ON WORLD BANK/WORLD HEALTH ORGANIZATION HEALTH ACTIVITIES

JOINT MEMORANDUM ON WORLD BANK/WORLD HEALTH ORGANIZATION HEALTH ACTIVITIES

1. This Memorandum is aimed at developing further cooperation between the World Bank ("the Bank") and the World Health Organization ("WHO") in the area of health. Health activities are defined herein to include those activities which substantially affect physical, mental and social well-being.

2. The Memorandum supplements the already existing arrangements between the Bank and WHO for collaboration under the Cooperative Programme in Water Supply and Waste Disposal, the Joint Memorandum on Population Activities, and the Programme for Onchocerciasis Control. This expanded relationship is expected to enhance the effectiveness of both organizations and prevent uneconomic duplication of efforts and staffing.

3. The Bank will assist WHO in the analysis and projection of socio-economic conditions, in the assessment of national development plans and, selectively, in the planning, implementation and evaluation of WHO-assisted projects, in the establishment or strengthening of national health or health-related institutions and in the analysis of problems arising from the delivery of health services. WHO, on the other hand, will make its assistance available to the Bank as required in designing, appraising and monitoring schemes for the delivery of health services, the control of communicable diseases, the planning of health manpower education, the monitoring of health conditions, and in relation to research in the bio-medical sciences. These forms of collaboration shall be undertaken with due regard to their likely cost and effect in particular instances, on the basis of jointly agreed plans. In addition, the two parties are expected to assist each other in defining priorities for joint study or action, developing operational guidelines and procedures, and in recruiting temporary and permanent staff.

Methods of Cooperation

4. Bank and WHO staff will, on request, assist field and headquarters operations to the extent consistent with their responsibilities and obligations to their respective organizations and host countries. The two organizations will seek, at the request of the other organization, on a case-by-case basis, to include participants from the other organization in missions to countries. Secondment of WHO staff to the Bank and of Bank staff to WHO will also be considered in order to facilitate communication and liaison.

5. The two parties will give serious consideration to selection of one another's staff members as participants in their training programmes as appropriate to this Memorandum. WHO staff will be considered for appropriate courses offered by the Bank's Economic Development Institute and Bank staff for attendance at WHO in-service training programmes at headquarters or in the regions.

6. The Bank will provide WHO with schedules of missions, confidential appraisal reports for projects with health components or consequences, and research proposals, research reports, policy analyses and reports, guidelines and operational manuals related to health. Similarly, WHO will provide the Bank with information on its planned programme, including research, and with research reports, policy analyses and reports, guidelines, and operational manuals which are likely to be of interest to the Bank. In addition, both parties will exchange any other materials likely to be of interest and value, and which affect relevant policies and current thinking of the organizations. It is basic to the spirit of this understanding that such documentation and information should be communicated regularly and as early as possible in order to facilitate constructive criticism and review, with a view to enhanced cooperation.

7. Staff of the Bank and WHO will meet at least once a year in Washington or Geneva to discuss policy issues of interest to both organizations, to review operations in countries in which they are carrying out, or have planned, projects or other activities in the health sector or with health implications, and to identify methods and procedures which would increase collaboration. At that time they shall also examine the scope and adequacy of the information exchanges provided for in paragraph 6.

Reimbursement for Services

8. The Bank and WHO will make appropriate arrangements for the reimbursement of the cost of services provided by each other under this Memorandum on a case-by-case basis.

Liaison

9. Within the Bank, the Director, International Relations Department, will be responsible for Bank contacts and liaision on matters of inter-institutional cooperation arising in connexion with the implementation of this Memorandum; the Bank's Environmental and Health Adviser, Office of Environmental and Health Affairs, will be responsible for contacts and liaison on health policy and technical matters.

10. Within WHO headquarters, the contact point for inter-institutional cooperation with the Bank will be the Director, Division of Coordination.

Robert S. McNamara

for the World Bank

Date 5/17/76

for the World Health Organization

Date 5.5.76

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Dew file
TDR

DATE November 7, 1985

TO Distribution Below
Thru: Mr. John D. North, Director, PHND

FROM Nancy Birdsall, PHNPR

EXTENSION 61581

SUBJECT Egypt - Evaluation of National Schistosomiasis Control Program (New Development Project Credit 1083 EGT)

Attached are comments of Vicente Paqueo on the above report. Dr. Paqueo is presently preparing a review of the economics of tropical disease control for us and for WHO. He makes several points worthy of consideration in further discussions of Egypt's Schistosomiasis Control Program. Two in particular are: (1) that continued thought be given to the optimal allocation of resources between chemotherapy and molluscicide (2) that additional thought be given to the merits of establishing a policy of some charge for the chemotherapy treatment.

Attachments

Distribution List:

Messrs. Ramasubbu, EMPA1
Favilla, EM1EG
Denning, PHND3
Liese (PHNDR)

cc: PHNPR staff
A. Measham (PHNDR)

NBirdsall:lcj

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE : November 7, 1985

TO : Ms. Nancy Birdsall, Chief, PHNPR

FROM : Vicente Paqueo, PHNPR

EXTENSION : 60527

SUBJECT : Egypt - Evaluation of National Schistosomiasis Control Program (New Land Development Project Credit 1083 EGT)

In general, I tend to agree with Bernhard Liese's assessment that the Report is relevant and well documented. I would like to raise, however, the following issues:

1. The Report observed that there is a definite lack of perceived importance of bilharzia in the minds of most people, i.e., they seem not to regard bilharzia as a serious disease. This attitude is reflected in people's behavior, namely, lack of compliance for a proper administration of metrifonate and continued exposure to infected bodies of water inspite of advice from the health education program.

This observation is quite disturbing because it cast serious doubt about the value of the Control Program. It is unfortunate that the Report fails to articulate the meaning and significance of the people's apparent lack of concern. It certainly is important in analyzing the desirability of the proposed investment in bilharzia control in view of many other health problems in Egypt.

How does one interpret the observation that people do not seem to consider bilharzia as a serious disease? One interpretation is that people do not have a reasonable appreciation of the consequences of the disease. It is ironic that in analyzing the effect of health education there is no assessment of how well informed people are about the welfare consequences of schistosomiasis infection. In spite of this, however, it would seem reasonable to assume that lack of information is not the major problem. According to the Report, people generally are aware of bilharzia, the cause of the disease and its transmission. Hence, it is likely that they are also aware of the consequences of schistosomiasis infection. This claim, of course, is subject to empirical verification.

Ignorance aside, the perception of people that schistosomiasis is not a serious threat may be reasonable. First of all, most schistosomiasis infections are not severe. And while the welfare consequences of severe infection are clearly serious, there is very little rigorous evidence about the seriousness of the welfare effects of moderate to light infection. Secondly, serious damage from severe infection can now be prevented by chemotherapy. The recent appearance of a relatively cheap and highly effective praziquantel, in particular, reinforces the correctness of the perception that schistosomiasis is no longer a serious threat.

2. If this interpretation is correct then people may be pursuing a rational strategy in dealing with the problem of schistosomiasis. That is, contrary to the "advice" from the health education program, farmers, women, and children continue to work and play in the fields, canals, rivers, etc., even if these are infected. They are willing to take the risk probably because the disutility (cost) of avoiding those places may be high, while the chances of getting severe infection and the cost of treatment are relatively low especially when chemotherapy is highly accessible and free of charge. Hence, it may be an efficient strategy for people to take the risk of being infected and have oneself treated, if necessary.

3. In view of the above arguments, it is highly probable that a strategy that improves screening and increases the accessibility of chemotherapy using praziquantel treatment without (or with minimum) investment on molluscicide is more beneficial than the proposed bilharzia control program. For example, the proposed expenditure on molluscicides and snail control can be used instead to widen the coverage and efficiency of delivering chemotherapy throughout endemic areas in Egypt. The delivery of chemotherapy can be targeted to serious cases and persons whose infection is likely to become serious.

It is also probable, on the other hand, that the proposed strategy of allocating substantial resources for molluscicide activities may be more efficient to the extent that savings in treatment cost due to reduction in the number of infected individuals and the very high re-infection rate may be greater than the cost of the control program under consideration.

The point we want to make here is that the Report does not seem to have seriously considered this resource allocation issue. In this regard, it would appear that data may in fact be available for making some rough cost-effectiveness comparisons.

4. Incidentally, the discussion under the heading of "cost-benefit analysis" is really a program impact analysis (i.e. assessment of the effect on transmission potential and prevalence rate). It does not address the question of whether those outcomes are worth the cost of the program. This is an important question in view of the fact that there may be other health problems on which the money could perhaps be better spent.

5. The Report is silent on the question of the appropriate price of chemotherapy. I assume that the proposed program will provide chemotherapy free of charge.

Income distribution aside, subsidy for chemotherapy may be justified on efficiency ground due to "externality". Treatment prevents an infected individual from passing on parasites and hence helps reduce transmission and the probability of another individual being infected. One must, however, be aware of the possible effect on people's risk avoidance behavior. It may be hypothesized that people's frequency of contact with infected areas depends on their perception of the cost and benefit of avoiding exposure to infection. Availability of free effective chemotherapy reduces the cost of risk-taking or the benefit from risk avoidance. Hence,

people would tend to take more risk than what might be socially optimal. Consequently, infection rates might also be higher, resulting in increased amount of resources used for chemotherapy. Clearly, it is possible that as a result of free chemotherapy there might be an over-dependence on treatment and insufficient preventive care against infection and re-infection. Hence, the policy problem that should be addressed by the proposed program is to determine an appropriate pricing policy or mix of policies that balances the desirability of subsidizing chemotherapy (for reasons of income distribution and externality) and the need to discourage reckless and unnecessary risk-taking. It may be pointed out here that a rigorous analysis of this problem is hampered by the fact that at present there is lack of empirical studies regarding the effects of price on demand for (schistosomiasis) treatment and risk-taking behavior. Assuming, however, that the two countervailing effects of subsidizing chemotherapy tend to cancel each other out, charging a positive price for chemotherapy (not necessarily equal to the full cost of treatment) should perhaps be seriously considered for efficiency reasons. The charge should include not just the cost of drug but also labor and other costs associated with treatment. In this regard, one can think of initially providing chemotherapy for free or at highly subsidized price and then charging re-infected patients at a price that is closer to the full cost of treatment. The drawback of this strategy is the difficulty of implementing the scheme. Alternatively, one can simply provide chemotherapy for free during the first couple of years. Afterwards patients would be charged a positive price at an increasing rate until it is sufficiently close to the full cost of providing treatment. It maybe assumed that, as the chemotherapy program matures, an increasing proportion of the patients will be re-infected individuals. Hence, with proper announcement and explanation in the IEC campaign, such a strategy would send a strong signal for people to avoid unnecessary exposure to infection and delays in seeking treatment.

6. This pricing strategy could reinforce the envisioned IEC program, which intends to mark low and high risk areas and put out messages enjoining people to use low risk places, if one must at all use infected rivers, fields, etc. In this regard, it can be argued that, as with previous experience, the proposed IEC program would likely continue to have no significant effect on behavior in the absence of a price signal because of incentives incompatibility problem (i.e., the implicit subsidy to risk taking associated with free chemotherapy).

7. The problem of recurring cost is not being addressed by the Report. Inasmuch as the bilharzia control program is not envisioned to eradicate schistosomiasis or completely break the transmission cycle, the question arises as to the desirability of letting the local population (program beneficiaries) take on an increasing share of the program cost. Or, is it the case that the bilharzia program under consideration is envisioned to be financed indefinitely by foreign borrowing, which will be paid for from general tax revenues?

Incidentally, the pricing strategy suggested above for policy consideration would fit very well with a program that wants to promote greater local self-reliance and responsibility especially among beneficiaries regarding the treatment and control of endemic diseases.

Clearly, however, there is a need to study and articulate efficient and equitable approaches to finance endemic disease control activities (such as molluscicide).

8. Assuming that the aformentioned issues are valid, the research component of this program (Chapter 9) might perhaps be expanded to include some of the issues raised above. The findings would be useful for improving future evaluation of the Control Program in Middle and Upper Egypt and in developing appropriate strategies for other endemic areas in the country.

VP:lhs

THE WORLD BANK INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Date: October 23, 1985

To: Mr. Ramasubbu, EMPA1, Mr. A. Favilla, EMlEG, Mr. S. Denning, PHND3

From: Bernhard H. Liese, Senior Public Health Specialist, PHNDR

Extension: 61578

Subject: Egypt - Evaluation of National Schistosomiasis Control Program (New Land Development Project Credit 1083 EGT)

1. Background. Please find attached the report of an independent evaluation mission which evaluated the national Schistosomiasis control program in Egypt. The evaluation of the Control Program was undertaken following a Bank recommendation to consider in light of new control technologies a cost effective strategy for maintaining present achievements and for an expansion of control operations into other areas. The evaluation was financed by Credit 1083 EGT. To undertake the task MOH hired an international evaluation team consisting of six experts which worked in Egypt between October 1984 and April 1985 at various times. Of particular importance is a sample survey on Schistosomiasis prevalence, intensity and distribution which was undertaken in Middle Egypt involving examination of about 33,000 people in about 20 districts.

2. You will recall that the Schistosomiasis Control Program was started in 1977 in Middle Egypt with the assistance of the Bank. The program was later expanded to Upper Egypt and the Giza Governorate. The program presently covers about 10 million people. The major part of the control program has been financed as project components of three projects: Upper Egypt drainage II, Nile Delta drainage II, and the New Land Development Project. A total of about US$ 25.1 millions has been disbursed for the program and the uncommitted balance under credit CR 1083 is presently only US$350,000. Thus the Bank has not only initiated major control operations in Upper and Middle Egypt but has also been the central funding source of Schistosomiasis control in Egypt up-to-date.

3. Findings. The evaluation report as presented reads well, its conclusions are very relevant and superbly documented; the results of the epidemiological field studies and their computer evaluation are excellent pieces of work which would deserve publication as a book. An epidemiological study on Schistosomiasis on such a large sample and with such rigor of methodology has, to my knowledge, not previously been undertaken.

4. The general conclusions of the evaluation report are (i) that the program has worked well and should be continued in Upper and Middle Egypt, (ii) that the control operations have been affordable and are replicable and (iii) that control operations should be extended to the Nile delta as soon as possible. The report in particular points out that the program has been effective, and the impact, measured as reduction of morbidity and prevalence, has been very substantial. The special study undertaken confirmed that not only the results were good but also that the programs routine reporting system is accurate. The evaluation furthermore indicated that management of the

program has been quite satisfactory. The Ministry of Health has been capable of building-up an effective organization which has executed the program. This organization is now perfectly capable of sustaining the achievements and extending the program to the Nile Delta, if finances are forthcoming.

5. However maintaining the present situation, particularly in Middle and Upper Egypt, is the basis for expanding intensive operation into new areas. Maintenance of the present situation is favored by the development of new control tools which involve a change in control strategy. This will allow to reduce the overall cost of maintenance in the long-term. The new control tools allow as well to proceed at reasonable cost with an expanded program in the Delta. This will involve a shift from transmission control using area wide "blanket molluscicide" to disease control based on large scale chemotherapy. The report gives detailed recommendations to this effect.

6. Next Steps. The MOH is very appreciative of the outcome of the evaluation mission and is presently adjusting the control strategy in line with the recommendations made. MOH has also requested further assistance to establish the maintenance activities for the program in Upper and Middle Egypt and to expand the program into the Delta. We are presently planning a mission to supervise the components and to discuss the issue of follow-up for January 1986. One possibility to continue supporting the program is to provide funding as part of components of agricultural projects - the channel maintenance project being the next possible vehicle. Another possibility is the development of a health project focusing on schistosomiasis control - an option MOH strongly favors and which I also feel is warranted - replacing the previous component approach. As first discussions show, the possibility of a project would likely attract substantial cofinancing from other agencies, and allow the Bank to provide the focus for a better donor coordination of endemic disease control in Egypt with relatively limited commitment of funds.

7. There is a certain urgency to follow up. The Bank's components are nearly fully disbursed and the MOH expects to run short of funds to continue full control operations by the end of 1986. Such a situation would seriously jeopardize the present achievements and previous investments. I would very much appreciate a discussion among ourselves how best to continue to support this program and on the prospect for continuing Bank financing.

cc: ✓Mr. North, PHNDR
Mr. van Tuijl, EMPA1
Mr. Venkatraman, EM1EG

Attachment

cc: Mr. Measham, PHNDR
Mr. Cuca, PHND3
Ms. Valdivia, PHND3
Mr. Rahman, EMPA1

THE WORLD BANK INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE November 7, 1985

TO Distribution Below
Thru: Mr. John D. North, Director, PHND

FROM Nancy Birdsall, PHNPR

EXTENSION 61581

SUBJECT Egypt - Evaluation of National Schistosomiasis Control Program (New Development Project Credit 1083 EGT)

Attached are comments of Vicente Paqueo on the above report. Dr. Paqueo is presently preparing a review of the economics of tropical disease control for us and for WHO. He makes several points worthy of consideration in further discussions of Egypt's Schistosomiasis Control Program. Two in particular are: (1) that continued thought be given to the optimal allocation of resources between chemotherapy and mollusciciding (2) that additional thought be given to the merits of establishing a policy of some charge for the chemotherapy treatment.

Attachments

Distribution List:

Messrs. Ramasubbu, EMPA1
Favilla, EM1EG
Denning, PHND3
Liese (PHNDR)

cc: PHNPR staff
A. Measham (PHNDR)

NBirdsall:lcj

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE : November 7, 1985

TO : Ms. Nancy Birdsall, Chief, PHNPR

FROM : Vicente Paqueo, PHNPR

EXTENSION : 60527

SUBJECT : Egypt - Evaluation of National Schistosomiasis Control Program (New Land Development Project Credit 1083 EGT)

In general, I tend to agree with Bernhard Liese's assessment that the Report is relevant and well documented. I would like to raise, however, the following issues:

1. The Report observed that there is a definite lack of perceived importance of bilharzia in the minds of most people, i.e., they seem not to regard bilharzia as a serious disease. This attitude is reflected in people's behavior, namely, lack of compliance for a proper administration of metrifonate and continued exposure to infected bodies of water inspite of advice from the health education program.

This observation is quite disturbing because it cast serious doubt about the value of the Control Program. It is unfortunate that the Report fails to articulate the meaning and significance of the people's apparent lack of concern. It certainly is important in analyzing the desirability of the proposed investment in bilharzia control in view of many other health problems in Egypt.

How does one interpret the observation that people do not seem to consider bilharzia as a serious disease? One interpretation is that people do not have a reasonable appreciation of the consequences of the disease. It is ironic that in analyzing the effect of health education there is no assessment of how well informed people are about the welfare consequences of schistosomiasis infection. In spite of this, however, it would seem reasonable to assume that lack of information is not the major problem. According to the Report, people generally are aware of bilharzia, the cause of the disease and its transmission. Hence, it is likely that they are also aware of the consequences of schistosomiasis infection. This claim, of course, is subject to empirical verification.

Ignorance aside, the perception of people that schistosomiasis is not a serious threat may be reasonable. First of all, most schistosomiasis infections are not severe. And while the welfare consequences of severe infection are clearly serious, there is very little rigorous evidence about the seriousness of the welfare effects of moderate to light infection. Secondly, serious damage from severe infection can now be prevented by chemotherapy. The recent appearance of a relatively cheap and highly effective praziquantel, in particular, reinforces the correctness of the perception that schistosomiasis is no longer a serious threat.

2. If this interpretation is correct then people may be pursuing a rational strategy in dealing with the problem of schistosomiasis. That is, contrary to the "advice" from the health education program, farmers, women, and children continue to work and play in the fields, canals, rivers, etc., even if these are infected. They are willing to take the risk probably because the disutility (cost) of avoiding those places may be high, while the chances of getting severe infection and the cost of treatment are relatively low especially when chemotherapy is highly accessible and free of charge. Hence, it may be an efficient strategy for people to take the risk of being infected and have oneself treated, if necessary.

3. In view of the above arguments, it is highly probable that a strategy that improves screening and increases the accessibility of chemotherapy using praziquantel treatment without (or with minimum) investment on molluscicide is more beneficial than the proposed bilharzia control program. For example, the proposed expenditure on molluscicides and snail control can be used instead to widen the coverage and efficiency of delivering chemotherapy throughout endemic areas in Egypt. The delivery of chemotherapy can be targeted to serious cases and persons whose infection is likely to become serious.

It is also probable, on the other hand, that the proposed strategy of allocating substantial resources for molluscicide activities may be more efficient to the extent that savings in treatment cost due to reduction in the number of infected individuals and the very high re-infection rate may be greater than the cost of the control program under consideration.

The point we want to make here is that the Report does not seem to have seriously considered this resource allocation issue. In this regard, it would appear that data may in fact be available for making some rough cost-effectiveness comparisons.

4. Incidentally, the discussion under the heading of "cost-benefit analysis" is really a program impact analysis (i.e. assessment of the effect on transmission potential and prevalence rate). It does not address the question of whether those outcomes are worth the cost of the program. This is an important question in view of the fact that there may be other health problems on which the money could perhaps be better spent.

5. The Report is silent on the question of the appropriate price of chemotherapy. I assume that the proposed program will provide chemotherapy free of charge.

Income distribution aside, subsidy for chemotherapy may be justified on efficiency ground due to "externality". Treatment prevents an infected individual from passing on parasites and hence helps reduce transmission and the probability of another individual being infected. One must, however, be aware of the possible effect on people's risk avoidance behavior. It may be hypothesized that people's frequency of contact with infected areas depends on their perception of the cost and benefit of avoiding exposure to infection. Availability of free effective chemotherapy reduces the cost of risk-taking or the benefit from risk avoidance. Hence,

people would tend to take more risk than what might be socially optimal. Consequently, infection rates might also be higher, resulting in increased amount of resources used for chemotherapy. Clearly, it is possible that as a result of free chemotherapy there might be an over-dependence on treatment and insufficient preventive care against infection and re-infection. Hence, the policy problem that should be addressed by the proposed program is to determine an appropriate pricing policy or mix of policies that balances the desirability of subsidizing chemotherapy (for reasons of income distribution and externality) and the need to discourage reckless and unnecessary risk-taking. It may be pointed out here that a rigorous analysis of this problem is hampered by the fact that at present there is lack of empirical studies regarding the effects of price on demand for (schistosomiasis) treatment and risk-taking behavior. Assuming, however, that the two countervailing effects of subsidizing chemotherapy tend to cancel each other out, charging a positive price for chemotherapy (not necessarily equal to the full cost of treatment) should perhaps be seriously considered for efficiency reasons. The charge should include not just the cost of drug but also labor and other costs associated with treatment. In this regard, one can think of initially providing chemotherapy for free or at highly subsidized price and then charging re-infected patients at a price that is closer to the full cost of treatment. The drawback of this strategy is the difficulty of implementing the scheme. Alternatively, one can simply provide chemotherapy for free during the first couple of years. Afterwards patients would be charged a positive price at an increasing rate until it is sufficiently close to the full cost of providing treatment. It maybe assumed that, as the chemotherapy program matures, an increasing proportion of the patients will be re-infected individuals. Hence, with proper announcement and explanation in the IEC campaign, such a strategy would send a strong signal for people to avoid unnecessary exposure to infection and delays in seeking treatment.

6. This pricing strategy could reinforce the envisioned IEC program, which intends to mark low and high risk areas and put out messages enjoining people to use low risk places, i.e., one must at all use infected rivers, fields, etc. In this regard, it can be argued that, as with previous experience, the proposed IEC program would likely continue to have no significant effect on behavior in the absence of a price signal because of incentives incompatibility problem (i.e., the implicit subsidy to risk taking associated with free chemotherapy).

7. The problem of [illegible] cost is not being addressed by the Report. Inasmuch as the [illegible] control program is not envisioned to eradicate schistosomiasis or [illegible] break the transmission cycle, the question arises as to the [illegible] of letting the local population (program beneficiaries) take on an increasing share of the program cost. Or, is it the case that the [illegible] program under consideration is envisioned to be financed indefinitely by foreign borrowing, which will be paid for from general tax revenue?

Incidentally, the pricing strategy suggested above for policy consideration would fit very well with a program that wants to promote greater local self-reliance and responsibility especially among beneficiaries regarding the treatment and control of endemic diseases.

Clearly, however, there is a need to study and articulate efficient and equitable approaches to finance endemic disease control activities (such as molluscicide).

8. Assuming that the aformentioned issues are valid, the research component of this program (Chapter 9) might perhaps be expanded to include some of the issues raised above. The findings would be useful for improving future evaluation of the Control Program in Middle and Upper Egypt and in developing appropriate strategies for other endemic areas in the country.

VP:lhs

THE WORLD BANK INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Date: October 23, 1985

To: Mr. Ramasubbu, EMPAl, Mr. A. Favilla, EMlEG, Mr. S. Denning, PHND3

From: Bernhard H. Liese, Senior Public Health Specialist, PHNDR

Extension: 61578

Subject: Egypt - Evaluation of National Schistosomiasis Control Program (New Land Development Project Credit 1083 EGT)

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E G Y P T

NATIONAL BILHARZIA CONTROL PROGRAM

Report of an Independent Evaluation Mission
Middle and Upper Egypt

June 1985

EGYPT

NATIONAL BILHARZIA CONTROL PROGRAM

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* *

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Dr. Lars G. Remstrand,	IEC Specialist
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The study was carried out with the guidance and supervision of Dr. Saleh-el-Hak, Director General of Endemic Diseases, Dr. Samir Nassiff, Director of Epidemiology and Chemotherapy, Dr. Mahmoud Mustafa, Assistant Project Manager, and Mr. Mustafa Ibrahim, Chief Engineer, Snail Control. The essential cooperation and assistance of all field personnel in the study is gratefully acknowledged. The team is particularly indebted to Dr. Zabri Zaki, Minister of Health, for his enthusiastic support of this evaluation.

E G Y P T

NATIONAL BILHARZIA CONTROL PROGRAM

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REPORT OF AN INDEPENDENT EVALUATION MISSION
MIDDLE AND UPPER EGYPT

JUNE 1985

CHAPTER 1

SUMMARY OF THE ACTIVITIES, RESULTS AND CONCLUSIONS, OF THE INTERNATIONAL EVALUATION MISSION, BILHARZIA CONTROL PROGRAM, EGYPT

1.1 INTRODUCTION

BILHARZIA, a disease known in Egypt since hundreds of years, has caused immeasurable misery to people, death and most certainly a marked loss of productivity; since the 1900's many a control scheme has been tried. The government of Egypt has, since many years, sponsored bilharzia control and tried with pilot and large scale projects, given the respective tools of each period, to gain control of the disease. But only in the last few years, with the advent of efficient drugs and molluscicides as well as improved strategies and better basic health coverage have control measures succeeded in producing and sustaining significant results in terms of a reduction of morbidity and reduction of infection.

1.2 HISTORY AND PRESENT PROGRAM STATUS

The bilharzia control program in Middle Egypt was started in January 1977 with the assistance of the World Bank. The program was later expanded to Upper Egypt. The Middle Egypt area covers three governorates; Beni Suef, Minya and Assiut (North) with 1,050,000 feddans, a population of over 5 million, 20 districts with 590 villages, 347 RHU's, 210 snail control units and 33,450 km length of water canals. In this area extensive water investment and land reclamation schemes have been implemented. S. haematobium has been the only species in the area. The program had three execution phases: active intervention, consolidation and since 1984 maintenance has been started.

Control activities comprised molluscicide and chemotherapy with the aim to considerably reduce the prevalance of bilharzia and control its disease manifestations. The results achieved during intervention and consolidation with apparent reduction of transmission, prevalence and intensity of infection led to the beginning of the maintenance phase with a reduction of the area wide molluscicide thus economising on the amount and the expense of the molluscicide.

In view of the enormous areas and distances involved in the Middle and Upper Egypt Projects, the logistic problems of transport, drugs and molluscicide supply, and the immense management tasks required, the team regards the progress of the project to-date as remarkable and highly commendable. The team has witnessed numerous examples of solid achievement at all levels - central Ministry of Health, Governorate, District and Rural Health Unit.

1.3 REASONS FOR PRESENT MISSION

Following a recommendation of the World Bank, the MoH decided that a review of the present achievement of the control programs would be warranted, to consider, in light of new control technologies a cost effective strategy for maintaining present achievements and for an expansion of control operations into other areas. Subsequently an international evaluation mission was fielded during the period of October 1984 to April 1985. The team worked in close cooperation with the counterparts of the MoH and the governorates. The mission evaluated the various aspects of the program.

1.4 HUMAN ASPECTS OF SCHISTOSOMIASIS EPIDEMIOLOGICAL TRENDS AND CHEMOTHERAPY DELIVERY

These two basic aspects of the Middle and Upper Egypt bilharzia control projects were evaluated using three main methodologies:

(i) Examination of data present in Ministry of Health progress reports, and its comparison with governorate and health unit data.

(ii) A random sample survey of Middle Egypt carried out in November- December 1984, involving the examination of 33,985 persons in 20 districts and 60 villages.

(iii) A programme of 63 visits by the team to a total of 53 health units in 5 governorates, and to governorate laboratories. These visits served the purpose of quality control, cross checking of reported data and observation of the administration of chemotherapy.

Trends in the most important epidemiological parameters have been generally downwards since the inititaton of the project, and a good measure of disease control has been achieved. The baseline information in 1977 shows a prevalence of about 30% in the Middle East project area, this had been reduced to about 8.5% by the end of 1984. This is a remarkable reduction in the amount of Schistosoma infection and has been accompanied by a large reduction in intensity of infection to low levels consistent with the presence of low worm burdens. However, transmission still continues in the project area and significant reinfections, particularly among schoolchildren have been taking place. A number of serious foci of infection and disease still need further control. The techniques employed in screening are

very well-performed, but have a tendency to understate true prevalence-rates of infection, and this should be borne in mind when planning future modifications of control strategies. Similarly, intensities of infection expressed as geometric mean egg output can be obtained more efficiently by the use of simpler, quicker and cheaper techniques.

Because data recording, transmission and analysis are slow, and subject to inevitable errors, the health unit area is a more appropriate unit than the governorate for future data trend presentation and comparison.

Limited autochthonous transmission of Schistosoma mansoni infections now occurs in the project area; future control strategy must allow for this.

Metrifonate compliance rates are generally disappointingly low, and the use of this drug has been devalued in the minds of health staff and some members of the public by the introduction of single dose praziquantel in some S.haematobium areas.

1.5 BIOLOGICAL ASPECTS OF SCHISTOSOMIASIS
SNAIL SAMPLING AND CONTROL

The present method of snail sampling was observed and evaluated in terms of sensitivity in detecting transmission potential by independent snail sampling. Assessment of the comparison revealed that the present snail sampling strategy used by the snail sampling units is not sensitive in finding infected snails.

Regarding the snail control work, one area-wide molluscicide operation was observed at El Ghanayim, South Assiut; a radius control operation was observed at Minya; and focal molluscicide was witnessed at the Nile River in 2 locations in Assiut and at the Ibrahimiya Canal in Assiut

Because most of the period of this evaluation mission coincided with the low transmission season, much of the actual appraisal of the present operations in Middle and Upper Egypt had to be made by inspection of past data, on amounts of niclosamide used, timing of applications, and mainly, epidemiological information shedding light on re-infection rates in school children by season.

In the past, molluscicide in Middle and Upper Egypt helped by chemotherapy, has reduced human levels of S. haematobium infection quickly; however, the present area-wide applications of molluscicide once a year in Middle Egypt and twice a year in Upper Egypt no longer seem to be cost-effective. Recommendations for future molluscicide in Middle and Upper Egypt, as well as the Nile Delta are summarized in another summary section of this report and are given in detail in the chapter on snail control.

1.6 COSTS

The total cost of the Middle Egypt project which has been specially studied was: 1977 to 1984 LE 26,079,865; the total population covered in 1977 was 4.5 million and in 1984 5.85 million. The tabulation presented by MoH indicates a prevalence rate of 30% in 1977 and 9.2% in 1984. The total number of infected persons found in the 1977 to 1984 period is 6,314,000 persons. LE 26,000,000 : 6,314,000 persons = LE 0.50 cost per episode of infection.

Assuming a mean population of 5.040 million and an annual expenditure of LE 3,250,000, the per capita cost of this programme is LE 0.64 per person per year. Assuming a population of 4.28 million at risk, the cost per person is LE 0.76 per year.

Percentage component costs for the project have been:

- snail control	69.1%
- chemotherapy	30.9%
	100.0%

Percentage total costs for the project have been:

- personnel	42.6%
- molluscicides	49.0%
- drugs	3.5%
- transport and miscellaneous costs	4.9%
	100.00

The MoH budget for all purposes has increased from 1970 LE 1.26 to 1984 LE 7.96 per capita. The bilharzia control cost in 1984 was just over 8% of the budgeted per capita cost of all Government health services.

1.7 MANAGEMENT & ORGANISATION

The bilharzia program has four levels: Ministry of Health - Department of Endemic diseases with the overall responsibility for the execution of the program; the health directorate of the governorate where the director of Endemic diseases is the Executive Director in charge of, among other duties, the bilharzia control activities together with the snail control services and supervising the district activities under the guidance of the district manager who is to oversee the RHU's in his district. The workload of all concerned is considerable and on each level only a percentage of the total work time is being spent on bilharzia control.

The present management system is appropriate. Procurement, logistics, storage and distribution of drugs and molluscicides are undertaken efficiently. The transport system is in good condition and well supervised. Personnel management is adequate, most positions are filled. The present organizational structure is geared to execute area-wide molluscicide, snail and human prevalence surveys. Chemotherapy is handled through the RHU.

In the future the emphasis will be more on chemotherapy and less on molluscicide. These changes of strategy will have consequences on the management structure.

1.8 HEALTH EDUCATION - COMMUNICATION - INFORMATION

There is no structured health education - information program for schistosomiasis. It was not possible to evaluate the impact the health education activities had in changing the behavioural pattern of the people in the Middle Egypt Program area. People generally are aware of bilharzia, the cause of the disease and its transmission. The people do know that there is treatment readily available in the RHU's but the treatment compliance is not very satisfactory.

There are many reasons which can be identified why health education in the past did not greatly influence the people in the areas at risk. It seems that there is a definite lack of perceived importance in the minds of most people. People seem not to take bilharzia as a serious disease.

The different health education approaches did not take into consideration the people's behaviour: school children will go swimming contrary to advice - women will do their laundry in the canals since they combine this work with a social function - farmers are in frequent water-contact in the course of working in the fields.

Health education activities were not targetted to either specific groups - school children - farmers - nor timed and coordinated with bilharzia control activities such as case finding - everybody should have his urine examined at least once a year. The use of molluscicide and the importance of full treatment courses was not effectively and convincingly communicated to the people. School children were not sufficiently exposed to the problems of bilharzia. The media, television and radio were not used to full advantage to stimulate community participation in the control program.

1.9 RECOMMENDATIONS

The recommendations for future action made by the evaluation team in the present report are objective and independent; they are, of course, entirely open to agreement or rejection by the Government of Egypt. The recommendations made fall into 6 categories.

1.9.1 Future Priorities and Strategies

Within the financial and management resources available, priorities have to be assigned to two options:

1.9.1.1 The maintenance and/or improvement of present achievements in Middle and Upper Egypt, to protect the large existing investment.

1.9.1.2 The extension of bilharzia control to the Nile Delta.

Having allocated priority to these two options, or having decided to proceed with both, two further decisions must be made:

1.9.1.3 The setting of targets on an area basis for prevalence - rates and intensities of infection.

1.9.1.4 The choice of screening techniques to be adopted and the balance to be achieved in control between education, chemotherapy and molluscicide.

1.9.2 Surveillance Procedures

The team recommends that epidemiological surveillance data be presented by defined Health Unit area rather than by Governorate. Although this may seem to be a formidable task, it would not in fact produce an indigestible mass of information, and it is essential if the necessary flexibility and speed in applying intensification and diversification of control effort to problem villages is to be achieved. The translation of data trends into rapid and effective executive action demands that Governorate Executive Directors of Bilharzia Control:

1.9.2.1 Be fully trained in epidemiology and management activities.

1.9.2.2 Be released from their many other heavy and time consuming duties to concentrate on endemic disease problems.

1.9.3 Screening Techniques

The team recommends that screening techniques used in the bilharzia programs, and any future extensions of them be modified as follows:

1.9.3.1 Parasitological Screening Techniques

Sedimentation, centrifrugation, direct microscopy should be retained for urinary screening.

A quantitative 50 mg Kato-Katz technique should be introduced for faecal screening in the RHU's and the necessary training programs instituted.

Single-use stained Nytrel^{R} filters and syringes should be used for egg-output counting in urine, and the necessary training procedures should be instituted.

1.9.3.2 Snail Screening techniques

A sustained re-training of snail sampling workers, snail technicians, and their agricultural-engineer supervisors be carried out so that all future snail sampling be conducted primarily in village human water contact points.

1.9.4 Control Strategies

The team has recommendations on three aspects of future control strategies:

1.9.4.1 The Role of Information/Education

In order to better the people's understanding of bilharzia and its control, the major recommendations are:

Make use of TV and Radio broadcasts, using specially produced, attractive and stimulating films and radio tapes.

Address target groups; school children, pregnant women, farmers.

Coordinate communication efforts with molluscicide activities.

Stimulate people to have their urine examined regularly.

Make people aware that complete treatment compliance is of utmost importance to improve their health.

1.9.4.2 Snail Control

For the Middle Egypt Project in the maintenance phase, the present once-a-year area-wide molluscicide operations and back-up spraying of infested water courses should be stopped at the end of 1985. A much more cost-effective strategy of molluscicide could then be implemented in 1986. This strategy entails initial area wide molluscicide in only the few remaining areas where there are high and homogeneous human prevalence rates (selective area molluscicide), and also molluscicide in individual villages scattered throughout districts with unacceptably high prevalence rates. Prevalence rates (especially among school children), rather than snail data should be the main initial criterion of whether to molluscicide a village or groups of villages. Second, the whole molluscicide program should slowly evolve towards focal control as fewer and fewer villages need radius control. Any future focal molluscicide should concentrate in village foci where infected snails are found in or near water contact points.

In the Upper Egypt project, the present timing of the area-wide molluscicide operations need to be modified. Instead of the first application scheduled to begin in May, it should be moved forward to early April as was done in previous years (to prevent the first peak of transmission). Instead of the second application to begin in September, it should be timed to begin in early August (to prevent the second peak of transmission). By 1987 when the maintenance phase begins, all future molluscicide should be drastically reduced, and the future strategy should then follow the recommendations given above for the Middle Egypt Project.

For any bilharzia control project to begin in the Nile Delta, total area-wide molluscicide should not be considered as a serious option for snail control. Any future molluscicide in a project framework in the Delta should initially adopt selective area molluscicide and radius control, targetted to high transmission-high prevalence areas and villages only. The later evolution of molluscicide towards more focal control would be contingent upon progress being made on reducing levels of human infection.

1.9.4.3 Chemotherapy

More efficient delivery of chemotherapy requires that health unit physicians should serve for a period of 3-5 years in a rural health unit, and require good performance reports from their supervisors before being allowed to proceed to Ministry of Health higher training programmes. They should also be required to produce brief annual reports of their unit activities, including verifiable evidence of bilharzia detection rates and drug compliance rates.

Health units must be regularly supervised and monitored for drug delivery activities.

Metrifonate should be progressively phased out of use, and replaced all over Egypt by praziquantel, used in a single dose at 40 mg per kg body-weight, following bi-annual screening of school students and annual screening of the rest of the population.

1.9.5 Management Issues

Due to the increasing work load a staff increase at the MoH is recommended. Physicians having field experience and special training in epidemiology and management should be selected. This would allow more frequent supervision of field activities. The executive director at governorate level should be an epidemiologist with management experience. The district manager should be a full time staff member with a similar background as the executive director at governorate level.

The doctors at the RHU level should be posted for extended periods of duty (three years). Furthermore it is highly recommended to organize courses with practical contents for the rural health physicians to enable them to efficiently operate a RHU.

1.9.6 Cost Issues

The recommended strategy for the maintenance phase in Middle Egypt does not require major staff changes. The personnel costs will remain more or less the same, except possibly some new establishment posts for supervisor-epidemiologists at central Ministry of Health and governorate level.

The costs for imported drugs: Praziquantel 40 mg/Kg - average body weight 50 Kg = 2000 mg = 4 tablets 600 mg each for one treatment course, each costing approx. DM. 6 (exchange rate 17. March 1985 DM 3.41 = $. 1.-) $1.75 per treatment course per person. Assuming that 500,000 persons have to be treated annually the cost is $875,000 persons per year.

The cost for molluscicide in Middle Egypt for the maintenance phase is estimated to require 31 metric tonnes of niclosamide per year, 1 metric tonne costing $18,000. The yearly needed amount of 31 tonnes costing $558,000.

Estimate for chemotherapy in Upper Egypt is 600,000 treatments per year costing approx. $1,050,000.

For the maintenance phase in Upper Egypt the needed amount of molluscicide is estimated to be 56 metric tonnes per year costing $1,008,000.

1.10 CONCLUSIONS

Very substantial progress has been made in reducing prevalence-rate of infection and controlling disease in the Middle and Upper Egypt project areas and it has been demonstrated over a very large area inhabited by some 10.2 million people in 1984, that control by integrated measures of area wide molluscicide and selective mass chemotherapy can be delivered and maintained over a time-span of up to 8 years.

A clear need has been identified to maintain and reinforce control in Middle and Upper Egypt with some modifications in techniques.

It is highly desirable that the area of control operations should be extended to those parts of the Nile Delta which are at present uncontrolled.

The evaluation team strongly recommends that these proposals are an appropriate subject for funding by the International Bank for Reconstruction and Development, and that these proposals should be treated as a matter of the greatest urgency by the IBRD.

CHAPTER 2

HISTORY AND PRESENT PROGRAM STATUS

2.1 INTRODUCTION

Bilharziasis is recognised as the most important parasitic infection in Egypt and many of the relationships between the respective infections and the more serious clinical manifestations such as urinary tract diseases, bladder cancer or involvement of the portal circulatory system and liver failure have now been established. Of the three most important schistosomes infecting man, Schistosoma haematobium, S. mansoni and S. japonicum, both S. haematobium and S. mansoni are endemic in Egypt (being transmitted by the snail species Bulinus truncatus and Biomphalaria alexandrina, respectively). S.haematobium is prevalent in the Nile Valley from Aswan to Cairo and through the Delta, and S. mansoni is mainly confined to the Delta with a low prevalence in the Governorate of Giza near Cairo. Limited foci of transmission of S. mansoni, however, have now been identified in Beni Suef, Assiut Sohag and Qena Governorates in Middle and Upper Egypt.

2.2 CONTROL PROGRAMS IN EGYPT

A control program was initiated in El Fayoum Governorate in 1968, using molluscicide applications for snail control in the spring, summer and autumn and chemotherapeutic treatment of the infected population. Prevalence of S. haematobium was reduced from 45.7% to 9.1% between 1968 and 1974 and was estimated to be 6.7% in 1978 - transmission of bilharziasis having been effectively stopped. Despite the introduction of chemotherapy using metrifonate (Bilarcil^{R}), and inconsistent area-wide molluscicide, there has, however, been an increase in endemicity of S. haematobium, and a recent survey showed an overall prevalence of 11% with much higher prevalence rates being recorded in different villages (15-25%).

The integrated bilharzia control program initiated in 900,000 feddans of Middle Egypt, north of Dairut, under the I.B.R.D. Upper Egypt Drainage I Project in 1976, supports the Fayoum control project. This was supplemented by control work in a further 153,730 feddans between Assiut and Dairut under Upper Egypt Drainage II Project. The total area contains a population of 4.3 million people.

The control strategy applied in Middle Egypt has involved a three year period of intensive snail control measures - by molluscicide on an area-wide basis three times annually - together with chemotherapy of the infected population in rural areas.

This control strategy is also being applied in Upper Egypt between Aswan and Assiut under Delta Drainage II Project. The project area covers some 1,200,000 feddans, of which 1,120,000 feddans are cultivated, and it contains a total population of 5.1 million people. Epidemiological evaluation commenced in 1979 together with limited delivery of chemotherapy.

2.3 CONTROL STRATEGY

As the drainage works to be undertaken in the Upper Egypt Drainage Project extended over 800 km. from Beni Suef in the north to Aswan in the south, meaningful snail control measures in all the drainage project sub-areas have necessarily involved the entire irrigation and drainage network throughout the Upper Nile Valley. In the absence of adequate snail control measures in this overall area, it was not expedient to apply intensive measures in relatively small discontinuous parts of the system unsupported by complementary control work in adjacent areas. Control measures limited to drainage channels would likewise have been ineffective in reducing transmission of infections and the widely scattered locations requiring treatment would have made the measures costly and supervision difficult.

The drainage project would have exacerbated the transmission of bilharzia as a result of providing new drainage channels where snails would breed and become infected with increased opportunities for human water contact and infection. It is inconceivable that control measures of any value could be applied to the drainage system unsupported by adequate coverage of the irrigation canals. Rapid reinfestation of the drains from untreated irrigation canals and distributaries would occur and the applied effort rendered meaningless in terms of control and transmission. Efficient application of molluscicide to drains is difficult and the required frequency of their treatment in isolation would prove prohibitively expensive.

Control may have the objective of limiting the spread of infection, reducing morbidity or controlling and even stopping transmission. Control of transmission implies reduction of bilharzia to a prevalence and level of intensity where it is no longer a major public health problem. Control once achieved must be maintained, implying a continuing programme, although a reduction in the degree of applied measures should be possible during later consolidation phases. The different methods of control include therapy of the human definitive host, environmental sanitation, control of contact with water and control of the molluscan intermediate host. These methods will prove more or less effective according to the conditions where they are applied and each has advantages and disadvantages.

It is now generally recognised that treatment of the infected population, while not always curing the individuals, causes a marked reduction in the number of eggs passed. Population chemotherapy, as a control procedure, has as its main objective a reduction in the number of bilharzia eggs passed by a community.

A further benefit is the alleviation of symptoms and reduced morbidity in individuals resulting from fewer bilharzia eggs being deposited in their tissues.

The efficient disposal of human excreta by the provision of adequate latrine facilities should, in theory, be an adequate method of controlling transmission of bilharzia. Acceptance of such facilities generally is dependent on overall improved standards of living and education but, even then, some contamination of the environment is likely to persist.

Prevention of contact with infested waters through provision of alternative water supplies is an effective aspect of sanitary control measures. Uncontaminated domestic water supplies are available in most of the villages within the project area.

It is generally considered that snail control is a rapid and effective means of reducing transmission of bilharzia and its efficacy is likely to be enhanced if combined with chemotherapy.

A combination of control methods directed against different links in the life-cycle is most likely to achieve a threshold level below which transmission may cease and the composition of any control programme must depend on local conditions, the goal of control, available resources and a feasible strategy.

In Middle Egypt, an area was selected where substantial drainage works were to be undertaken and where the irrigation system would provide areas of command for which feasible control measures could be designed. The area selected was situated in the Governorates of Beni Suef and El Minya where project drainage works extending over 136,000 feddans were to be constructed. The selected area covers the command of the Ibrahimir and Bahr Yousef canals with a population of about 4 million. The overall prevalence of bilharzia in Middle Egypt is highest in these Governorates and the intermediate snail hosts of S. mansoni are already present in parts of the existing drainage systems. The project area was subsequently extended to the area north of Assiut and then southwards to Aswan.

The original project was intended to be of 4 years duration, commencing in 1974 with the purchase of equipment and materials and the establishment of the necessary organization to execute the programme. Actual control operations would extend over 3 years 1975-77 and would include application of the molluscicides to minimise populations of B. truncatus and prevent the spread of B. alexandrina, so reducing the transmission of S. haematobium and preventing possible future spread of S. mansoni. This programme would re-inforce the integrated bilharzia control programme in Fayoum, which receives its irrigation supplies from the Bahr Yousef Canal.

It was concluded that, in the circumstances prevailing in the area under consideration, integrated measures involving snail control by the application of molluscicide and population chemotherapy would achieve the best control of transmission of bilharzia and its disease potential.

2.4 CHEMOTHERAPY

Dr. A. Davis, Medical Research Council, Great Britain, in 1974 seconded to W.H.O. (presently Director, Parasitic Diseases Programme, W.H.O., Geneva), recommended the use of metrifonate (Bilarcil®) in the project, provided that management of the proposed regimen was adequate and cholinesterase monitoring of patients to be treated be carried out. In 1975 it was decided to use metrifonate in the project and ensure that large-scale delivery of the drug would only take place when crop-spraying with other organo-phosphorus compounds was not taking place.

Previous studies (Davis and Bailey, 1969) confirmed that the optimum individual doses of the mono-specific drug metrifonate was 7.5-10 mg/kg. body weight, and a widely used schedule of 7.5-10 mg/kg. given in three oral doses, at intervals of 14 days, has become the standard treatment regimen; cholinergic symptoms may be expected during treatment, but tolerance had been extremely good, and such symptoms, if they occur, are mild and disappear spontaneously in a few hours. Should cholinergic symptoms arise, the paranteral administration of atropine sulphate, repeated if necessary, will block the muscarinic but not the nicotinic effects!

Following preliminary trials in Cairo, at the Institute of Tropical Medicine, by Dr. M. Saif, the Ministry of Health decided to recommend that a schedule of 10 mg/kg. body weight metrifonate given in three oral doses at intervals of 14 days, be adopted for chemotherapy throughout the project. A large scale orientation trial was organized and 90,000 infected patients of all ages treated with the drug.

2.5 MOLLUSCIDIDING SCHEDULE

It has been demonstrated that a good molluscicide, properly applied, kills 99% of th snails and that snail populations generally remain below 5-10% of the original levels during some 8-12 weeks following such treatment. Thus, it was considered that mollusciciding of the entire area should be initiated in early March and completed in early May - the period of onset of intensive snail breeding. This should result in a reduced snail population density during the warmer early summer period when transmission is most intense. Optimum control of snails is then achieved by another area-wide application of molluscicide 7-8 weeks later in mid-July. A further application of chemical is made in mid-September to control transmission during the autumn period up to November.

During the intensive phase of integrated control in Middle and Upper Egypt, therefore, area-wide applications of the molluscicide niclosamide (Bayluscide®), 70% wettable powder formulation, have been made three times annually in the spring, summer and autumn in the irrigation and drainage systems throughout the project area, as follows:

(a) Molluscicide is dispensed into all irrigation branch canals and lateral distributaries at 1-2 mg/l. for 8 hours, in relation to the 15 days irrigation water rotation system and any variations being operated. The required concentration of chemical is determined in relation to the discharge of the particular canal being treated.

(b) The molluscicide is similarly applied to main and field drains whenever flow conditions render this method of application feasible.

(c) The molluscicide is applied by spraying (at 1 mg/l. active ingredient) at the tails of tertiary irrigation canals and in main and field drains, particularly those having vegetative cover.

(d) Chemical analysis of water samples is made during applications to ensure that adequate concentrations are maintained throughout the system being treated for the requisite time-scale.

(e) Snail surveillance is performed by snail control units, one week before all applications commence and one to two weeks afterwards.

Sampling in canals and drains is carried out with a standard dip-net (100 meshes per inch) and three scoops with the dip-net are made every 20 metres. The number of snails found is recorded as the number per 100 standard dips made.

Snail surveillance is carried out at fixed stations in the system and random sampling is also performed throughout the control areas. Molluscicide has not been routinely applied in the major Ibrahimir and Bahr Yousef canals, except from Malatia on the Ibrahimir, and at Minchat Al Dhab on the Bahr Yousef - where at each point, through a major branch canal, extensive distribution of molluscicide is achieved with high cost effectiveness.

Focal applications of molluscicide have, however, been made in the Ibrahimir in relation to infestation with Biomphalaria sp. and greater emphasis is now given to spraying focally in peri-domestic situations.

At the beginning of the consolidation phase of control operations in Middle Egypt, the area-wide applications during the Summer Phase were discontinued and surveillance with focal molluscicide only was substituted. This was done in order to reduce the quantity of molluscicide being used and, of course, the cost.

The applications carried out in Middle Egypt during the first year of operations (1976-77) were beset by a shortage of transport and equipment. Nevertheless, a high level of technical expertise was developed and most of the logistic problems were overcome through the local provision of vehicles and borrowed equipment. The availability of adequate numbers of vehicles from late 1977 onwards ensured greater precision in timing of the three phases of molluscicide and their duration.

In Upper Egypt area-wide molluscicide commenced in 1981, some two years after the introduction of chemotherapy.

Complementary weed clearing has played an important part in the overall efficiency of snail control by molluscicide. Mechanical and chemical methods are employed to clear weeds, including the use of Magnacide (acrolein) and 2,4-D.

Epidemiological evidence suggests that the program of surveillance and focal molluscicide introduced during the consolidation phase in Middle Egypt may not have been adequate, since large numbers of re-infections have occurred in school children during the summer months. The success of focal molluscicide depends upon sound surveillance and adequate resources, including management structure, to undertake the work.

CHAPTER 3

REASONS FOR THE PRESENT MISSION

Following a recommendation by the World Bank, the Ministry of Health decided that a review of the present achievements of the control programs would be warranted, to consider, in light of new control technologies, a cost-effective strategy for maintaining present achievements and for an expansion of control operations into other areas.

Subsequently, an international evaluation mission was fielded during the period of October 1984 to April 1985, consisting of the following people:

-	Dr. Peter N. Kessler	Team Leader, Health Administration
-	Dr. Brian A. Southgate	Epidemiologist
-	Dr. Ralph K. Klumpp	Biologist/epidemiologist assistant
-	Dr. Malek Mahmoud	Statistician
-	Dr. Lars G. Remstrand	IEC specialist
-	Dr. Lotfallah Imam Saleh	Economist

The team worked in close cooperation with counterparts of the Ministry of Health, at headquarters and in the governorates. The mission evaluated major aspects of the control program. The objectives of the evaluation were to review trends in available MOH epidemiological data including prevalence rates and intensity of infection for the project area, establish quality and costs of current intervention procedures, and formulate, in the light of this information, recommendations for future cost-effective control measures applicable to other areas in Egypt, and, in particular, the Delta Region. The evaluation also focused upon institutional organization and management systems, health education, and made, where necessary, specific proposals.

CHAPTER 4

EPIDEMIOLOGICAL TRENDS IN BILHARZIASIS AND THE EVALUATION OF CHEMOTHERAPY DELIVERY

4.1 INTRODUCTION

The evaluation of achievements in the bilharziasis control programmes for Middle and Upper Egypt during the past 8 years rests primarily on the reductions achieved in a number of objective and quantifiable epidemiological parameters. The primary objective of control has been to reduce the amount of morbidity and mortality due to bilharziasis seen in Egypt, and hence to improve the quality of life of the exposed populations in the country, and to increase their economic productivity and potential by reducing sickness induced absenteeism from work and from school attendance.

It is a feature of chronic infections such as bilharziasis that the pathogenesis of the severe complications of the disease occurs over a time-span measured in years or decades. Hence the evaluation of a control programme must rely to a great extent on measures of parameters concerned with infection rather than with disease, and it is essential to bear in mind several features of bilharziasis when interpreting the results of the current evaluation. The most important of these is that disease caused by bilharziasis is a product of three factors: the amount of infection present in a population; the load of infection present in those individuals in a population who are infected; the average duration of infection experienced by those who are actually infected. Disease control must seek to reduce all three of these parameters, and the efficacy of control can be regularly monitored and periodically evaluated by measurement of three relevant epidemiological indices.

Since these indices will be frequently mentioned in this section of the present report, they are listed here:

i) Prevalence-rate, the proportion of a population (expressed here as a percentage) which exhibits evidence of infection, using a standardized technique of examination, at a given point in time. This measures the amount of infection present in a population.

ii) Intensity of infection, the average worm-burden carried by infected individuals; this is measured indirectly by counting the egg-output in a standardized volume of urine from infected individuals, and provides a good measure of the load of infection in the infected proportion of a population. Because egg-output figures from populations tend to be log-normally distributed, intensity of infection is summarized as the geometric mean egg-output in positively infected members of a community; ranges of egg-counts from lowest to highest are a useful supplementary statistic to the geometric span.

iii) Incidence-rate, the proportion of a population becoming infected during a given time period (expressed here as percentage per year). This measures the amount of transmission occurring in an area, and hence reflects the efficacy of control measures; it also indirectly measures the duration of infection, which in itself cannot be directly assessed, because of the epidemiological relationship, which applies when a disease is in equilibrium, and incidence-rate and duration have been constant over a long time-period:

Incidence-rate X Duration = Prevalence-rate.
In the rapidly changing circumstances of an active control programme, we may say that prevalence-rate varies as the product of incidence-rate and duration.

The evaluation of the epidemiological trends observed in these three parameters in Middle and Upper Egypt during the past 8 years depends on critical examination of three factors:

i) The actual results obtained in measurements of the three parameters.

ii) The techniques used to measure them and the skill and care with which these techniques were performed.

iii) The data recording and reporting systems used to ensure a flow of information to the Ministry of Health in Cairo, and its subsequent analysis and tabulation for purposes of further planning, and where necessary, corrective action.

A second major component of the current evaluation is the assessment of the efficiency of the chemotherapy delivery system. Control during the past 8 years has been based on a strategy of snail-control combined with detection and drug treatment of infected individuals. Since the maintenance of control, and its geographical extension into hitherto uncontrolled areas of Egypt, demands an appraisal of chemotherapy costs and strategies, a retrospective assessment of the chemotherapy coverage already achieved is essential.

In view of the vital importance of chemotherapy and its delivery, the main features of the drugs used in Egypt in the past 8 years, and available for the forseeable future, are presented here:

i) Metrifonate (Bilarcil®). An orally administered drug, effective only against Schistosoma haematobium, the causative agent of urinary bilharziasis, which until recently has been virtually the only form of the disease present in Middle and Upper Egypt. Metrifonate has potential risks in administration and should only be given under medical supervision; to achieve maximum possible cure-rates and reductions in egg-output, it must be administered in a course of three doses at fortnightly intervals.

ii) Praziquantel (Biltricide®). Also an orally administered drug, it is effective against both S. haematobium and S. mansoni infections. S. mansoni, the cause of intestinal bilharziasis, has been reported sporadically in a few villages of Middle and Upper Egypt in recent years, and is the predominant parasite in many parts of the Nile Delta, which have not yet been subjected to systematic control. Praziquantel is remarkably non-toxic, and is probably safe for use by non-medically qualified personnel; it requires only a single oral dose regime to exert its maximal beneficial results.

4.2 METHODOLOGY OF EVALUATION - EPIDEMIOLOGICAL TRENDS

Three main approaches were made to the problem of evaluating epidemiological achievements in Middle and Upper Egypt during the course of the control programmes of the past 8 years.

4.2.1 Retrospective data analysis

The first and most straightforward was to examine the data presented by the Ministry of Health on the three most important parameters, prevalence-rates of infection, intensities of infection and incidence-rates of infection. Baseline data on prevalence-rates were collected in a series of sample surveys carried out in Middle Egypt during the period April to July 1977. Subsequent yearly follow-up of prevalence-rates has been made on 4 different data-bases:

i) Annual screening in sample surveys.

ii) Annual follow-up of a fixed population sample or "cohort" at index villages.

iii) Annual returns of rural health units and health centres, recording the numbers of persons examined and the numbers detected as infected with S. haematobium.

iv) Bi-annual examinations of school students, carried out at the beginning of the school year in October, and just before the start of the hot-weather transmission season in March.

Essentially the same methodology has been followed for Upper Egypt, with the difference that baseline prevalence-rates were obtained in a sample survey carried out in June - September 1980.

4.2.2 The random survey

The most important single aspect of epidemiological evaluation was the conduct of a randomized sample survey of the area covered by the Middle East project, Beni Suef, Minya and Assiut (North) during the months November and December 1974; this survey was steered and supervised by an independent evaluation team organized through an agreement between the Egyptian Ministry of Health and the World Bank, and consisting of experts from various

international institutions. The survey was designed to provide accurate unbiased information on a number of factors, especially prevalence-rates and intensities, in a random population sample of both sexes and all age-groups, avoiding the problem inherent in all health unit statistics that the sample examined is self-selected because of some perceived form of illness, and thus is potentially biased in favour of urinary positivity. The process of survey design consisted of two main components, sample size and sample selection; both components are tightly connected to each other and are basically dependent on the requirements needed for the final results. In this survey it was clearly understood that:

i) The results should be on a district level, because prevalance of bilharziasis is always different from one district to another as a result of environmental and geographical factors.

ii) Population surveyed should be randomized for sex and other population characteristics such as age, educational attainment and employment status.

iii) Limited time was available for preparation, field work, statistical processing and final report (6 weeks at most were available for field work).

iv) Prevalence-rates for 1982 were taken to estimate the sample size.

It is clear that in the planning of a sample survey, a stage is always reached at which a decision must be made about sample size. This should guarantee high accuracy and minimize the use of resources and effort. As a start the specification of precision was made by defining the amount of error that could be tolerated in the sample estimate of prevalence-rate and secondly the risk that the actual error is larger than the error tolerated. The sample and the formula which connects the error tolerated (d) and the risk (α) is:

$$\Pr\ 1_p - P1 \geq d = \alpha$$

Where:

P = prevalence rate presented as a proportion or percentage derived from the sample.

p = Prevalence rate for the population.

d = Value of error tolerated (margin of error).

= Percent of acceptable risk (which is always 5% or 1%).

The formula which connects a sample size (n) with the desired precision is:

$$t \mathrel{\mathcal{L}} \frac{d}{s/\sqrt{n}} = \frac{(p - P)}{pq/\sqrt{n}} \quad \text{when } (q = 1 - p)$$

where t can be found from Tables of Student's t and is equal to 1.96 at the 5% level and 2.56 at the 1% level, and s is the standard derivation of the population prevalence-rate (known for 1982). The above formula is easily transformed into:

$$n = \frac{t^2 s^2}{d^2} = \frac{t^2 pq}{d^2}$$

For more simplification if we put d as a proportion of p where $d\tilde{N} = xp$ when x takes the values (0.05, 0.1,.....) the formula will be:

$$n = \frac{t^2 pq}{x^2 p^2} = \frac{t^2 q}{x^2 p}$$

With the agreed values of 1.96 for t and 0.1 for x, the factor t^2/x^2 can be replaced by the symbol K, which in this case will be a constant of value 384.16. Sample sizes for different values of p are then equal to:

$$\frac{Kq}{P_1}, \frac{Kq}{P_2}, \frac{Kq}{P_3}, \frac{Kq}{P_4}, \ldots\ldots \frac{Kq}{P_i}$$

The following table gives the values of q/p for different values of p :

p	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
q/p	19.00	9.00	5.67	4.00	3.00	2.33	1.86	1.50

Thus the sample size needed can be calculated from the following table, given that the margin of error in the sample estimate of prevalence-rate should not exceed 10% of the present population estimate, and that the confidence limit for the sample estimate is 95% (i.e. x = 0.10 and = 0.05):

p	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
n	7299	3457	2178	1537	1152	895	715	576

Sample sizes required for the 20 districts covered in the Middle Egypt project area were thus calculated as follows:

Governorate	District	Sample Size
Beni Suef		(12075)
	Beni Suef	2050
	El Fashn	1880
	El Wasta	2115
	Ihnasia	1690
	Beba	1910
	Somosta	1140
	Nasser	1290
Minya		(14850)
	Minya	1855
	El Fikreia	1795
	Edwa	1220
	Beni Mazar	1635
	Der Mowas	1415
	Samalout	1840
	Matai	1395
	Maghagha	1600
	Mallawi	2065
Assiut (North)		(10800)
	Assiut	2590
	Manfalout	3015
	El Quosseia	2475
	Dairut	2720

The total sample size required for the Middle Egypt project area can thus be seen to be 37725. Sample selection was based on the following criteria:

i) Population estimates for mid-1984 made from 1976 census data (district and village levels) and 1980 data (on a district level); the population growth rates were calculated and used to estimate population estimates for 1/7/1984 on a village/district level.

ii) Survey unit: District —— Village —— Family (Household) —— Individual
Households in every village were numbered and registered in books.

iii) Average family size is 5.0 persons in the three governorates, according to 1976 census and demographic surveys conducted in the governorates by 4 different projects. The actual average family size ranges between 4.8 and 5.2 persons. Therefore the sample survey unit became the family, and the population to be surveyed in every district was divided by 5 to get the desired number of families.

iv) It was decided by the evaluation team to limit the study to three villages from each district, and therefore to divide the population to be surveyed proportionately among them.

v) A random selection of villages was undertaken.

vi) The sample portion of families was 1/10 and the number of families to be surveyed in each village was identified.

vii) A random number between 0 and 9 was chosen for every village to be used for systematic sampling.

viii) Another number between 0 and 9 (other than the number chosen for the village) was also randomly chosen to be used as a reserve in case 1/10 of the families surveyed was less than the desired number of families to be surveyed.

ix) The first family to be surveyed was the family with a number of one digit followed by the others (e.g. 3, 13, 23,....)

x) No replacement should take place if for any reason the family is not located.

xi) If the reserve number is used, the same system will be used as the original sampling procedures.

Three tables were constructed to identify all sampling procedures. They consist of the following:

i) A text explaining how to identify the families to be surveyed by using the sample fraction and when to use the reserve sample.

ii) The name of the governorate.

iii) The name of the district.

iv) The name of the chosen villages in each district.

v) The number of families to be surveyed in each village.

vi) The original sample number for each village.

vii) The reserve sample number for each village.

The sampling process was thoroughly explained by the statistician to the survey leaders in Cairo and the necessary tables were handed to them. Several meetings between the leaders and field supervisors were held in the governorates to ensure correct understanding of the procedure. Then a last meeting was held in Cairo to emphasize that the survey should be conducted smoothly and efficiently according to schedule.

Below is a diagram of the sample selection table:

i) Governorate name

ii) Explanatory text for sample procedures

iii) Sample table

District Name

Name	1st Village
Number families chosen	
Original sample number	
Reserve sample number	
Name	2nd Village
Number families chosen	
Original sample number	
Reserve sample number	
Name	3rd Village
Number families chosen	
Original sample number	
Reserve sample number	

The examination of the random sample was carried out in November and December 1984 by Ministry of Health staff from Cairo, governorates, districts and health units; a member of the independent evalution team carried out random checks on the execution of the study, quality control of the diagnostic and egg-counting procedures used, and data recording and transmission throughout the work. This independent control was perfomed mainly in Beni Suef and Minya governorates, but also to some extent in Assiut (North) governorate; the actual villages where quality control was exercised are indicated in Tables 4.3 to 4.5, where the symbol *** indicates that a health unit was studied and assessed during the actual conduct of the random survey. In the same Tables, the symbol ** indicates that a random survey village health unit was visited and assessed at a point in time shortly before or after the random survey was performed.

4.2.3 In-depth Health Unit Studies

The third main epidemological evaluation tool used by the team was a prolonged series of detailed studies in-depth of a randomly chosen group of health units in all governorates but one involved in the Middle and Upper Egypt project areas; the unstudied exception was Aswan governorate, where lack of time and the distances involved precluded the possibility of field visits. Tables 4.3 to 4.8 show the health units visited, summarized by governorate and district in Tables 4.1 and 4.2.

These health unit visits were also utilized in assessing the chemotherapy delivery system, and the general operation and management of the rural health care programme, as will be described in the next section of this report. In order to obtain in-depth analyses of certain key aspects of health unit function, a number of health units were visited on more than one occasion; Tables 4.1 to 4.8 show that this component of the independent evaluation comprised a total of 63 visits to 53 health units, made up as follows:

	Units	Visits
Units visited once	46	46
Units visited twice	5	10
Units visited three times	1	3
Units visited four times	1	4
Totals	53	63

Some 9.7% of all rural health units in the Middle Egypt project area were visited and 4.5% of units in the Upper Egypt area. Each unit visited was assessed by means of a carefully prepared protocol, which combined quantitative objective observations, qualitative objective observations, questions posed about facts to the health unit staff, opinions elicited from the health unit staff and subjective impressions formed by the evaluation team member; subjectivity was kept to a minimum.

TABLE 4.1 Summary of health units visited and assessed by independent evaluation team, Middle Egypt Project area, October 1984 - March 1985.

Governorate	District	Number of units visited	Number of visits made
Beni Suef	El Wasta	3	3
	Nasser	2	2
	Beni Suef	1	1
	Inasia	3	3
	El Fashn	1	1
	Sub Total	10	10
Minya	Beni Mazar	2	2
	Edwa	2	2
	Matai	1	1
	Samalout	3	3
	El Fikreia	2	2
	Mallawi	1	1
	Sub Total	11	11
Assiut (North)	El Quosseia	4	8
	Manfalout	2	2
	Assiut	7	10
	Sub Total	13	20
TOTAL (Middle Egypt)		34	41

TABLE 4.2 Summary of health units visited and assessed by independent evaluation team, Upper Egypt Project area, October 1984 - March 1985.

Governorate	District	Number of units visited	Number of visits made
Assiut (South)	Abnob	2	4
	Abutig	3	4
	Sedfa	1	1
	Sahel Salim	2	2
	El Ghanayim	1	1
	Sub Total	9	12
Sohag	Akmin	2	2
	Sakulta	1	1
	El Maraga	1	1
	Tahta	1	1
	Sub Total	11	11
Qena (North)	Qena	1	1
	Nag Hammadi	1	1
	Esna	3	3
	Sub Total	5	5
TOTAL (Upper Egypt)		19	22

TABLE 4.3 Beni Suef Governorate, Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
El Wasta	5/11/84	Zawyet El Masloob	RHU	1	* * *
	5/11/84	El Homa	RHU	1	* * *
	4/3/85	Maidun	RHU	1	* * *
Nasser	7/11/84	Dandil	RHU	1	* * *
	7/11/84	Kafr El Gezira	RHU	1	* * *
Beni Suef	3/3/85	Ehnassia Hadra	Rural Hospital	1	
Ihnasia	6/11/84	Nena	RHC	1	* * *
	6/11/84	Manshat El Hag	RHU	1	* * *
	3/3/85	Sedmant	RHU	1	* * *
El Fashn	5/3/85	El Fant	Rural Hospital	1	

* * * - 1984 Random survey village visited during survey
* * - 1984 Random survey village, not visited during survey
* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 10
TOTAL VISITS - 10

TABLE 4.4 Minya Governorate, Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
Beni Mazar	21/11/84	Nazbel Aldeleel	RHU	1	* * *
	21/11/84	Oto el Wakf	RHU	1	* * *
Edwa	20/11/84	El Akliah	RHU	1	* * *
	23/2/85	Bani Amer	RHU	1	* *
Matai	19/11/84	Sedah El Sharkiya	RHU	1	* * *
Samalout	28/10/84	Beni Khaled	RHU	1	
	24/2/85	Darfash	RHU	1	* *
	24/2/85	Dolkorm	RHU	1	
El Fikeia	27/10/84	Abuha	RHC	1	* *
	18/11/84	El Berba	RHU	1	* * *
Mallawi	29/10/84	Ashmonin	Rural Hospital	1	

* * * - 1984 Random survey village visited during survey
* * - 1984 Random survey village, not visited during survey
* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 11
TOTAL VISITS - 11

TABLE 4.5 Assiut Governorate (North), Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
El Quosseia	15/10/84 22/10/84 7/02/85 9/02/85	Reskit El Deir	RHU	4	
	15/10/84	Deir El Marrat	RHU	1	
	22/10/84 28/2/85	Fazara	Rural Hospital	2	* * (special project)
	7/2/85	El Saragna	RHU	1	
Manfalout	23/10/84	Nasr Karar	RHU	1	* *
	15/1/85	Beni Adi El Kabliah		1	
Assiut	18/10/84	Deir Durunka	RHU	1	
	20/10/84 27/02/85 28/02/85	Sallam	RHU	3	
	20/10/84 27/02/85	Bahig	RHU	2	* *
	20/10/84	El Oder	RHU	1	*
	21/10/84	Al Wan	RHU	1	
	13/04/84	Beni Ghaleb	RHU	1	* * *
	15/01/85	Masra	RHU	1	

* * * - 1984 Random survey village visited during survey
* * - 1984 Random survey village, not visited during survey
* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 13
TOTAL VISITS - 20

TABLE 4.6 Assiut Governorate (South), Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
Abnob	21/10/84	El Wasta	RHU	2	
	26/02/85				
	16/01/85	Bani Murr	RHC	2	
	3/02/85				
Abutig	18/10/84	El Zarebi	RHC	1	
	18/12/84	El Nikhela	RHC	2	
	6/02/85				
	18/12/84	El Mutia	RHC	1	
El Ghanayim	17/10/84	El Ghanayim	RHC	1	
Sedfa	6/02/85	Beni Faiz	RHU	1	
Sahel Salim	16/01/85	El Ghourib	RHU	1	
	10/02/85	Al Awara	RHU	1	

* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 9
TOTAL VISITS - 12

TABLE 4.7 Sohag Governorate, Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
Akmin	12/02/85	El Hawawish	RHU	1	
	13/02/85	Nadeh	RHU	1	
Sakulta	13/02/85	Seflak	RHU	1	
El Maragha	14/02/85	Sheikh Youssef	RHU	1	
Tahta	14/02/85	Shatora	RHU	1	

* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 5
TOTAL VISITS - 5

TABLE 4.8 Qena Governorate, Health Units visited and assessed by independent evaluation team, October 1984 - March 1985

District	Date	Name of Unit	Type of Unit	Number of Visits	Notes
Qena	16/02/85	El Gabalao	RHU	1	*
Nag Hammadi	17/02/85	Al Sharki Bahjoura	RHU	1	*
Esna	18/02/85	El Nougou Bahary	RHU	1	*
	18/02/85	Asfun	RHU	1	
	18/02/85	El Deir	Rural Hospital	1	

* - Ministry of Health "indicator" village

TOTAL UNITS VISITED - 5
TOTAL VISITS - 5

From the point of view of epidemological evaluation, the most important aspects of the health unit visits were the information collected on the following topics:

(i) Numbers of urine examinations performed and found positive in 1982, 1983 and 1984, classified as school students and out-patients.

(ii) The availability and condition of relevant items of equipment, particularly microscopes, centrifuges, conical flasks, glass slides and weighing-scales for patients.

(iii) Quality control of urine examinations performed on the day of the visit.

(iv) Presence of a physician and a laboratory technician in the unit on the day of the visit.

(v) Evidence of supervisory visits by district medical officers and laboratory supervisors to the units.

(vi) Physical condition of data records, and their concordance with statistics available in governorate medical headquarters and in Cairo.

4.3 METHODOLOGY OF EVALUATION - CHEMOTHERAPY DELIVERY

The principal technique used for evaluating the various aspects of the chemotherapy delivery system in Middle and Upper Egypt was the series of health unit visits and studies described in the previous section of this report. The following factors related to chemotherapy were assessed during the visits:

(i) Availability of metrifonate and/or praziquantel in the unit, and quantity available in relation to average monthly needs.

(ii) Storage conditions of drugs, inspections of pharmacies and inspection of refrigerators.

(iii) Expiry dates and/or manufacturers batch number on stocks of drugs.

(iv) Recorded compliance rates in the unit books in terms of:

(a) Percentage of bilharziasis patients diagnosed who were treated at all.

(b) In the case of metrifonate usage, the percentage of 2nd and 3rd doses which were actually given.

(v) The presence of medically qualified staff in the unit to supervise drug administration and to be available to treat complications and side-effects of therapy.

(vi) The views of health unit physicians on the importance of bilharzia chemotherapy, on their own role in the bilharzia programme and on possible ways of improving case finding and drug compliance rates.

The programme of health unit visits was supplemented by a series of visits to governorate medical headquarters and governorate bilharzia laboratories where two main activities were carried out - relevant to both epidemiological and chemotherapy delivery evaluation:

(i) Discussions on all problems of surveillance, diagnosis, equipment, management, personnel, drug supply and drug delivery were held with the appropriate staff members.

(ii) Quality control of the egg-counting procedures carried out on urine samples collected regularly from "indicator" villages was performed; this expression of intensity of infection is crucial as an indicator of general control efficacy, but more particularly of the coverage and percentage compliance achieved by the chemotherapy delivery system.

4.4 RESULTS OF EVALUATION - EPIDEMIOLOGICAL TRENDS MINISTRY OF HEALTH PROJECT PROGRESS REPORTS

4.4.1 Baseline Data

Table 4.9 shows the figures on prevalence-rates in the two project areas obtained in the 1977 and 1980 surveys; these data will be taken as baseline figures for the pruposes of the present evaluation.

4.4.2 Data Trends in Control (Middle Egypt)

Tables 4.10 to 4.13 list the annual data obtained from project progress reports of the Ministry of Health, Cairo; Table 4.10 lists the results of annual screening in sample surveys, Table 4.11 shows the results of annual examination of a fixed population sample or "cohort" in index villages, Table 4.12 records the consolidated returns of rural health units and centres, and Table 4.13 gives the results of biannual examination of school children. Examination of the trends revealed by these tables indicates that there has been a general downward trend in prevalence-rates in all governorates of the project area. More detailed inspection of the figures for Middle Egypt, however, reveals that the greater part of the fall in prevalence-rates occurred during the first three years of the project from 1977-1979, with a slower annual rate of decline from 1980-1984; this slowing in the rate of fall of revalence-rates is to be expected as disease control projects move into their consolidation and maintenance phases.

TABLE 4.9 Base-line prevelence-rates used for evaluating progress of control operations in Middle and Upper Egypt.

Governorate	Date of Survey	Prevalence Rate (%)
Beni Suef	1977	27.7%
Minya	1977	33.6%
Assiut (North)	1977	19.3%
Assiut (South)	1980	15.9%
Sohag	1980	20.9%
Qena	1980	31.9%
Aswan	1980	17.0%

Table 4.10. Annual screening in Sample Surveys -

Middle Egypt - S. haematobium (See table 4.9 for 1977 baseline data)

GOVERNORATE	BENI SUEF		MINYA		ASSIUT (NORTH)		TOTAL	
YEAR:	Examined	Positive %	Examined	Positive %	Examined	Positive %	Examined	Weighted Positive %
1979	151,294	16.4	111,247	17.4	39,731	11.8	302,272	16.1
1980	24,980	14.4	169,213	17.3	17,437	9.9	211,630	15.3
1981	30,980	15.5	296,390	14.7	69,031	10.4	396,401	14.1
1982	179,436	15.2	505,260	14.0	45,593	7.0	730,289	13.2
1983	265,401	9.3	325,738	11.6	35,987	8.9	627,126	10.5
1984	299,062	6.8	450,571	9.1	52,331	10.4	801,964	9.2

Table 4.11. Results of annual examination of the fixed sample - "cohort" - at Index Villages - Middle Egypt - S. haematobium

Governorate		1977	July 1979	July 1980	July 1981	July 1982	July 1983	July 1984
Beni Suef	Examined	6,226	7,115	6,930	7,724	7,338	5,300	5,710
	Positive	1,720	1,204	902	983	1,106	605	424
	%	27.6	16.9	13.0	12.7	15.1	11.4	7.4
Minya	Examined	15,645	11,072	13,450	11,576	13,035	13,353	12,953
	Positive	5,256	1,973	1,403	1,439	1,550	1,397	1,381
	%	33.6	17.8	10.4	12.4	11.9	10.5	10.7
Assiut (North)	Examined	5,534	3,799	2,460	2,883	3,013	2,536	2,004
	Positive	1,073	334	201	160	128	86	75
	%	19.4	8.8	8.2	5.5	4.2	3.4	3.7
TOTAL	Examined	27,405	21,986	22,840	22,183	23,386	21,189	20,667
	Positive	8,049	3,511	2,506	2,582	2,784	2,088	1,880
	%	29.4	16.0	11.0	11.6	11.9	9.9	9.1
Positivity Total (%) Weighted for population of each governorate		29.3	15.9	10.7	11.2	11.4	9.5	8.5

Table 4.12. Consolidated Returns at Rural Health Units & Centers,

Middle Egypt. S. haematobium

GOVERNORATE	BENI SUEF		MINYA		ASSIUT (NORTH)		TOTAL	
YEAR:	Examined	Positive %	Examined	Positive %	Examined	Positive %	Examined	Positive%
1977 - 1978	885,704	26.4	1,394,206	33.6	465,859	19.2	2,745,769	29.4
1979	405,463	19.3	641,738		269,436	13.2	1,316,637	
1980	294,232	16.9	590,833	17.5	250,513	13.1	1,135,578	16.4
1981	314,518	16.3	825,883	17.5	233,581	12.2	1,373,982	16.3
1982	403,795	12.7	962,343	17.3	237,094	12.3	1,603,232	15.4
1983	410,837	11.7	824,562	12.0	230,657	13.2	1,466,056	12.1
1984	196,413	9.6	488,104	13.8	110,417	11.9	794,934	12.5

Table 4.13. Results of bi-annual examination of school students - Middle Egypt. S. haematobium

School year		BENI SUEF		MINYA		ASSIUT (NORTH)		TOTAL	
		Examined	S.Haem %	Examined	S.Haem %	Examined	S.Haem %	Examined	S.Haem %
1978/1979	Oct 78	44,528	20.4	94,269	22.1	74,382	16.3	213,179	19.7
1979/1980	Oct 79	64,562	16.3	121,569	26.3	33,481	14.1	219,612	21.5
	re exed in summer	44,782	12.3	86,809	18.6			121,501	16.5
1980/1981	Oct 80	61,935	16.3	116,167	31.3	34,023	15.8	212,125	24.4
1981/1982	Oct 81	74,645	15.7	156,440	25.2	46,756	14.5	277,841	20.9
	March 82	68,981	12.8	133,779	16.1	32,416	14.2	235,176	15.0
1982/1983	Oct 82	78,321	14.1	157,896	26.0	44,895	16.7	281,112	21.2
	March 83	84,257	12.1	156,332	14.7	40,882	5.1	281,471	12.5
1983/1984	Oct 83	94,296	14.5	191,360	26.1	53,001	18.0	338,657	21.6
	March 84	93,703	9.9	169,235	16.8	34,288	4.9	297,226	13.3
1984/1985	Oct 84	99,077	11.4	221,413	19.9	57,710	15.9	378,200	17.1
	March 85								

Detailed inspection of data from Table 4.12, with baseline prevalence-rates for comparison, illustrates this trend:

Governorate	1977 Baseline	Year 1980	1981	1982	1983	1984
Beni Suef	27.7%	16.9%	16.3%	12.7%	11.7%	9.6%
Minya	33.6%	17.5%	17.5%	17.3%	12.0%	13.8%
Assiut (North)	19.3%	13.1%	12.2%	12.3%	13.2%	11.9%
Total		16.4%	16.3%	15.4%	12.1%	12.5%

Examination of the Table 4.10, based on annual sample surveys, which can be expected to be a better indicator of true prevalence-rates than the inevitably biased results from attenders at health units, reveals some similar trends in positivity rates:

Governorate	1977 Baseline	Year 1980	1981	1982	1983	1984
Beni Suef	27.7%	14.8%	15.5%	15.2%	9.3%	6.8%
Minya	33.6%	17.3%	14.7%	14.0%	11.6%	9.1%
Assiut (North)	19.3%	9.9%	10.4%	7.6%	8.9%	10.4%
Total (weighted)		15.3%	14.1%	13.2%	10.5%	9.2%

Assiut (North) for example, has a higher sample prevalence-rate in 1984 than in 1980, and shows no consistent trend over the five year period; Beni Suef has a rising prevalence-rate from 1980-1982, and has only shown a satisfactory decline in the last two years; Minya has a steady decline in prevalence-rate throughout the five year period. A similar impression is obtained from Tables 4.11 and 4.13, listing the "cohort" and school examinations; again, Assiut (North) has a higher proportion of school students positive in the October 1984 study than in either the October 1980 or October 1979 examinations, and Beni Suef and Minya show only very slow downward trends.

It is clear that these results indicate that although interest and enthusiasm for schistosomiasis control amongst both the public and the health workers have been sustained at a high level, some transmission of infection still continues; significant reinfections occur, particularly in young age-groups in some villages in the project area. In addition, the figures must be considered in connection with the future strategies for chemotherapy delivery, and in particular the role of praziqualtel versus metrifonate.

4.4.3 Data trends in control (Upper Egypt)

A detailed inspection of the figures for Upper Egypt, presented in Tables 4.14 to 4.16, shows a generally similar set of trends to those observed in Middle Egypt. Again, as in Middle Egypt, most of the falls in prevalence-rates have occurred in the early part of the project, and as could be expected from an area which is still in the consolidation phase of operations, some 1983 and 1984 prevalence-rates are higher than any observed in Middle Egypt. As in Middle Egypt, some inexplicable anomalies occur in data-trends, for example the rise in positivity-rate in health unit attenders observed in Sohag between 1983 and 1984, and the rise in prevalence in the "cohorts" examined from the same governorate in the same year, as well as in Qena between 1982 and 1983.

Table 4.14 Annual screening in Sample Surveys - Upper Egypt - S. haematobium

Governorate	Assiut (South)		Sohag		Qena		Aswan		Total	
Year	Examined	Positive %	Examined	Positive %	Examined	Positive %	Examined	Positive %	Examined	Positive %
1981	91,904	15.7	264,176	20.2	259,314	30.8	42,290	17.1	657,681-	23.6
1982	32,407	15.1	326,457	16.0	408,184	26.0	63,946	4.6	830,994	17.8
1983	40,166	14.1	485,431	12.1	504,576	18.5	192,163	3.2	1,222,336	13.4
1094	42,268	11.4	466,282	11.4	279,307	16.0	80,359	1.9	868,216	12.3

Table 4.15 - Results of annual examination of the fixed sample - "Cohort" - at index Villages - Upper Egypt - S. haematobium

Governorate		July 1979	July 1980	July 1981	July 1982	July 1983	July 1984
Assiut (South)	Examined		4,130	5,792	7,104	5,567	4,637
	Positive		175	921	1,293	785	528
	%		5.8	15.9	18.3	14.1	11.4
Sohag	Examined	9,610	59,945	15,573	11,139	15,231	14,157
	Positive	2,143	13,424	2,592	1,616	1,265	2,379
	%	22.3	22.4	16.6	14.5	8.3	16.8
Qena	Examined	83,581	84,122	15,636	16,255	19,410	15,014
	Positive	38,338	28,010	3,653	2,455	3,824	2,183
	%	45.9	33.3	23.4	15.1	19.7	14.5
Aswan	Examined	36,429	32,415	33,785	35,246	31,091	4,011
	Positive	7,294	4,951	5,523	1,022	800	59
	%	20.0	15.3	16.3	2.9	2.6	1.5
Total	Examined	129,620	180,612	70,786	69,744	71,299	37,846
	Positive	47,775	46,560	12,689	6,391	6,674	5,149
	%	36.9	25.8	17.9	9.2	9.4	13.6
Possitivity total % weighted for population of each governorate		31.6	22.4	18.0	14.0	12.2	13.6

TABLE 4.16 - Consolidated returns at rural health units and centres - Upper Egypt

S. haematobium

Governorate: / Year	Assiut (South) Examined	Positive %	Sohag Examined	Positive %	Qena Examined	Positive %	Aswant Examined	Positive %	Total Examined	Positive %
1981	286,376	20.5	314,792	21.6	134,769	28.3	103,512	12.6	839,419	21.1
1982	337,003	16.6	280,914	10.3	987,758	25.7	116,230	10.3	1721,935	20.4
1983	267,983	17.1	1,280,396	12.6	979,662	20.8	85,553	7.2	2583,594	16.0
1984	138,817	14.8	303,783	14.5	262,467	20.9	96,076	4.8	801,143	15.5

A summary of trends in the three main data sources for Upper Egypt is given here:

Health unit returns

Governorate	1980 Baseline	Year 1981	1982	1983	1984
Assiut (South)	22.2%	20.5%	16.6%	17.1%	14.8%
Sohag	21.4%	21.6%	10.3%	12.6%	14.5%
Qena	27.3%	28.3%	25.7%	20.8%	20.9%
Aswan	10.2%	12.6%	10.3%	7.2%	4.8%
Total	26.3%	21.1%	20.4%	16.0%	15.5%

Annual Sample Surveys

Governorate	Year 1981	1982	1983	1984
Assiut (South)	15.7%	15.1%	14.1%	11.4%
Sohag	20.2%	16.0%	12.1%	11.4%
Qena	30.8%	26.0%	18.5%	16.0%
Aswan	17.1%	4.6%	3.2%	1.9%
Total	21.1%	20.4%	16.0%	15.5%

"Cohort" Studies

Governorate	1979	1980	Year 1981	1982	1983	1984
Assiut (South)	-	5.8%	15.9%	18.3%	14.1%	11.4%
Sohag	22.3%	22.4%	16.6%	14.5%	8.3%	16.8%
Qena	45.9%	33.3%	23.4%	15.1%	19.7%	14.5%
Aswan	20.0%	15.3%	16.3%	2.9%	2.6%	1.5%
Total (weighted)	31.6%	22.4%	18.0%	14.0%	12.2%	13.6%

4.4.4 Egg output studies

Intensity of infection has been recorded in Ministry of Health progress reports for Middle Egypt since October 1980, and for Upper Egypt since October 1981. Intensity is expressed as the geometric mean egg-output per 10ml. urine in subsamples of positive school students. Trends in the Middle and Upper Egypt project areas are as follows:

	Year				
Middle Egypt	1980	1981	1982	1983	1984
Governorate					
Beni Suef	24.6	23.1	19.1	18.3	32.7
Minya	57.3	108.9	77.4	76.3	4.7
Assiut (North)	14.1	7.8	-	44.9	38.6
Total	38.5*	57.5*	47.6*	41.4*	11.6

*Figures corrected from Ministry of Health progress reports, after recalculation

Upper Egypt	1981	1982	1983	1984
Governorate				
Assiut (South)	-	57.3	35.3	30.9
Sohag	62.0	29.4	41.3	47.1
Qena	39.0	32.8	31.1	7.3
Aswan	47.1	26.9	25.8	20.0
Total	54.1*	35.6*	32.9*	14.6*

*Figures corrected from Ministry of Health progress reports, after recalculation.

These figures again show an overall downward trend, and indicate that a very considerable degree of control of worm burden has been achieved in both the Middle and Upper Egypt project areas; in its turn, this may be expected to be a predictor of reduced incidence-rates of disease complicating bilharzia infection in the years to come.

Again, however, there are inexplicable anomalies in the intensity data. Assiut (North) has higher geometric mean values in 1983 and 1984 than in 1980 and 1981; Beni Suef has a higher geometric mean in 1984 than in any of the previous 4 years; Minya, consistently the most intensely infected governorate from 1980-1983, shows an extraordinary and dramatic fall in 1984; the trend in Sohag has been rising from 1982 to 1984, whereas in the rest of Upper Egypt it has been falling from 1981 to 1984. It should also be pointed out that the GM totals for 1984, 11.6 for Middle Egypt and 14.6 for Upper Egypt, were weighted according to the total number of positive school children in each governorate in order to avoid misleading impressions.

4.4.5 Incidence-rate Studies

Incidence rates of new infection have been reported by the Ministry of Health in the project progess reports since 1980; rates are calculated on an annual percentage basis in a subsample of school children in index villages confirmed as negative in October of one particular year, and than converted to positive at examination 12 months later. This method of estimating annual incidence-rates is fraught with difficulties in strict epidemiological terms; there is no random definition of the denominator group, who are clearly an atypical group in that they consist entirely of negatives in any particular October; extensive re-examination of school students is performed in March each year, before the end of the school year and before the start of the intense, hot weather transmission season - many positive students are treated at this time; population subsamples are not standardized for age and sex from year to year, although bilharziasis is par excellence an infection where age and sex have immense influence on incidence-rates. Nevertheless, it must be recognized that there are enormous difficulties in producing valid incidence-rate data in infections such as bilharziasis for numerous reasons - the prolonged and variable pre-patent period of the infection, the natural rate of reversion for the positive to the negative state, the difficulty with a single, rather insensitive urine examination of determining rates of either positivity or negativity. In these circumstances, although the incidence-rates calculated must be treated with caution, the trends in incidence-rates from year to year may be taken as indicators of increasing or decreasing transmission. Reported incidence-rates for the project area are as follows:

Middle Egypt	Year			
Governorate	80 - 81	81 - 82	82 - 83	83 - 84
Beni Suef	21.9%	18.6%	14.5%	7.1%
Minya	18.8%	22.9%	15.3%	12.0%
Assiut (North)	3.2%	12.2%	5.1%	9.7%
TOTAL (Weighted)	17.0%	19.7%	13.3%	10.1%

Upper Egypt	Year			
Governorate	80 - 81	81 - 82	82 - 83	83 - 84
Assiut (South)	-	19.7%	9.0%	13.1%
Sohag	32.9%	19.4%	17.0%	13.0%
Qena	46.6%	27.7%	29.2%	11.7%
Aswan	-	5.9%	3.1%	3.1%
TOTAL (Weighted)	-	19.5%	15.8%	10.8%

4.4.6 Heterogeneity of data

One feature of great importance that emerged from the study of epidemiological data on bilharziasis in Egypt was the great heterogeneity of prevalence-rates and incidence-rates which occurs throughout Middle and Upper Egypt, both at the time baseline data were established and at the present time. This heterogeneity can often be explained in terms of features such a proximity of a community to water which provides exceptionally good snail habitat, or to local occupations and agricultural practices; its main importance is that it is often concealed and overlooked when epidemological data are presented in tabular form on a district or governorate basis. Relatively small foci of residual intense infection may act as sources of re-infection for well-controlled areas in view of the great mobility of the Egyptian population, and it is essential that such foci be identified, treated and carefully monitored.

4.5 RESULTS OF EVALUATION - EPIDEMIOLOGICAL TRENDS THE NOVEMBER-DECEMBER 1984 RANDOM SURVEY

As stated previously in Section 4.2.2 of this chapter, the Random Survey consitituted the most important single component of the evaluation of epidemiological trends. The careful and meticulous design of the random survey by the Egyptian Ministry of Health was described in the same section.

The conduct of the random survey was performed with an extremely high degree of efficiency, and the random selection of families for inclusion in the survey, the calling of persons for examination, and the recording and verification of data on the coded data sheets was carried out with the punctuality and precision of a highly successful military operation.

Numerous items of information were recorded on the individuals who were selected for participation in the random survey. Demographic characteristics of age, sex and family size, occupational information, educational status, history of signs and symptoms of bilhaziasis such as haematuria, cloudy urine and renal colic, and history of previous treatment and type of treatment for bilharziasis. A data bank has been accumulated that is unique in the history of epidemiological studies of bilharziasis in terms of the depth and variety of information available on a very large randomly selected sample of exposed persons living in an epidemic area; this data bank will prove invaluable to the Egyptian Ministry of Health in the future monitoring of epidemiological trends in Middle Egypt, and in planning extensions of control measures to other areas of Egypt.

In the present chapter, the extensive data collected on prevalence-rates of egg-positive urine examinations are used in conjunction with Ministry of Health project progress reports discussed in Section 4.4 and field visits to Health Units and laboratories reported in Section 4.6 to provide a detailed and quantified evaluation of the control, measures carried out in Middle Egypt. Data from the random survey have been presented in a very large series of computer print-outs; simplified tables directly relevant to the evaluation of control will be given in this Chapter. Certain data such as demographic structure of the population will be presented in summary form for the whole project area, whilst prevalence-rate data will be presented by Governorate as well.

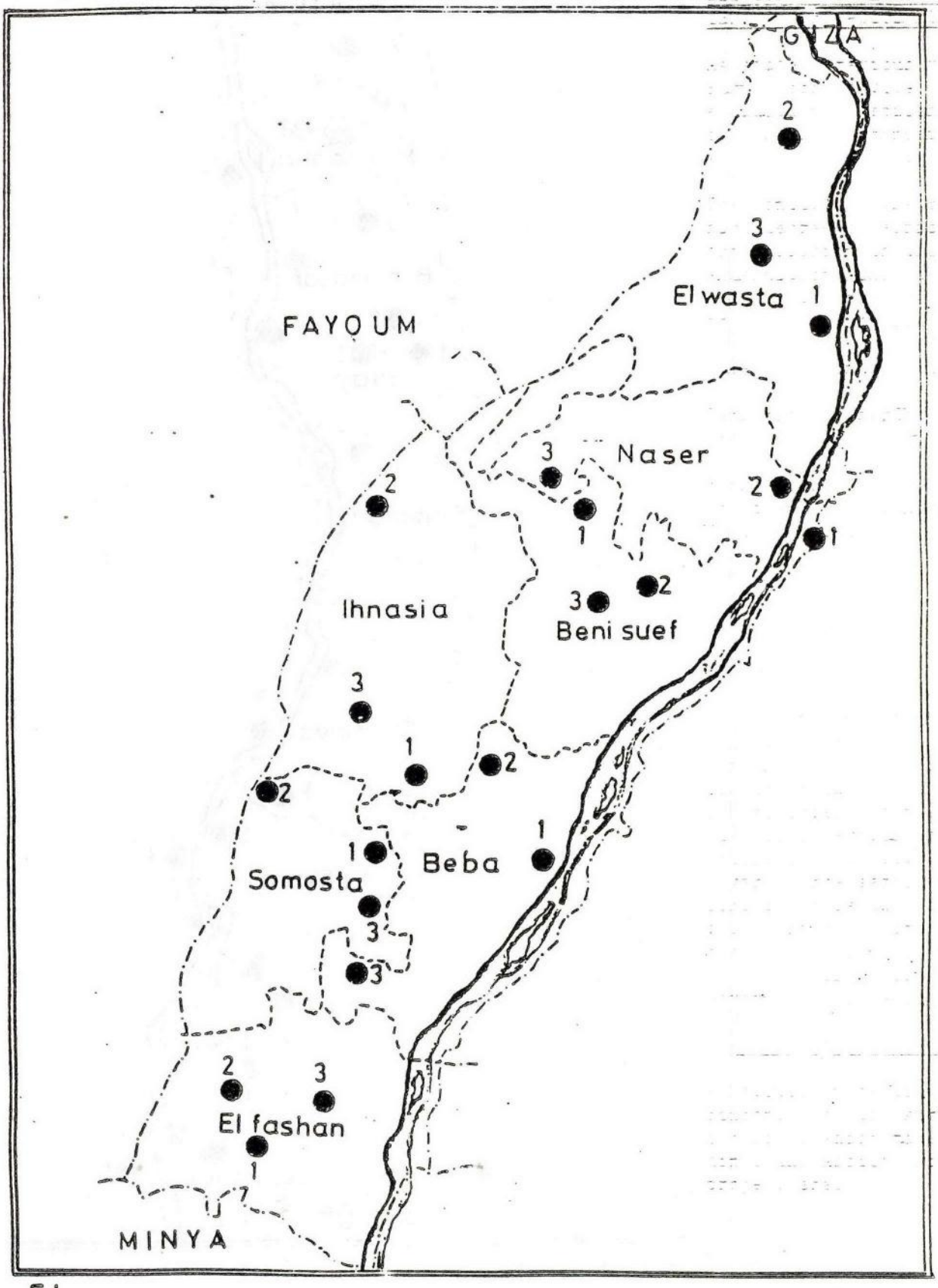
4.5.1 The location of the random survey study villages

As stated in section 4.2.2, a total of 60 villages were selected randomly for the survey, three from each of the 20 administrative districts which make up the three Governorates of Beni Suef, Minya and Assiut (North) which constitute the Middle Egypt project area.

The locations of the study villages are shown on Maps 1, 2 and 3; within each district the three villages selected are shown as coloured, numbered circles, and the village names are listed on the accompany map legends.

MAP 1

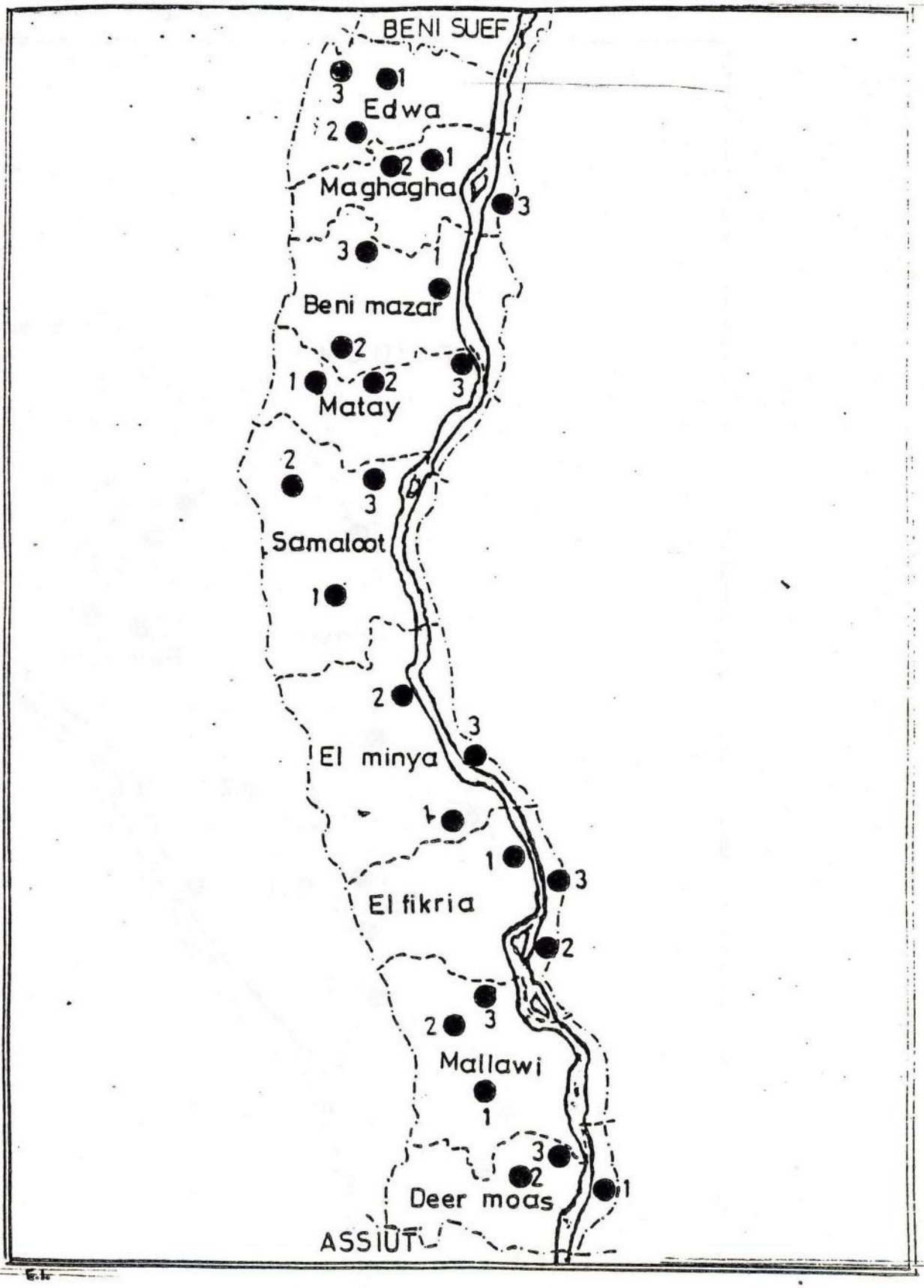
GOVERNORATE BENI SUEF



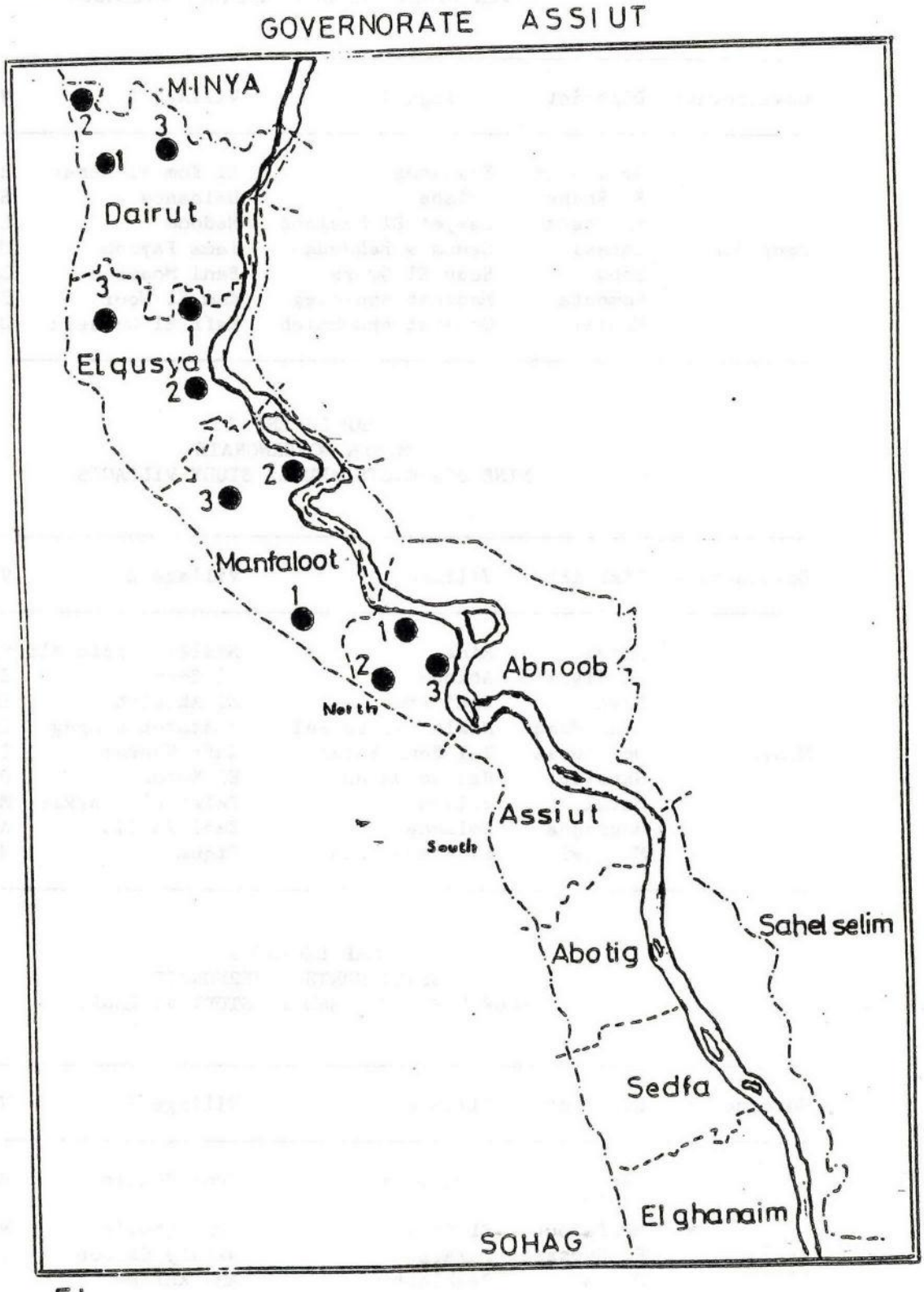
E.I.

MAP 2

GOVERNORATE MINYA



MAP 3


GOVERNORATE ASSIUT
MINYA
Dairut
El qusya
Manfaloot
Abnoob
North
Assiut
South
Sahel selim
Abotig
Sedfa
El ghanaim
SOHAG

E.I.

MAP LEGEND 1
BENI SUEF GOVERNORATE
SEVEN DISTRICTS AND 21 STUDY VILLAGES

Governorate	District	Village 1	Village 2	Village 3
Beni Suef	Beni Suef	Ebshanna	El Kom El Ahmar	Beni Bakheet
	El Fashn	Ekfahs	Delhanes	Saft El Noor
	El Wasta	Zawyet El Masloob	Medoom	El Hooma
	Ihnasia	Nenna & Bahnana	Tema Fayoom	Manshat El Hag
	Beba	Seds El Omara	Beni Moamena	Zawyet El Naweya
	Somosta	Manshat Abu-Mleg	Kom El Noor	Bedahl
	Nasser	Gezeret Abu-Saleh	Kafr El Gezeera	Dandeel

MAP LEGEND 2
MINYA GOVERNORATE
NINE DISTRICTS AND 27 STUDY VILLAGES

Governorate	District	Village 1	Village 2	Village 3
Minya	Minya	Rida	Nazlet Hussin Ali	Sawadah
	El Fikreia	Abioha	El Berba	El Sheikh Temay
	Edwa	Beni Amer	El Akleiah	El Kayat
	Beni Mazar	Nazlet El Daleel	Maasaret Haggag	Eato El Wakf
	Der Mowas	Tal Beni Emran	Kafr Khozam	Tookh
	Samalout	Hassan Basha	El Kotosha	Dafash
	Matai	Helwah	Selah El Sharkia	Manshat Lutfallah
	Maghagha	Belhasah	Beni Khalid	Abdad Sharona
	Mallawi	El Areen Quibly	Etqua	Naway

MAP LEGEND 3
ASSIUT NORTH GOVERNORATE
FOUR DISTRICTS AND 12 STUDY VILLAGES

Governorate	District	Village 1	Village 2	Village 3
Assiut North	Assiut North	Naga Saba	Beni Ghalib	Bahig
	Manfalout	El Ezeya	Beni Shokir	Nazza Karar
	El Quosseia	Fazara	Nazaly Ganoob	Beni Helal
	Dairut	Dashloot	Abu Kareem	Amshool

4.5.2 The demographic characteristics of the population surveyed

Table 4.17 shows the age and sex structure of the 33 985 persons who comprised the study population; Tables 4.18 - 4.20 give the details of the three individual governorates. There are minor differences between governorates in such characteristics as family size and sex-composition, but the only significant demographic differences are in the age compositions of Minya and Assiut (North), where Minya has a distinctly older population; 30.7% of the population of Assiut (North) is under the age of 15 years, compared with 28.7% in Minya, whilst 27.7% of Assuit (North) is aged over 40 years, compared with 31.9% in Minya.

TABLE 4.17 DEMOGRAPHIC CHARACTERISTICS OF SAMPLE SURVEYED
MIDDLE EGYPT (TOTAL)

NUMBER OF FAMILIES SURVEYED = 7845				
NUMBER OF PERSONS SURVEYED = 33985				
AVERAGE FAMILY SIZE = 4.33				
SAMPLE DISTRIBUTION BY AGE AND SEX				
AGE (YEARS)		SEX		TOTAL
		MALES	FEMALES	
5	NO	1293	1138	2431
	%	7.4	6.9	7.2
5 - 9	NO	2345	2063	4408
	%	13.5	12.5	13.0
10 - 14	NO	2788	2056	4844
	%	16.0	12.4	14.3
15 - 19	NO	2196	1490	3686
	%	12.6	9.0	10.8
20 - 29	NO	2233	2316	4549
	%	12.8	14.0	13.4
30 - 39	NO	1814	2331	4145
	%	10.4	14.1	12.2
40 - 49	NO	1741	2233	3974
	%	10.0	13.5	11.7
50 - 59	NO	1628	1760	3388
	%	9.3	10.6	10.0
60+	NO	1377	1183	2560
	%	7.9	7.1	7.5
TOTAL	NO	17415	16570	33985
	%	100.0	100.0	100.0
PERCENT OF SEX	%	51.2	48.8	100.0

TABLE 4.18 DEMOGRAPHIC CHARACTERISTICS OF SAMPLE SURVEYED
GOVERNORATE: BENI SUEF

NUMBER OF FAMILIES SURVEYED = 2428			
NUMBER OF PERSONS SURVEYED = 11252			
AVERAGE FAMILY SIZE = 4.63			
SAMPLE DISTRIBUTION BY AGE AND SEX			
AGE (YEARS)		SEX	TOTAL
		MALES	FEMALES
5	NO	526	449	975
	%	9.2	8.1	8.7
5 - 9	NO	793	708	1501
	%	13.9	12.8	13.3
10 - 14	NO	911	706	1617
	%	16.0	12.7	14.4
15 - 19	NO	733	492	1225
	%	12.9	8.9	10.9
20 - 29	NO	708	814	1522
	%	12.4	14.7	13.5
30 - 39	NO	567	762	1329
	%	9.9	13.7	11.8
40 - 49	NO	556	690	1246
	%	9.8	12.4	11.1
50 - 59	NO	493	538	1031
	%	8.6	9.7	9.2
60+	NO	413	393	806
	%	7.2	7.1	7.2
TOTAL	NO	5700	5552	11252
	%	100.0	100.0	100.0
PERCENT OF SEX	%	50.7	49.3	100.0

TABLE 4.19 DEMOGRAPHIC CHARACTERISTICS OF SAMPLE SURVEYED
GOVERNORATE: MINYA

NUMBER OF FAMILIES SURVEYED = 3248			
NUMBER OF PERSONS SURVEYED = 13017			
AVERAGE FAMILY SIZE = 4.01			
SAMPLE DISTRIBUTION BY AGE AND SEX			
AGE (YEARS)	SEX		TOTAL
	MALES	FEMALES	
5 NO	299	260	559
%	4.5	4.1	4.3
5 - 9 NO	740	699	1439
%	11.2	10.9	11.1
10 - 14 NO	992	740	1732
%	15.0	11.5	13.3
15 - 19 NO	838	617	1455
%	12.7	9.6	11.2
20 - 29 NO	972	955	1927
%	14.7	14.9	14.8
30 - 39 NO	819	938	1757
%	12.4	14.6	13.5
40 - 49 NO	691	904	1595
%	10.5	14.1	12.3
50 - 59 NO	665	756	1421
%	10.1	11.8	10.9
60+ NO	585	547	1132
%	8.9	8.5	8.7
TOTAL NO	6601	6416	13017
%	100.0	100.0	100.0
PERCENT OF SEX %	50.7	49.3	100.0

TABLE 4.20 DEMOGRAPHIC CHARACTERISTICS OF SAMPLE SURVEYED
GOVERNORATE: ASSIUT (NORTH)

NUMBER OF FAMILIES SURVEYED = 2169			
NUMBER OF PERSONS SURVEYED = 9716			
AVERAGE FAMILY SIZE = 4.48			
SAMPLE DISTRIBUTION BY AGE AND SEX			
AGE (YEARS)		SEX	TOTAL
		MALES	FEMALES	
5	NO	468	429	897
	%	9.2	9.3	9.2
5 - 9	NO	812	656	1468
	%	15.9	14.3	15.1
10 - 14	NO	885	610	1495
	%	17.3	13.3	15.4
15 - 19	NO	625	381	1006
	%	12.2	8.3	10.4
20 - 29	NO	553	547	1100
	%	10.8	11.9	11.3
30 - 39	NO	428	631	1059
	%	8.4	13.9	11.7
40 - 49	NO	494	639	1133
	%	9.7	13.9	11.7
50 - 59	NO	470	466	936
	%	9.2	10.1	9.6
60+	NO	379	243	622
	%	7.4	5.3	6.4
TOTAL	NO	5114	4602	9716
	%	100.0	100.0	100.0
PERCENT OF SEX	%	52.6	47.4	100.0

4.5.3 Sample size achieved and sample size designed

By comparison with figures given in Section 4.2.2, it can be seen that the extraordinarily high figure of 90.1% of the population sample designed to be surveyed were actually located and recorded in the survey, for the whole of the Middle Egypt Project area. Individual governorate sample design populations actually studied were 93.2% in Beni Suef, 87.7% in Minya and 90.0% for Assiut (North).

This figures reflect the highest possible credit on the whole organisation responsible for the conduct of the random survey, from the central administration within the Endemic Diseases Department of the Ministry of Health in Cairo to the district and health unit technicians and medical teams who made the family to family visits in the field. The achievement of such success in the conduct of the random survey is especially commendable in view of the great time pressure and very tight timetabling under which it was carried out.

4.5.4 Prevalence-rates of S. haematobium infection detected

Table 4.21 - 4.24 shows the prevalence-rates of S. haematobium infection detected by microscopic examination of urine in the project area as a whole and in the three component governorates.

Table 4.21 shows that 98.7% of all individuals participating in the survey in the whole project area had urine samples examined microscopically; Tables 4.22 - 4.24 show that corresponding individual governorate figures were 98.5% for Beni Suef, 99.4% for Minya and 98.1% for Assiut (North).

The overall prevalence-rate of positives (all age-groups and both sexes) for the Middle Egypt project area is 8.5%; individual governorate prevalence-rates are Beni Suef 6.0%, Minya 11.6% and Assiut (North) 7.3%.

The overall prevalence-rate is twice as high (11.3%) in males as in females, the individual governorate ratios for male : female prevalence-rates being Beni Suef 1.81 : 1.00, Minya 1.95 : 1.00, Assiut (North) 2.40 : 1.00.

TABLE 4.21 DISTRIBUTION OF SAMPLE EXAMINED BY MICROSCOPIC URINE EXAMINATION, SEX AND AGE

MIDDLE EGYPT

	MALES				FEMALES				TOTAL			
AGE	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS
5	1057	28	1085	2.6	924	26	950	2.7	1981	54	2035	2.7
5-9	2058	282	2340	12.1	1924	139	2063	6.7	3982	421	4403	9.6
10-14	2288	499	2787	17.9	1857	198	2055	9.6	4145	697	4842	14.4
15-19	1801	395	2196	18.0	1337	153	1490	10.3	3138	548	3686	14.9
20-29	1950	271	2221	12.2	2159	154	2313	6.7	4109	425	4534	9.4
30-39	1653	155	1808	8.6	2233	91	2329	3.9	3891	246	4137	5.9
40-49	1598	141	1739	8.1	2150	83	2233	3.7	3748	224	3972	5.6
50-59	1525	99	1624	6.1	1704	56	1760	3.2	3229	155	3384	4.6
60+	1305	71	1376	5.2	1160	22	1182	1.9	2465	93	2558	3.6
TOTAL	15235	1941	17176	11.3	15453	922	16375	5.6	30688	2863	33591	8.5

N.B.: POS = POSITIVE

NEG = NEGATIVE

TABLE 4.22 DISTRIBUTION OF SAMPLE EXAMINED BY MICROSCOPIC URINE EXAMINATION, SEX AND AGE

GOVERNORATE: BENI SUEF

	MALES				FEMALES				TOTAL			
AGE	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS
5	439	6	445	1.3	382	7	389	1.8	821	13	834	1.6
5-9	729	61	790	7.7	680	28	708	4.0	1409	89	1498	5.9
10-14	790	120	910	13.2	650	56	706	7.9	1440	176	1616	10.9
15-19	625	108	733	14.7	444	48	492	9.8	1069	156	1225	12.7
20-29	632	67	699	9.6	770	41	811	5.1	1402	108	1510	7.2
30-39	543	20	563	3.6	746	16	762	2.1	1289	36	1325	2.7
40-49	527	27	554	4.9	666	24	690	3.5	1193	51	1244	4.1
50-59	473	18	491	3.7	529	9	538	1.7	1002	27	1029	2.6
60+	405	8	413	1.9	386	6	392	1.5	791	14	805	1.7
TOTAL	5163	435	5598	7.8	5253	235	5488	4.3	10416	670	11086	6.0

N.B.: POS = POSITIVE

NEG = NEGATIVE

TABLE 4.23 DISTRIBUTION OF SAMPLE EXAMINED BY MICROSCOPIC URINE EXAMINATION, SEX AND AGE

GOVERNORATE: MINYA

	MALES				FEMALES				TOTAL			
AGE	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS
5	254	10	264	3.8	211	10	221	4.5	465	20	485	4.1
5-9	620	120	740	16.2	617	82	699	11.7	1237	202	1439	14.0
10-14	760	232	992	23.4	636	104	740	14.1	1396	336	1732	19.4
15-19	637	201	838	24.0	544	73	617	11.8	1181	274	1455	18.8
20-29	813	156	969	16.1	865	90	955	9.4	1678	246	1924	12.8
30-39	712	105	817	12.9	888	50	938	5.3	1600	155	1755	8.8
40-49	609	82	691	11.9	860	44	904	4.9	1469	126	1595	7.9
50-59	612	52	664	7.8	722	34	756	4.5	1334	86	1420	6.1
60+	544	40	584	6.8	537	10	547	1.8	1081	50	1131	4.4
TOTAL	5561	998	6559	15.2	5880	497	6377	7.8	11441	1495	12936	11.6

N.B.: POS = POSITIVE

NEG = NEGATIVE

TABLE 4.24 DISTRIBUTION OF SAMPLE EXAMINED BY MICROSCOPIC URINE EXAMINATION, SEX AND AGE

GOVERNORATE: ASSIUT (NORTH)

	MALES				FEMALES				TOTAL			
AGE	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS	NEG	POS	TOTAL	% POS
5	364	12	376	3.2	331	9	340	2.6	695	21	716	2.9
5-9	709	101	810	12.5	627	29	656	4.4	1336	130	1466	8.9
10-14	738	147	885	16.6	571	38	609	6.2	1309	185	1494	12.4
15-19	539	86	625	13.8	349	32	381	8.4	888	118	1006	11.7
20-29	505	48	553	8.7	524	23	547	4.2	1029	71	1100	6.5
30-39	398	30	428	7.0	604	25	629	4.0	1002	55	1057	5.2
40-49	462	32	494	6.5	624	15	639	2.3	1086	47	1133	4.1
50-59	440	29	469	6.2	453	13	466	2.8	893	42	935	4.5
60+	356	23	379	6.1	237	6	243	2.5	593	29	622	4.7
TOTAL	4511	508	5019	10.1	4320	190	4510	4.2	8831	698	9529	7.3

N.B.: POS = POSITIVE

NEG = NEGATIVE

Figure 4.1 AGE and SEX distribution of urinary positivity for Schistosoma haematobium, Beni Suef, November-December 1984

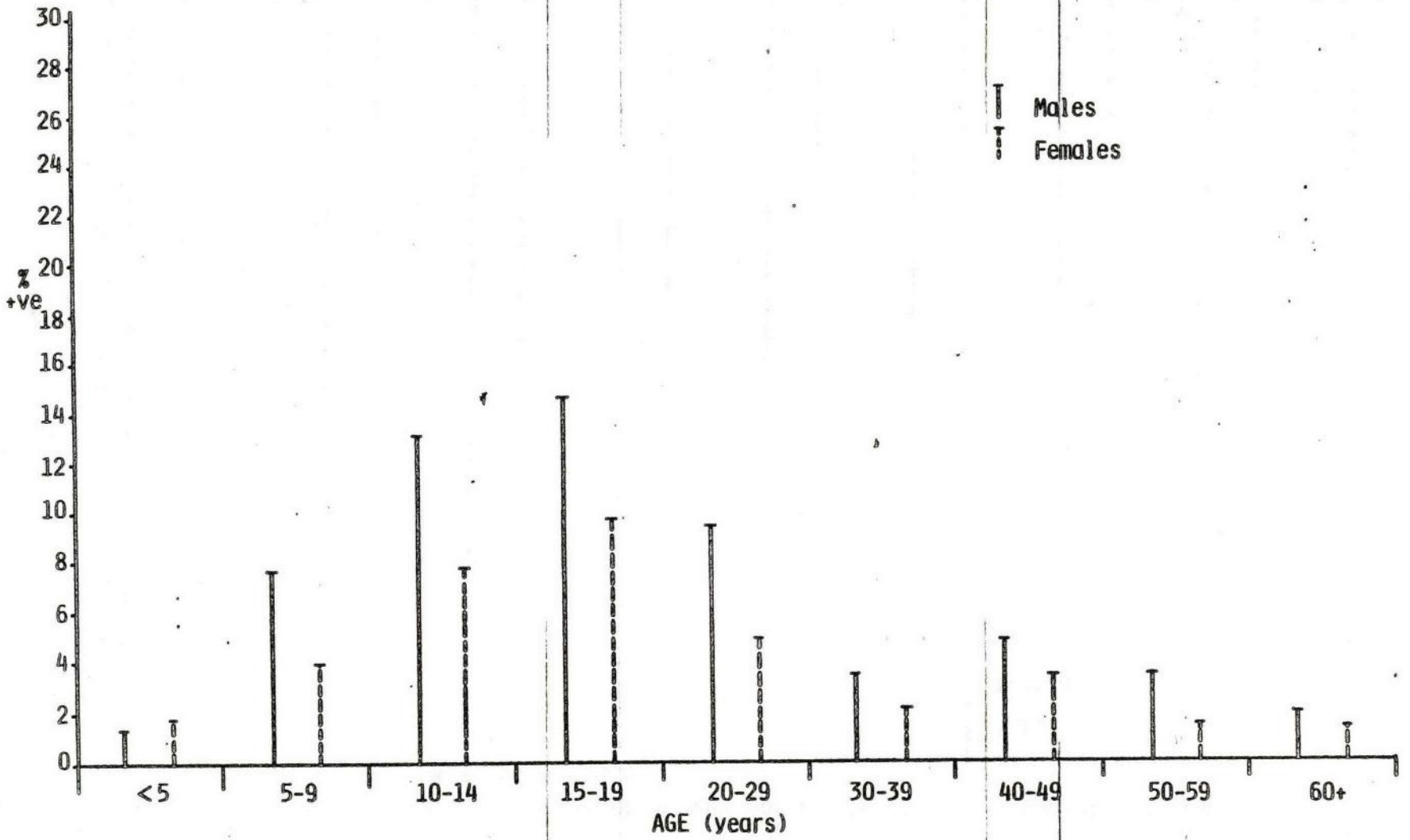


Figure 4.2 AGE and SEX distribution of urinary positivity for Schistosoma haematobium, Minya, November-December 1984

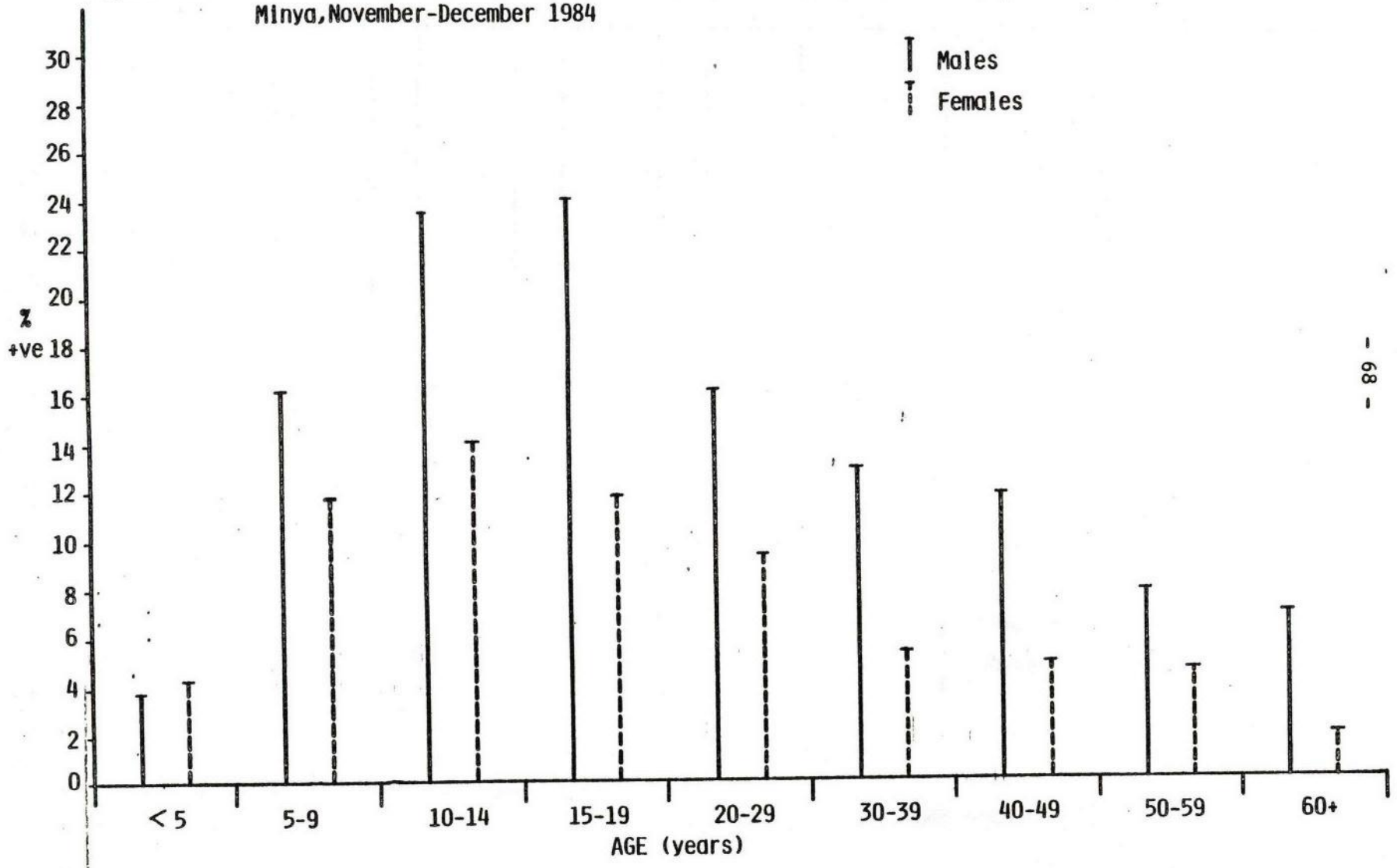
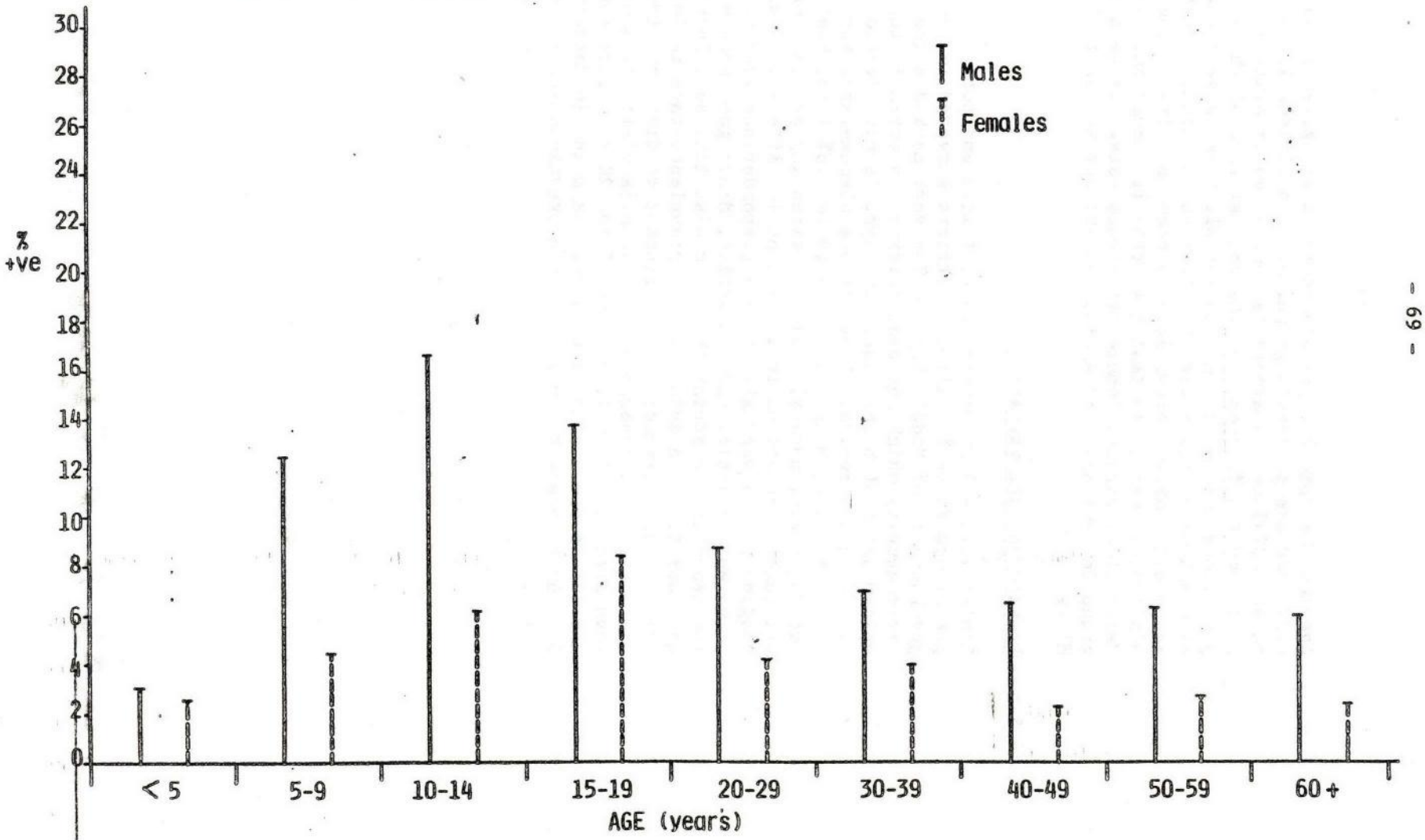


Figure 4.3 AGE and SEX distribution of urinary positivity for Schistosoma haematobium, Assiut (North), November - December 1984



Age and sex specific prevalence-rates are given in Table 4.21 - 4.24, and are presented graphically in figures 4.1 - 4.3 for the three individual governorates considered separately. It can be seen from the figures that the general form of the age-sex prevalence curves is the same for all three governorates, although minor and interesting variations occur. In Beni Suef and Minya, maximum prevalence is been in males in the 15-19 years old group, whereas in Assiut (North) it occurs amongst 10-14 years olds; highest female prevalence-rates are seen in the 15-19 group in Beni Suef and Assiut (North) but in the 10-14 group in Minya.

4.5.5 Prevalence-rate variation

Tables 4.24 - 4.25 present male, female and total prevalence-rates for all 20 districts surveyed in the three governorates of Middle Egypt. The very marked degree of heterogeneity which has been observed so often in the epidemiology of bilharziasis in Egypt is highlighted once again by the random survey. District prevalence-rates vary from 25.4% (Edwa district, Minya governorate) to 3.6% (Beni Suef district, Beni Suef governorate) Equally interesting are the very pronounced variations in sex ratios in different districts, ranging from a very slight male preponderance seen both in a high prevalence district (Edwa district, Minya governorate) and in a low prevalence district (El Fashn district, Beni Suef governorate) to a male : female prevalence-rate ratio of 5:1, seen in two intermediate prevalence-rate districts (Mallawi district, Minya governorate and Ihnasia district, Beni Suef governorate). In only one out of the 20 districts surveyed did the female prevalence-rate exceed the male, in Nasser district, Beni Suef, where the male : female prevalence-rate ratio was 0.9 : 1.0.

TABLE 4.25 OVERALL PREVALENCE-RATES OF INFECTION, BENI SUEF, BY DISTRICT AND SEX

District	MALES			FEMALES			TOTAL		
	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve
Beni Suef	891	51	5.7	852	12	1.4	1742	63	3.6
El Fashn	826	33	4.0	834	32	3.8	1660	65	3.9
El Wasta	1072	138	12.9	1060	93	8.8	2132	231	10.8
Ilnasia	794	95	12.0	765	18	2.4	1559	113	7.2
Beba	926	58	6.3	914	35	3.8	1840	93	5.1
Somosta	572	36	6.3	568	19	3.3	1140	55	4.8
Nasser	516	24	4.7	497	26	5.2	1013	50	4.9
Total	5598	435	7.8	5488	235	4.3	11086	670	6.0

TABLE 4.26 OVERALL PREVALENCE-RATES OF INFECTION, MINYA, BY DISTRICT AND SEX

District	MALES			FEMALES			TOTAL		
	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve
Minya	644	111	17.2	682	51	7.5	1326	162	12.2
El Fikreia	881	100	11.4	808	37	4.6	1669	137	8.1
Edwa	581	157	27.0	606	145	23.9	1187	302	25.4
Beni Mazar	751	181	24.1	688	70	10.2	1439	251	17.4
Der Mowas	630	56	8.9	580	26	4.5	1210	82	6.8
Samalout	912	146	16.0	921	77	8.4	1833	223	12.2
Matai	750	93	12.4	691	41	5.9	1441	134	9.3
Maghagha	607	33	5.4	610	26	4.3	1217	59	4.8
Mallawi	804	121	15.0	790	24	3.0	1594	145	9.1
Total	6559	998	15.2	6377	497	7.8	12936	1495	11.6

TABLE 4.27 OVERALL PREVALENCE-RATES OF INFECTION, ASSIUT (NORTH), BY DISTRICT AND SEX

District	MALES			FEMALES			TOTAL		
	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve	Number examined	Number positive	% +ve
Assiut (North)	1130	126	11.2	1136	67	5.9	2266	193	8.5
Manfalout	1545	133	8.6	1410	48	3.4	2955	181	6.1
El Quossela	1012	147	14.5	939	41	4.4	1951	188	9.6
Dairut	1332	102	7.7	1025	34	3.3	2357	136	5.8
Total	5019	508	10.1	4510	190	4.2	9529	698	7.3

4.5.6 The random survey results and Ministry of Health project progress report data

The random survey results demonstrate conclusively the remarkable achievements in control that the been made in Middle Egypt. Comparison of Tables 4.25 - 4.27 with Tables 4.9 - 4.12 demonstrates the following results, set out in Table 4.28, showing the random survey results in comparison with the Ministry of Health project progress report indicators.

TABLE 4.28: COMPARISON OF 1984 RANDOM SAMPLE SURVEY RESULTS WITH OTHER PREVALENCE-RATE MEASURES USED FOR EVALUATION

	Prevalence-rate (%)				
Governorate	1977 (baseline)	Sample survey	Fixed Sample (cohort)	Health Unit returns	The Random Sample
Beni Suef	27.7	6.8	7.4	9.6	6.0
Minya	33.6	9.1	10.7	13.8	11.6
Assiut North	19.3	10.4	3.7	11.9	7.3

In Beni Suef, prevalence-rates have been reduced to 21.7% of their pre-control values, in Minya to 34.5% and in Assiut (North) to 37.8%; this tremendous achievement reflects the highest credit on all concerned, and is the most important single indicator of the benefits of the Middle Egypt bilharzias control project.

4.5.7 Intensity of infection in the random survey

1648 positive urine samples were subjected to egg counting; this represents 4.8% of the total population admitted into the random survey population, 4.9% of those who had urine samples examined and 57.6% of those whose urine samples were positive for eggs of S. haematobium. Table 4.29 shows the frequency distribution of these egg counts for the whole Middle Egypt project area grouped into logarithmic frequency classes.

TABLE 4.29: FREQUENCY DISTSRIBUTION OF EGG COUNTS IN POSITIVE CASES, MIDDLE EGYPT

CASES REGISTERED: 33985

TOTAL CASES EXAMINED BY URINE MICROSCOPY: 33551

FREQUENCY DISTRIBUTION OF EGG COUNT											
GROUP	FREQ	%	CUMM %	GROUP	FREQ	%	CUMM %	GROUP	FREQ	%	CUMM %
1	84	5.1	5.1	11-	258	15.6	57.3	201-	32	1.9	96.0
2	147	8.9	14.0	21-	166	10.1	67.4	301-	12	0.7	96.7
3	82	5.0	19.0	31-	101	6.1	73.5	401-	9	0.5	97.3
4	66	4.0	23.0	41-	65	3.9	77.4	501-	8	0.5	97.8
5	56	3.4	26.4	51-	46	2.8	80.2	601-	6	0.4	98.1
6	62	3.8	30.1	61-	37	2.2	82.5	701-	1	0.1	98.2
7	50	3.0	33.2	71-	26	1.6	84.1	801-	3	0.2	98.4
8	59	3.6	36.7	81-	342	1.9	86.0	901+	26	1.6	99.9
9	40	2.4	39.2	91-	53	3.2	89.2				
10	41	2.5	41.7	101-	80	4.9	94.1	TOTAL	1648	100.0	

NUMBER OF SUBSAMPLE = 1648

SUBSAMPLE: TOTAL REGISTERED = 4.8%

SUBSAMPLE: TOTAL URINE MICROSCOPIES = 4.9%

Log-probit analysis of the data, by least-squares regresion of log (base 10) of egg-count on the probit of cumulative percentage positive gives the regression equation:-

y (probit of cumulative % + ve) = 3.4965 + 1.2979x (log egg count)

The correlation coefficient r is 0.9956, and using the test statistic:

$$t = r \sqrt{\frac{n - 2}{1 - r^2}}$$

to test the true difference of r from zero, we find t = 54.998 ($p < 0.001$). It can thus be seen that as in many other epidemiological situations, egg-counts are distributed in a very close approximation to a log-normal distribution.

In the data given for the whole Middle Egypt project area, the median egg density per 10 ml urine sampled can be calculated from the regression equation at 14.4 eggs per 10 ml; this will be a very close approximation to the geometric mean for the sample, and compares with the figures of 11.6 given as the geometric mean for 1984 in Ministry of Health progress reports (Section 4.4.4).

4.5.8 Other random survey data

An enormous quantity of data was generated in the random survey which will not be summarized or discussed here, as it is not directly relevant to the evaluation of control measures in the project area.

Correlations between naked-eye appearance of urine, symptoms, educational and literacy status, history of treatment for bilharziasis, egg-count and a number of other factors, all classified by age, sex, district and governorate were produced by the computer analysis of the completed random survey forms. This information will prove invaluable to the Egyptian Ministry of Health in planning future modifications to its control strategies.

4.6 RESULTS OF EVALUATION - EPIDEMIOLOGICAL TRENDS THE VISITS TO HEALTH UNITS AND GOVERNORATE LABORATORIES

As described in section 4.2.3 information was recorded on a number of topics in the programme of health unit visits carried out by the evaluation team.

4.6.1 Data comparison

Urine examination results for 1982, 1983 and 1984 were recorded, and compared with figures available in governorate centres and in Cairo; concordance will be discussed in section 4.6.3 below.

4.6.2 Laboratory Equipment

Laboratory equipment was checked in every unit visited.

4.6.2.1 Microscopes

A total of 55 microscopes were examined in 53 health units, two units having two microscopes each in use. Microscopes were of a wide variety of makes, which makes the procurement and supply of spare parts difficult. 48 out of 55 microscopes were in good or satisfactory condition, and only 3 out of the 7 in unsatisfactory condition required immediate replacement - these were reported to the governorate Bilharzia Exeuctive Directors concerned. Microscope makes seen were as follows:

Country of Origin	Maker	Number
Japan	Olympus	17
	Erma	2
West Germany	Karl Kaps	7
	Ernst Leitz	5
	Carl Zeiss	1
Poland	PZO	8
Czecholslovakia	Meopla	5
China	Meiji	6
Italy	Officine Galileo	2
Austria	Reichert	1
Switzerland	Wild	1

All microscopes were monocular; one out of 55 had electric Kohler illumination.

4.6.2.2 Centrifuges

All units visited had a hand centrifuge, although in 2 out of 53 units the centrifuge was not in working order; 8 units were using round bottomed test tubes rather than tapered centrifuge tubes for centrifugation of urine.

4.6.2.3 Glassware

All units had conical flasks and microscope slides available, generally in adequate supply and in good condition, although 4 units had less than 10 conical flasks, which posed problems when examining school classes by sedimentation.

4.6.2.4 Weighing Scales

All units possessed scales, although a widespread request was expressed for the provision of portable spring ("bathroom") scales, for weighing children in schools when drug administration is carried out there. All scales weighed a member of the evaluation team to within 2% accuracy.

4.6.3 Quality Control

Quality control of urine diagnoses was performed in 43 out of the 53 health units visited. Concordance in diagnosis for the 524 urine samples examined is expressed in the following two-by-two table, which is made up of urine samples chosen at random by the evaluation team and examined after the health unit technician had completed his examination.

		Independent Evaluation +ve	Independent Evaluation -ve	
Health Unit Technician	+ve	222	2	224
	-ve	10	290	300
		232	292	524

It can be seen without statistical manipulation of the data that concordance in diagnosis was excellent; all the false positive and false negative results occurred in 3 out of the 43 health units where quality control was prformed, one in Assiut (North), one in Minya and one in Beni Suef. All errors in diagnosis detected were demonstrated to governorate amd district laboratory supervisors, and in the case of Minya, to the Under Secretary of the Ministry of Health for the Governorate. The main criticism of the methodology of urine examination concerns time and speed of centrifugation, where in spite of Ministry of Health instructions, centrifuging times ranging from 2 seconds to 3 minutes were recorded by the evaluation team, compared with the recommended 5 to 15 seconds of gentle centrifugation. Further, in only 2 out of 53 health units did the physician in charge carry out the mandatory 10% random spot check on urine examinations at the conclusion of work for the day.

4.6.4 Staff attendance

In the course of 63 health unit visits, units were found without a physician in attendance during normal working hours on 5 occasions when sickness or permission to be absent was not an explanation. Three of these units had 2 staff physicians, and in each case both were absent. These episodes were reported to governorate medical headquarters. All units visited had a laboratory technician in attendance during working hours.

4.6.5 Supervisory visits

In 21 out of 53 units, written and dated evidence of supervisory visits by district medical officers and district laboratory supervisors was seen. Clearly this level of supervision of the health units should be greatly strengthened.

4.6.6 Records and concordance

The physical condition of bilharziasis data records in health units was extremely variable, and it is impossible to make a tabular summary of the observations made. Longhand recording of data on name, age, sex, date, urine examination and drug treatment in large books is clearly time-consuming, and offers scope for errors to occur at all levels in the data reporting chain. However, all the items recorded are needed for identification and later follow-up of patients.

In no single case examined, did comparison of health unit data records agree with governorate records in every detail, and similarly governorate records have not been found to agree exactly with data presented in the yearly Ministry of Health project progress reports issued in Cairo. To illustrate the discrepancies, one example only is presented here - taken from a good health unit with well above average record - keeping and the best set of governorate records which the evaluation team inspected. Data compared are from Beni Faiz health unit in Sedfa district, and from the records of Assiut governorate:

Year	Group	Result	Health Unit records	Governorate records
1982	School	Examined	1292	761
		Positive	248	110
		%	19.2%	14.5%
	Outpatients	Examined	3233	3143
		Positive	520	480
		%	16.1%	10.2%*
1983	School	Examined	1576	882
		Positive	297	195
		%	18.8%	22.1%
	Outpatients	Examined	4389	4389
		Positive	459	459
		%	10.5%	10.0%**
1984	School	Examined	1047	276
		Positive	124	32
		%	11.8%	11.5%***
	Outpatients	Examined	2954	3005
		Positive	386	386
		%	13.1%	12.8%

* Calculation error - should be 10.3%
** - should be 10.5%
*** - should be 11.6%

A similar comparison is made of Assiut governorate records with data presented on the returns of health units in the Ministry of Health annual project progress reports. Percentages of positive attenders at health units for Assiut (South) for the years 1981-1984 from the two sources are as follows:

Year	Governorate	Ministry of Health
1981	22.7%	20.5%
1982	18.0%	16.6%
1983	16.8%	17.1%
1984	17.8%	14.8%

To facilitate comparison of the data bases used, figures for Assiut (North) are compared in more detail below:

Year	Group	Result	Governorate records	Ministry of Health Progress reports
1981	School	Examined	61074	
		% Positive	14.0%	
	Outpatients	Examined	290561	233581
		% Positive	12.2%	12.2%
	Total	Examined	351635	
		% Positive	12.5%	
1983	School	Examined	66901	
		% Positive	17.7%	
	Outpatients	Examined	283544	230657
		% Positive	12.5%	13.2%
	Total	Examined	350455	
		% Positive	13.4%	
1984	School	Examined	78705	
		% Positive	14.9%	
	Outpatients	Examined	300452	110417
		% Positive	12.4%	11.9%
	Total	Examined	379157	
		% Positive	12.9%	

It must be repeated and stressed that the rural health unit and the governorate chosen for this comparison of data are among the best in terms of record keeping that the team visited, and it is a tribute to both that detailed data comparisons can be made. It is however, very apparent that the cumbersome system of data collection recording, transmission, compilation, tabulation and analysis lends itself almost inevitably to errors, and verification of data would be an heroic task given the number of health units concerned and the distances involved.

4.6.7 Heterogeneity of infection

Finally, the programme of visits to rural health units emphasized an epidemiological feature already discussed at the end of the section on data review - the importance of heterogeneity.

This factor can be simply illustrated by the rates of prevalence seen amongst school pupils at 30 schools in Qena governorate in October 1984, which are sited in the "indicator" villages for intensity monitoring in the governorate - the highest values recorded are 54.2% and 50.5% while the lowest are 5.2% and 3.6%. Similarly, in 17 rural health units in El Quosseia district, Assiut (North) governorate, the following ranges of infection-rates were seen in 1984, all expressed as percentages:

Out patients	18.9 8.3	17.1 15.7	16.7 10.4	12.6 21.5	16.0 21.3	11.3 19.8	8.5 18.5	43.6 9.3	33.6
School Students	18.9 7.1	39.3 11.0	20.4 11.9	11.6 15.2	59.8 20.3	12.8 33.2	5.9 24.7	16.8 14.7	56.8

This extraordinary range of infection-rates becomes submerged during the consolidation process in district and governorate tables as follows:

		El Quossieh	Assiut (North)
1984	Out-patients	17.3%	12.4%
	School-students	22.6%	14.9%

Furthermore, during the epidemiological evaluation field work, a number of areas were seen by the team where a rural health unit is lacking for various reasons, and where extremely high rates of infection were found amongst samples of school students. The areas do not enter local or national statistics, but are certainly important reservoirs of infection for adjacent communities. For this reason, a mobile team and laboratory have been provided for Assiut, Sohag and Qena Governorates to cover areas which are lacking in health services.

4.7 RESULTS OF EVALUATION - CHEMOTHERAPY DELIVERY

The programme of hea..h unit visits included assessment of chemotherapy delivery as well as epidemiological trends. The following results were recorded:

4.7.1 Drug stocks

All 53 health units had adequate quantities of metrifonate and/or praziquantel in stock, in all cases more than one month of average drug use.

4.7.2 Drug storage

Storage conditions of drugs were variable. In only 20 out of 53 units were opened tins of metrifonate stored in a refrigerator.

4.7.3 Drug expiration

Eight health units had stocks of metrifonate with printed expiry dates more than 2 years before the evaluation team visit. Dates recorded were:

15.11.1981	15.11.1981
15.7.1974	15.10.1981
15.7.1978	15.12.1981
15.7.1978	15.10.1981
30.6.1978	
30.6.1978	

Some units had stocks of more than one batch of expired drug. Batch numbers of praziquantel were recorded and are available for inspection. Governorate authorities were informed of all expired metrifonate seen. The quality of time-expired metrifonate has been studied by the Institute for Tropical Diseases of the Ministry of Health in Cairo. It was found that metrifonate tablets remained effective as long as they were intact, white, shiny and of even consistency.

4.7.4 Drug compliance rates

Compliance rates of metrifonate administration varied widely, and records of drug administration similarly ranged from excellent through poor to non-existent. It is clear that metrifonate compliance rates are dependant to a large extent on the energy and enthusiasm of health unit physicians and laboratory technicians, and to communication and co-operation between them, although compliance is also partly dependent on the public and its health concepts and its perception of the importance of bilharziasis. Compliance rates for school students were generally good, although a number of doctors admitted freely that they left metrifonate administration to school teachers, all three doses being handed over at once and left to schools to administer. Some units also followed this practice with adult out-patients. The problem of compliance with a three-dose regimen in adults can best be illustrated by presenting figures of the best and worse results obtained in units with enthusiastic and efficient doctors and good records attempting to give metrifonate under supervision, either in the health unit or in the patient's home:

(i) Best results

Year	Patients	Metrifonate Dose 1st	2nd	3rd
1982	1568	1130	1116	930
		(72.1%)	(71.2%)	(59.3%
1983	1212	846	803	803
		(69.8%)	(66.3%)	(66.3%
1984	1019	771	689	684
		(75.7%)	(67.6%)	(67.1%)

(i) Worst results

Year	Patients	Metrifonate Dose 1st	2nd	3rd
1982	226	226	81	58
		(100%)	(35.8%)	(25.7%
1983	410	403	120	76
		(73.2%)	(29.3%)	(18.5%)
1984	440	419	292	170
		(95.2%)	(66.4%)	(38.6%)

4.7.5 Discussions with health unit physicians

Discussions with health unit physicians produced a wide range of suggestions for improving metrifonate compliance, and for generally improving public awareness of bilharziasis and the availability of diagnosis and therapy in health units. 35 interviews were held that can be summarised to show physicians views:

32 wanted national TV publicity for bilharziasis and the importance of drug compliance.

27 wanted strengthened face-to-face health education in health units, schools and homes.

27 wanted the abandonment of metrifonate and its replacement by the single dose praziquantel.

7 wanted the taking of treatment to be enforceable by law.

7 suggested village competitions for a prize for the best compliance rates, results to appear on TV or radio.

2 doctors suggested the replacement of oral therapy by a long-acting preparation of an injectable schistosomicide such as Astiban®.

4.7.6 Quality control of egg counting

The important monitoring device for chemotherapy delivery, the production of egg-output intensity data in carefully selected "indicator" villages in each district of each governorate, was assessed at governorate central bilharzia laboratories. The laboratories in Beni Suef, Minya, Assiut, Sohag and Qena were visited and in 4 of them (the exception being Sohag), quality control of counting procedures was performed.

In Beni Suef, Minya, Assiut and Qena, 10 ml. urine samples stained with carbol fuchsin are filtered through 47 mm. diameter discs cut locally from sheets of Whatman No. 1 filter paper, using an electrically powered Millipore suction pump. Filters are then dried, and examined and counted using binocular microscopes. In Sohag, staining is performed with ninhydrin stain. In the 4 governorate laboratories concerned, a total of 115 filters chosen at random by the evaluation team was carefully counted, and the results compared with those recorded by the governorate technicians. Results are presented below:

	Governorate Technicians	Evaluation Team
Number of filters counted	115	115
Number of eggs counted	6124	5980
Arithmetic mean eggs per filter	53.3	52.0
Geometric mean eggs per filter	21.8	20.7
Highest egg count	500+	500+
Lowest egg count	1	1

As a formality, in spite of the excellent concordance of these results, a t-test for paired samples was performed to test the null hypothesis that the true difference in mean egg counts by the two counters was zero. This yielded a value of t of 0.1886 on 114 degrees of freedom, with 0.90 P 0.80, indicating that the minor difference in mean egg counts observed almost certainly arose by chance. The team concluded that the observations on which the intensity data presented by the Ministry of Health are based are carefully and accurately performed, and are fully reliable.

4.7.7 Alternative techniques of egg counting

To assess the efficiency of the technique used to determine intensity data, as opposed to the skill and care with which it is applied, the team undertook a comparative study of the existing technique used and two more recently introduced methods using monofilament polyamide (Nytrel^{R}) filters and polycarbonate (Nuclepore^{R}) filters of 13 mm. diameter, and hand filtration by 10 ml. syringes. A detailed account of this study is included as an Annex to this report, and forms the basis for one of the recommendations of this report.

4.8 APPRAISAL OF EPIDEMIOLOGICAL TRENDS

The initiation of active intervention in bilharzia control in Middle and Upper Egypt has undoubtedly led to a very considerable reduction in prevalence-rates, intensities and incidence-rates of infection; an integrated control strategy combining molluscicididing and chemotherapy had been in operation at the time of the present evaluation for a little over 7 years in Middle Egypt and for between 4 years and 5 years in Upper Egypt. All the currently available evidence indicates that a substantial reduction has been achieved in the incidence-rates of the early symptoms and signs of urinary bilharziasis such as dysuria and haematuria although in the absence of extensive baseline data on clinical features, this reduction cannot be usefully quantified. It can confidently be expected that if current levels of control are maintained and improved, incidence-rates of bilharzial disease will decline steadily in the coming years.

Nevertheless, attention should be focused on a number of points during the coming years:

(i) Incidence of new infection still occurs, and the bilharzial transmission cycle-water contamination with eggs, small infection, human water contact, human infection - is still operative almost everywhere in Middle and Upper Egypt.

(ii) In some health unit areas, especially in Middle Egypt, prevalence-rates of infection show a tendency to decline less rapidly or even remain static in recent years. Some of these trends are partially concealed when global figures for prevalence-rates are quoted for whole governorates or for the whole of a project area, but become apparent when district or preferably individual health unit area figures are studied.

(iii) A number of foci remain in existence where control has proved difficult for various reasons, and where prevalence-rates, infection intensities and rates of symptomatic bilharziasis are still quite high.

(iv) Infection data based on the examination of single urine samples by the sedimentation - centrifugation - direct microscopy technique practiced in Egypt underestimate prevalence-rates. Careful studies carried out in Qena governorate indicate that use of a more sensitive diagnostic technique employing filtration increased prevalence-rates by about 20%. At the same time it was shown that examination of two urine samples collected not more than 14 days apart also increased prevalence-rates by about 20%, and that the degree of underestimatation of prevalence-rates was inversely related to prevalence-rates and intensities of infection in the population under study. Thus, in epidemological situations of relatively low prevalence, it may be conservatively estimated that the technique in use at present underestimates true prevalence-rates considerably; real rates are probably at least 35% higher than reported rates.

(v) It is widely accepted that in communities, or sub-populations, with geometric mean egg-outputs of less than 50 per 10ml. urine, good control of the potential for development of bilharzial disease can be anticipated, although it is well recognised that some individuals with very light infections can develop complications of bilharziasis. Excellent reductions in intensity of infection have been achieved in the course of the control programme, and it is vitally important that these be maintained.

(vi) The present system of data recording, data transmission, data analysis and data presentation is rather slow; it depends on a number of factors which are subject to error or loss, and contains no built-in mechanism for checking accuracy and validity. As a result, discrepancies occur between data recorded in health units (which are subject to human error and have no checking mechanism), and data recorded at district, governorate or Ministry levels. These discrepancies can be explanined by the fact that all units include other irregular examinations such as post-treatment check-ups and confirmation and follow-up of negatives as part of their daily work records; the figures concerning numbers of patients examined are consistently higher in health unit records than in Governorate or Ministry records. It should also be remembered that Rural Health Units are multifunctional and have numerous commitments apart from bilharziasis control. There is thus no means by which prompt corrective action can be taken when adverse trends occur in a part of the project area; this is only in part of a problem of identification of trends - it also involves problems in management structure which are discussed in another part of this report.

(vii) The establishment of autochthonous foci of Schistosoma mansoni transmission in a few areas of Middle and Upper Egypt creates a new dimension to the problem of bilharziasis management in the project area. In particular, the outbreak at Al Sharki Bahjoura in Qena governorate in 1984 and early 1985 raises problems concerning snail control, techniques for field surveillance of faecal specimens, reporting mechanisms and management structures to deal with special situations urgently.

4.9 APPRAISAL OF CHEMOTHERAPY DELIVERY

The complex problems of procuring and deliverying metrifonate to a large number of health units throughout the very extensive project area with its long lines of communication have been tackled energetically and vigorously. The sample of health units visited by the evaluation team had adquate stocks, in quantitative terms, of metrifonate. However, as with the appraisal of epidemiological trends, a number of points for monitoring in coming years have been noted:

(i) Drugs are somtimes incorrectly stored, and are not always under the control of a qualified physician or pharmacist.

(ii) In spite of the well-advertised presence of an independent evaluation team, some very old stocks of metrifonate were found to be still in use; this observation raises questions of project management at both health unit and higher levels.

(iii) Compliance rates for metrifonate pose a number of extremely difficult problems-

a) In some health units, usable figures on compliance are not available; this reflects both the interest of some health unit physicians in drug administration in the bilharziasis project, and the relative lack of supervision of health units in some parts of the project area.

b) Where compliance figures are available, they often vary widely from year to year, reflecting the differing enthusiasm and energy of a succession of health unit doctors, who generally spend only 9 to 10 months in post in a given health unit.

c) The achievement of high compliance rates in adult out-patients requires greater flexibility in terms of opening-hours and staff availability than the average health unit offers at present. It was repeatedly stressed to the team that farmers and employees cannot be expected to attend for diagnosis and treatment between 09:00 hours and 13:00 hours; early morning and evening sessions were suggested as means of improving compliance.

d) The practice of leaving metrifonate distribution to school teachers in a few units is to be deplored on many grounds. Apart from the serious problem of side-effects and complications of treatment, it leaves health unit doctors with a feeling of lack of responsibility for the success of the bilharziasis project, and leads to the automatic recording of 100% compliance rates.

(iv) There is a disappointing public awareness of the importance of regular screening, and when necessary treatment for bilharzia infection. This awareness will decline further if the perceived frequency and importance of bilharzial disease declines. Chapter 8 of the present report deals with recommended remedies for this situation.

(v) There is misunderstanding among some health unit doctors about the role of metrifonate in the project. Widespread use of praziquantel in parts of the project area, without explanation of the reasons for its introduction to doctors, has left many of them with the impression that metrifonate is a second-class, outmoded drug. Thre is some resentment that certain doctors are left with the difficult problem of giving a three-dose regimen, whilst some of their colleagues are using a simple one-dose drug.

(vi) The relative insensitivity of the screening technique for urinary infection in use at present implies that the current, established policy of treating parasite positive individuals only, inevitably means that a certain number of infected individuals do not receive treatment. The device employed in some health units of giving a single dose of metrifonate to all negative school students has not been documented or evaluated, and may not produce high cure-rates in all lightly infected individuals, which is its present rationale. Many health unit doctors are under the impression that a single dose of metrifonate exerts a prolonged prophylactic effect in negative individuals. This topic should be the subject of further intensive research.

(vii) The introduction of praziquantel into some areas of the project where only S. haematobium is transmitted must be viewed with concern. Apart from the recurrent cost implications of this action, its effect on the morale of personnel in areas left to use metrifonate is regrettable. However, the introduction of praziquantel was limited to areas where prevalence-rates were higher than the current overall prevalence rate for the district, in order to achieve further reduction.

4.10 THE CURRENT EPIDEMIOLOGICAL SITUATION IN THE NILE DELTA

To assist in making recommendations on control strategies for the proposed Delta extension, the latest available information on prevalence rates of S. mansoni and S. haemotobium infections is set out in Table 4.30.

TABLE 4.30

DETAILS OF 1983 DELTA SURVEY ON THE PREVALENCE OF S. MANSONI AND S. HAEMATOBIUM, BASED ON ONE VILLAGE PER DISTRICT AND A 5% RANDOM SAMPLE OF THAT VILLAGE

Governorate District	Health Unit	(Kato/Katz) S. mansoni No. pos. No. exam	%	(Sedimentation) S. haematobium Prev. rate %
Minufiya				
El Bagour	Met Afif	38/222	17.2	7.4
Quweisna	Kafr Taha Shabra	40/74	54.0	4.0
El Shohada	Bashtamy	62/186	33.3	3.7
Shibin El Kom	Met Mosa	35/168	20.9	7.7
Minuf	Shabra Blula	8/139	5.7	6.2
Birket El Sab	Met Fares	3/241	1.2	7.4
Tala	Babel	133/299	44.4	2.3
Ashmon	Boha Shatanof	19/208	9.1	3.8

TABLE 4.30 cont

Governorate District	Health Unit	(Kato/Katz) S. mansoni No. pos. / No. exam	%	(Sedimentation) S. haematobium Prev. rate %
Gharbiya				
Tanta	Heset Shabsher	110/155	70.9	10.9
El Santa	Toukh Mezeed	139/276	50.5	-
Zifta	Farsees	84/279	30.1	10.0
Mahalla El Kub	El Shehedy	69/135	51.1	-
Kafr El Zaiyat	Kafr Hashad	61/223	27.3	13.9
Samannud	Bena Abu Seer	192/345	55.6	35.3
Kutur	Nesheel	66/281	23.4	4.2
Bashun	Salamoon	51/110	46.3	-
Kaft El Sheikh				
Kafr El Sheikh	El Raseef	111/176	63.0	6.2
Disuq	El Shabasia	82/103	79.6	10.7
Sidi Salim	El Haddadi	91/102	89.2	0.9
Qallin	Kafr El Marazka	122/291	41.9	7.2
Fuwu	El Fotouh	164/300	54.6	10.0
El Hamul	El Manawufa	39/69	56.5	-
Biyala	El Shotoot	36/50	72.0	24.0
Baltim	El Sahel El Kebly	69/328	21.0	-
Minyet El Kamh	El Telin	116/317	5.0	5.6
Bilbeis	El Kafr El Kadin	13/107	12.1	7.4
Abu Kebir	El Karamous	90/250	36.0	0.4
Abu Hammad	Manshat El Abasa	58/92	63.0	-
Dyarb Nagm	Karadis	157/249	63.0	0.4
Kafr Saqr	El Shawafin	91/157	57.9	10.1
Ibrahimiya	El Hewat	34/221	15.3	9.9
Dakahliya				
El Mansura	Telbana	160/320	50.0	10.0
Aga	Tanamel Gharby	57/242	23.5	5.3
Mit Ghamr	Dabbounia	29/144	20.1	13.2
Simbillaween	Kafr Ghanam	138/387	35.6	0.7
Dikernis	Met Fares	132/329	40.1	0.9
Minit Nasr	El Genina	81/198	40.9	6.5
El Manzala	Met Salseel	160/253	63.4	13.0
Talkha	El Manyal	77/211	36.4	0.4
Sirbin	Kafr Dabos	130/283	45.9	5.6
Bilkas	Manshit Shoman	124/201	61.6	10.4

TABLE 4.30 cont

Governorate / District	Health Unit	(Kato/Katz) S. mansoni No. pos. / No. exam	%	(Sedimentation) S. haematobium Prev. rate %
Damietta				
Kafr Saad	Rakabia	122/209	58.3	-
El Zarka	Shermassah	107/268	39.9	4.4
Faraskour	Rahmania	121/326	37.1	-
Damietta	Awlad Hammam	93/123	70.7	-
Beheira				
Itah El Baroud	Amleet	86/206	41.7	9.2
Damanhur	Karakes	55/99	55.5	2.0
Kafr El Dawar	Abees	169/317	53.3	15.7
Rasheed	El Gadia	30/85	35.2	-
El Mahmoudia	Dayrout	154/189	81.4	17.9
Abu El Matamir	Kom El Faraq	215/330	65.1	3.9
Abu Homus	Anwa El Mofty	207/275	75.2	0.3
El Rahmania	Somokhrat	99/223	44.3	2.2
Edco	Edco El Gadida	70/115	60.8	4.3
Hosh Isa	El Kony	120/199	60.3	41.7
Delengat	Zohor El Omara	65/170	38.2	16.6
Shobrakhit	Nakoma	100/363	27.5	4.6
Kom Hamada	El Sawaf	80/192	41.6	2.0
Qalyubiya				
Shibin Qanatir	Kafr El Shobak	66/198	33.3	23.2
Tukh	El Hessa	81/192	42.1	1.5
Qalyub	Zawyet El Nagar	58/287	20.2	11.7
Qahiriya	El Moneera	39/300	13.0	8.6
Benha	Met Assem	66/235	28.0	0.4
Kafr Shukr	El Bakasheen	37/183	20.2	8.1
El Khanka	Sandowa	146/339	43.0	1.4
Sharkiya				
Zagazig	Kafr El Hamam	15/439	3.4	7.7
Fakus	El Bedom	50/246	20.3	2.4
El Hesenia	El Salhia	45/145	31.0	4.1
Hehia	El Awasga	54/178	30.3	9.5

4.11 EPIDEMIOLOGICAL RECOMMENDATIONS FOR THE FUTURE

4.11.1 Epidemiological Surveillance

Epidemiological surveillance data should be presented by Health Unit areas rather than by governorate. This process would be greatly speeded up and facilitated by the use of microcomputers at district and probably health unit level. This recommendation is essential if flexibility and speed in reacting to unexpected epidemiological situations is to be achieved.

4.11.2 Parasitological Screening Techniques

Urinary screening should remain as at present. A quantitative 50mg Kato-Katz technique should be introduced for faecal screening in the rural health units.

Single use stained Nytrel® filters and syringes should be used for egg-output counting in urine.

The necessary training procedures for all these recommendations should be instituted.

4.12 CHEMOTHERAPY RECOMMENDATIONS FOR THE FUTURE

The future strategy of chemotherapy in all areas of Egypt should be the use of praziquantel at a single oral dose of 40mg per kg body weight, following twice yearly screening of school students, and annual screening of the rest of the population.

CHAPTER 5

SNAIL SAMPLING AND CONTROL

5.1 INTRODUCTION

The purpose of this chapter is to present evaluation findings on major aspects of the present snail sampling and snail control work being carried out in the Middle and Upper Egypt Bilharziasis Projects.

The main areas observed were: general organization of snail sampling and control, present sensitivity of snail sampling in detecting cercarial transmission, delivery capabilities of various molluscicide strategies, and present achievements of area-wide molluscicide in controlling transmission. Recommendations are given to improve any deficiencies noted above - hopefully in a constructive manner. Observations and recommendations are also made on how to control transmission in locations and foci presently not under snail control, and estimated future costs of molluscicide. A final recommendation is given on future molluscicide in the Nile Delta - a proposed strategy of cost-effective snail control in any structured bilharziasis control project in this part of Egypt.

5.2 GENERAL ORGANIZATION OF SNAIL CONTROL

In theory, the basic organization is as follows. In every governorate, there is a Governorate Inspectorate of Snail Control, which is usually headed by an agricultural engineer, with subordinate agricultural engineers to manage operations effectively. The governorate inspectorate oversees, coordinates, and supervises all snail sampling and snail control operations in the governorate, and is the final collating centre for all snail sampling and control data from all parts of the governorate. This inspectorate also receives, stores, and distributes essential supplies and equipment (like molluscicides and sprayers) to the district inspectorates. Each governorate inspectorate is supposed to have at least 2 vehicles for the snail work.

The senior engineers at the governorate inspectorate receive orders from the executive director of bilharziasis control at the governorate centre, but are mainly advised on their work by the Director of Snail Control, Ministry of Health, Cairo.

The second level of organization in each governorate is the District Inspectorate of Snail Control, one in each administrative district. This inspectorate is also headed by an agricultural engineer with 1 or more subordinate agricultural engineers. The main functions of each of these inspectorates are as follows: to supervise all snail sampling and snail control activities in the district, to supervise snail examination for cercariae in snails brought in from lower ranking units in the district, and mainly to supervise and direct all molluscicide operations in the district (except large-scale operations which are usually organized and supervised by the chief snail control engineer in the governorate). Each district

inspectorate is to have at least one technician trained in examining snails for trematode infection, and a number of clerks for collating data from snail control centres and units in the district. Each district inspectorate is to have at least one pickup truck.

The third level in the hierarchy is the snail control centre. It is usually headed by a medium-grade technician, who sometimes examines vector snails for schistosome infection. He oversees each snail control unit under his supervision - usually about 3 to 5 of these. He is to be provided with a motorcycle.

The last level in the organization is the snail control unit. Each unit usually comprises about 3 men (1 overseer), all supposedly experienced in vector snail identification and collection. These men should all have bicycles and should do snail sampling for at least 9 months of the year, coveraging an average of 200-300 km of water courses (canals and drains) each month. The whole organization of these units is arranged in such a way that all canals and drains in the governorate can be searched for snails once-a-month. The workers in the snail control units are also expected to be labourers in any molluscicide and/or weed control work supervised by the district inspectorate in their geographical area.

5.2.1 Observations on the present organization anad competence of personnel

5.2.1.1 Functioning of governorate inspectorates of snail control

Five governorate inspectorates were visited during the evaluation mission: Beni Suef, Minya, Assiut, Sohag, and Qena. The general organization was good. Every inspectorate had good records in regards to the following: number and species of vector snails collected by water course, area, and time; number of infected snails by the same breakdown; amount and type of molluscicide used by water course, area, and time; maps of all water courses and canals in the governorate; and synoptic maps with schematic canal-drain layout and irrigation rotations.

Because of the time of the evaluation mission (mainly in the low transmission season), it was possible to witness only one area-wide molluscicide operation, in South Assiut. This will be commented upon in a later section. But all engineers in every inspectorate possessed a good knowledge of calculating correct dosages of molluscicides for area-wide applications, the ecological and timing factors in correctly applying the molluscicides, and how to monitor molluscicidal concentrations in the water courses after application of the chemical.

The engineers were all knowledgeable in snail identification, recognizing S. haematobium cercariae, and the ecological factors responsible for varying levels of snail infestation in different water courses.

Generally, the governorate inspectorates of snail control were well managed, functioning smoothly and exercising their supervisory powers over the district inspectorates, snail control centres and units very well. All 5 governorate inspectorates visited had at least two pickup trucks and/or vans for the official work; and at least one large truck for carrying molluscicides. In all cases, this was an adequate transportation supply for carrying out work responsibilities.

5.2.1.2 Functioning of district inspectorates of snail control

Nine different district inspectorates were visited without prior warning. Eight were functioning well, with adequate, competent staff, equipment, and transportation. Only one was not working well - this was El Edwah District Inspectorate in Minya. There was only one part-time engineer at the Inspectorate, the microscope was not in good condition, no glass slides were available for snail crushing, and there was no vehicle for work activities.

An independent check was made on the transportation available for district inspectorates in 3 governorates in Middle and Upper Egypt, as well as Assiut N and S. It is shown in the table below.

Table 5.1
Number of pickup trucks for district inspectorates of snail control

Governorate	No. of district inspectorates	Number of pickup trucks			Approximate age of fleet (as of 1985) Yrs
		1	2	3	
Beni Suef	7	7	0	0	NA
Minya	9	7	1	1	7-8
Assiut N	4	4	0	0	7-8
Assiut S	6	5	0	1	5-7
Qena	11	11	0	0	2-4

The table shows that almost every district inspectorate assessed had one pickup truck for the official work. In Minya, El Edwah had no vehicle, and Mallawi district had 2 pickup trucks. In Assiut South, the district of El Ghanayim had no working pickup truck.

5.2.1.3 Functioning of snail control centres and units

Only a few ad hoc visits were made to these places. But each time, some staff were available (the rest presumably in the field) and an inspection of records revealed a well-organized system of data collecting.

5.2.1.4 Recommendation to improve communication between snail control staff and medical personnel

It can be stated that there is a communication gap between the people involved in snail control and the people involved in the medical side of the disease. This is unfortunate. It will be recommended later in this chapter that future snail control in Middle and Upper Egypt evolve towards molluscicide areas and villages of high prevalence rates of S. haematobium, before finally reaching the stage of focal control in villages with detected transmission. For this strategy to work well, the snail control engineers, health unit doctors, district medical officers, and governorate directors of bilharziasis control must establish closer communcation and cooperation. At the very least, a mechanism should be set up in the governorates whereby engineers in district inspectorates of snail control and at the governorate inspectorate receive monthly summary information on S. haematobium prevalence rates in all outpatients examined in every health unit and centre in the governorate, as well as prevalence rates among school children when each seasonal survey is completed. Any cases of S.Ñmansoni detected in any health unit or centre should also be communicated to the snail control engineers. Conversely, the snail control engineers should provide regular information on snail sampling results and snail control operations to the executive director of bilharziasis control in the governorate, who in turn, should relay this information to all the district medical officers.

5.3 SNAIL SAMPLING

5.3.1 Evaluation of the present snail sampling method for detecting transmission

The traditional snail sampling method used by the Ministry of Health throughout Egypt (i.e., 3 dips with a dip net every 20 metres along canals and drains) is a valid measure for detecting the presence of vector snails and in establishing the degree of snail infestation in the canal-drain network. But is the method sensitive in doing what bilharzia snail sampling should really do - finding infected Bulinus truncatus and Biomphalaria alexandrina, finding sufficient numbers to pinpoint transmission foci, and determining monthly transmission potentials?

It was possible to witness a number of snail searches by snail sampling units and by governorate inspectorate personnel. In no case did any of the snail sampling workers sample in human water contact points. This is reflected in the very low number of infected snails collected by all snail sampling units in all governorates of the Middle Egypt Project in 1984. the number of infected B. truncatus reported were 9 in Beni Suef, 22 in Minya, and 7 in Assiut North. The respective infection rates were 0.18%, 0.09% and 0.17%.

The sensitivity of the present snail sampling method was evaluated in October and November by a member of the evaluation team. Indpenedent snail sampling was conducted with senior engineers and snail workers in Assiut, Minya, and Beni Suef. All sampling was carried out in or near human water contact points - in the Nile, the Ibrahimiya Canal, and primary and secondary canals. Table 5.2 gives the results.

Table 5.2
Results of independent snail sampling in Middle Egypt during October and November 1984

Gov.	Place	District	Date	Water body	B. truncatus Total collected	B. truncatus Number Infect. *	B. truncatus % Inf.
Assiut	Assiut	Assiut	19.10	Nile River	25	3	12.0
Assiut	El Wasta	Abnub	21.10	Nile River	107	4	3.7
Assiut	Baheeg; Odar	Assiut	20.10	1°, 11° canals	58	0	0
Assiut	El Wan	Assiut	21.10	11° canal	0	0	0
Assiut	Arab Fezara	Qusiya	14.11	Ibrahimiya Canal	44	1	2.3
Assiut	Baheeg	Assiut	15.11	Nile River	16	2	12.5
Assiut	Assiut	Assiut	15.11	Nile River	33	1	3.0
Minya	El Hawasleya	Minya	23.10	11° canals	3	0	0
Minya	Beni Mohammed Sultan	Minya	23.10	1° canal	12	3	25.0
Minya	Ashmoneen	Mallawi	29.10	1°, 11° canals	0	0	0
Minya	Talout	Mallawi	29.10	1°, 11° canals	0	0	0
Minya	Koloba	Mallawi	29.10	1°, 11° canals	1	0	0
Beni S.	Esbit Sofia	Nasser	8.11	Nile River	37	1	2.7
				Total	336	15	4.5

* Infected with mature S. haematobium cercariae
1°, 11° = primary and secondary canals

Table 5.2 shows that out of 13 times an evaluator from the World Bank Mission directed the snail searching and participated in it directly, at least one infected snail with s. haematobium was found on 6 occasions (47% of the searches), and the overall infection rate was 15/336 = 4.5% - a high figure by Egyptian standards. Of the 15 infected B. truncatus, 11 came from the Nile River. the infection rate for the Nile was 11/218 = 5.0%. In each place searched in the Nile, at least one infected snail was found on every sampling occasion. The water contact points were very distinct and small in area. More important, primary and secondary canals were searched on 8 occasions (including the Ibrahimiya Canal), and infected snails were found 2 times (25% of the samples). The total infection rate for the canals was 4/118 = 3.4%.

The conclusion from the independent snail sampling is that the low numbers of infected snails found each year in all governorates of Middle Egypt is not the result of successful transmission control due to molluscicide. Large numbers of infected snails are present in the Nile, in main and secondary canals, and to a lesser extent, drains, but are not being found.

5.3.2 Recommendation

The present strategy of taking 3 dips every 20 metres regardless of transmission ecology and human water contact is fundamentally in need of modification. It should be modified in the following way.

First, all workers should concentrate their snail sampling in and near to villages. They should be taught how to identify and then monitor all important water contact points, especially those with vegetation favouring snail infestation. These points should be sampled thoroughly each month of the year except for the brief winter closure period.

Second, to familiarize the snail control engineers in each governorate in human water contact points, a field training course for these engineers should be held as soon as possible. One good venue for this training would be Qena, because, by far the largest number of infected snails are consistently found in this governorate. After the initial course is completed, the senior engineers could then conduct the same type of re-training in their governorates to pass on this knowledge through the ranks, to the district engineers and technicians, but mainly to the workers who carry out the actual day to day snail sampling.

5.3.3 Confirmation that the low transmission season begins in December

Because of the insensitivity of the snail sampling technique presently used in Egypt in terms of monitoring transmission, independent snail sampling was conducted by an evaluation team member in the month of December. This is the month where historically in Egypt, snails and cercarial transmission decline abruptly, since air and water temperatures become low and human water contact with canals and drains is sharply curtailed. The low transmission season normally continues to the following April. The high transmission season is from May through November.

Table 5.3 gives details of the independent snail sampling in December. All of the sampling was conducted in human water contact points in villages with high human prevalence rates of S.Ñhaematobium. The results show that in the 11 dangerous foci sampled, not a single infected snail was found, even though in a few places the total number of snails was relatively high, with old specimens predominating. Although the above sampling was limited in scope, it does tend to confirm that infected snails are few in number after November, and that the beginning of the low transmission season in Middle and Upper Egypt probably occurs each December.

Table 5.3
Details of the snail sampling in December

Gov.	Place	District	Water course sampled	B. truncatus	
				Total	infected*
Assiut	Abnub	Wasta Gezira	Nile River	31**	0
Assiut	Assiut	near Assiut	Nile River	19	0
Minya	Minya	near Tawa	11° canal	26	0
Minya	Samalout	Stahl	1° canal	0	0
Minya	Samalout	near Stahl	11° canal	4	0
Minya	Beni M.	Oto el Waft	11° canal	2	0
Minya	Beni M.	Shalkam	11° canal	13	0
Minya	Beni M.	Shalkam	Drain	9	0
Minya	Beni M.	Shalkam	11° canal	12	0
Minya	El Edwah	Beni Aimer	Drain	2	0
Minya	El Edwah	El Akliah	Bahr Youssef***	20	0

* Infected with mature S. haematobium cercariae

** 13 uninfected Biomphalaria alexandrina also found

*** A sheltered part of the Bahr Youssef Canal with active human water contact

5.3.4 Some defects noted in the transportation and examination of snails

These defects were noted over a six month period of observation. First, there is a noticeable flaw in most governorates in Middle and Upper Egypt in the way snails are transported from where they are collected to where they are usually crushed (district inspectorates). Presently, collected snails in many areas are simply put in small pieces of marked paper (with the date and place of collection) and left in these. But some snails were observed to die due to dessication or inadvertent crushing on their way to the inspectorates. Until recently in Egypt, the collected snails in the papers were also placed in wooden boxes with air holes, and covered with ample, moist vegetation or mud.

Six district or governorate snail inspectorates were visited when snails were actually being crushed. In each centre, one common mistake was noticed: snails collected were not carefully counted before being crushed. This was partly due to the fact that often 2 or more snails were crushed together on one microscope slide. The final count of snails was often a count of the number of microscope slides used instead of the actual number of snails being brought into the lab.

During microscopic examination of snails, only 10X objectives in monocular microscopes were observed in use. None of the microscopes had lower objectives attached. Although most snail-crushing technicians in Egypt are competent, it would be easier for them to spot the cercariae if they were to use a lower-power lens at first. If more close-up identification is needed, they could then switch to 10X power.

5.3.5 Recommendations

The old procedure of packing collected snails already wrapped in paper in wooden boxes with an overlay of vegetation to prevent dessication and trauma should be reintroduced again. This would be a simple correction to implement.

All microscopes used for snail sampling should have a low power objective like 4X for initial screening of the crushed snails. It would make microscopic examination faster and more efficient in detecting cercariae.

5.4 DELIVERY OF MOLLUSCIDING

5.4.1 Area-wide molluscicide

Part of the evaluation team was able to witness one area-wide molluscicide operation. This was in October at El Ghanayim in South Assiut. The main purpose of the visit was to assess the quality of the application of 600 kg of Bayluscide[R] in a primary canal - the Georgeweya, and later to test how well the molluscicide penetrated downstream, in the main channel, a secondary canal, and a tertiary canal. The discharge at the El

Ghanayim bridge was 12.18 m^3. Five drums of Bayluscide® were used to achieve a steady drip-feed over 8 hours. The application was conducted by the senior engineers at the Assiut Governorate Inspectorate along with the engineer from El Ghanayim District Inspectorate. The entire operation was carried out professionally and no obvious flaws were detected during the two hours the evaluation team had a chance to see the operation. A colorometric kit was used to test the concentration of Bayluscide® at 3 points downstream from El Ghanayim. The first point was about 24 km downstream from the point of application in the Georgeweya Canal. The concentration of the molluscicide at this point was 1.0 mg/l - a good concentration considering that the time of the monitoring was at or near the tail end of the molluscicidal wave. The second monitoring point was a few hundred metres away from the first point but in a secondary canal which branched off of the Georgeweya. Here the concentration of the chemical was also 1.0 mg/l. The third point of water analysis was in a tertiary canal a few km away from this secondary canal. The concentration of the molluscicide at this place was less than 0.2 mg/l, too low to kill snails.

5.4.2 Assessment of the area-wide application

It was a good operation, well conducted, and well monitored. The Bayluscide® delivered into the water seemed to achieve a 100% snail kill throughout most of the canal system where the chemical was meant to be delivered. As in all area-wide applications, small canals far downstream from the main application point often need supplementary spraying of their terminal ends, and in the present operation, this was done a few days later.

5.4.3 Radius molluscicide

This type of molluscicide is to deliver the chemical only into the relevant canal serving one or two villages. It is therefore a form of focal control. The evaluation team witnessed one radius control operation in October 1984 at the village of Beni Mohammed Sultan, Minya District, Minya Governorate. Approximately 100 kg of Bayluscide® was applied for 8 hours into the entrance of the Termiseya Canal feeding the village, which itself was a branch canal directly from the Ibrahimiya Canal. The justification for the radius control application was that 3 infected snails were found along a section of the Termiseya canal in a populated part of the village. The entire operation went well and required little equipment and manpower. It was impressive how the district engineer knew how to conduct a radius operation so well, since this strategy has been out of favour in Egypt of late, but will be the key to much of the future molluscicide in Egypt.

5.4.4 Focal molluscicide

Three different focal molluscicide operations were observed. The first involved dipping bags of copper sulphate along the shore of El Wasta village at the Nile River, Abnub District, Assiut.

The second was a training trial, directed by one of the mission evaluators, to spray Bayluscide® in small quantities in individual water contact points at Arab Fezara at the Ibrahimiya Canal, El Quosseia District, Assiut. One of the water contact points was found to have infected B. truncatus. The third focal control operation was also a training trial given by the same mission evaluator. It involved spraying two water contact points in the Nile River at Baheeg Village, Assiut, where 2 infected B. truncatus were collected.

5.4.5 Assessment of the operations

At El Wasta, 80 kg of copper sulphate were applied to 4 wide water contact points along an open beach stretch of the village shoreline. About 150 metres of the foreshore received dippings of $CuSO_4$. Even though there was little emergent vegetation to keep the water still, the chemical remained visible (blue in colour) in the zone where applied for at least one hour after application, despite choppiness of the water. The total time to apply $CuSO_4$ took about 1 hour (4 men).

The efficacy of the operation was assessed one month later when thorough snail sampling was conducted in the treated water contact points by one of the evaluators and support staff. A total of 39 B. truncatus (small) were found in the 4 water contact points. None was infected. Since 107 B. truncatus were found in the same points before application the month before, with 4 infected, the sulphating operation was successful in reducing overall snail density and transmission potential.

It was not possible to return to the Ibrahimiya Canal at any time after the focal application with Bayluscide®. Although two of the four water contact points treated had dense, emergent vegetation to prevent rapid dilution of the Bayluscide®, the two remaining points had little emergent vegetable cover, and it could be observed that the Bayluscide® was being rapidly washed away by the current in these 2 foci.

Therefore, for treating foci in large carrier canals, $CuSO_4$ is probably a better molluscicide than Bayluscide® unless heavy emergent vegetation exists around the water contact points.

The third focal treatment, at the 2 water contact points in the Nile at Baheeg village seemed to have achieved good results. Just before the focal spraying with Bayluscide®, 16 B. truncatus were collected, 2 of which had S. haematobium cercariae. One living B. alexandrina was also collected from one of the points. A month after the focal spraying, an exhaustive search for vector snails was carried out in the treated points (and along a 100 m stretch of shore). In the treated water contact points, none of the vector snails was found, while along the untreated parts of shore, 16 uninfected B. truncatus were found.

5.4.6 Recommendation

It is recommended that the Snail Control Section of the Endemic Diseases Control Department organize some training courses to teach agricultural engineers how to apply Bayluscide[R] focally, including how to calculate the desired concentration for any given volume of water. But care should be taken not to encourage the rapid, wide-scale use of focal molluscicíding with Bayluscide[R]. More recommendations on its future, limited use are given in a later section.

5.5 PRESENT ACHIEVEMENTS OF MOLLUSCICIDING IN THE MIDDLE AND UPPER EGYPT PROJECTS IN CONTROLLING TRANSMISSION OF S. HAEMATOBIUM

5.5.1 Brief history of operations

The development and strategy of molluscicíding for the Middle and Upper Egypt projects has already been described in reports by the main World Bank consultant over the years and the Egyptian engineers in-charge of snail control. Suffice it to say here that the strategy has been one of area-wide molluscicíding in all important canals and drains (and in a number of cases the main carrier canals) - 3 times a year (spring, summer, and autumn) during the active intervention phase (1977-1980 in Middle Egypt; 1981-1983 in Upper Egypt), two times a year (spring and autumn) during the consolidation phase (1981-1983 in Middle Egypt; 1984 onwards in Upper Egypt), and once-a-year (May) during the present maintenance phase in Middle Egypt. In addition to the area-wide applications, local molluscicíding using Bayluscide[R] has also been carried out, first to spray the terminal ends of the canals not reached by the area-wide molluscicíding upstream, and to spray all important drains, and then, mainly in the summer months, to treat locally canals and drains found infested with vector snails. Additionally, limited focal molluscicíding has been done to treat foci where infected vector snails were found.

5.5.2 Choosing data to evaluate the molluscicíding operations

Since most of the evaluation mission coincided with the winter months when virtually no large-scale snail control work was being carried out, it was impossible to evaluate directly the efficacy of the present molluscicíding operations in Middle and Upper Egypt. Detailed data on vector snail infestation rates in canals and drains, densities of snails in the water courses, numbers of infection snails, snail infection rates, quantitative levels of molluscicides used, and other statistics of snail control from season to season and year to year were made available by the Ministry of Health and individual governorate inspectorates of snail control. These data have been useful indicators to the evaluation team. But in assessing the molluscicíding operations of Middle and Upper Egypt, the efficacy of the molluscicíding over the past few years had to be almost entirely judged on the human parameter of prevalence rates among school children from winter and autumn surveys. These surveys made it possible to get an idea of the levels of reinfection occuring in this sensitive indicator

group, and therefore shed some light on the efficacy of transmission control from the molluscicide operations. It was felt that no evaluation of molluscicide efficacy could be made from year to year by changes in snail densities, numbers of infected snails, or snail infection rates. It has already been stated that the present snail sampling method in Egypt is geared more to finding vector snails per se than infected vector snails, and since few infected snails have been reported over the years (except from Qena Governorate), with no detailed precontrol figures available, it was not possible to make even theoretical assessments of how well molluscicide has reduced transmission potentials based on the snail data. Detailed data on human incidence rates would have been an important statistic in helping to evaluate the molluscicide operations, but no data of substance were available.

5.5.3 Assessment of molluscicide in Beni Suef

It was not possible to see much of Beni Suef during the evaluation mission, but from all data available, including review of synoptic data, assessment of points of molluscicide application, amount of Bayluscide® used over the years (including significant parts of Beni Suef receiving the chemical from large molluscicide operations in other control projects) and the timing of its application, and human parameters of infection, it can be concluded that molluscicide in Beni Suef has controlled S. haematobium quite well.

5.5.4 Assessment of molluscicide in Minya

Minya Governorate is the largest in the Middle Egypt Project, and with its vast network of canals and drains arising from 3 main carrier canals - the Ibrahimiya, the Suri, and the Bahr Youssef - posed formidable difficulties over the years in achieving significant snail and transmission control. At least 83 major branch canals had to be molluscicided each year to achieve thorough area-wide snail control. Only the Suri Canal was treated at its source in southern Minya with molluscicide to effect molluscicidal penetration through its system of branch canals, in 3 different agricultural rotations. An immense amount of work had to be done in spraying the ends of the majority of small canals in the governorate as well as the spraying of all important drains. While the molluscicide operations in Minya may have been effective during the active intervention phase in controlling cercarial transmission and human incidence, there is little evidence to suggest that the area-wide molluscicide since 1981 has contributed much to overall transmission control, beyond what has been achieved by drug administration. This assessment is based on results of shcool-age children from Ministry of Health data, given in Table 5.4.

Table 5.4
Seasonal changes in S. haematobium prevalence rates among schoolchildren, Minya Governorate

Month	Year	Number of school children examined	S. haematobium prevalence rates, %
October	1981	156440	25.2
March	1982	133779	16.1
October	1982	157960	26.0
March	1983	156332	14.7
October	1983	191360	26.0
March	1984	169235	16.8

The only conclusion one can draw from the above figures is that the school children received seemingly-effective chemotherapy each October and this showed up in significantly-reduced prevalence rates each following March, during which period there is very little transmission of S. haematobium. But the figures show rapid reinfection rates every March to every following October, near or at the end of the high transmission season. This implies that the area-wide molluscicide and local snail control measures in Minya did not completely control cercarial transmission during the period from April to October, each year from 1981 to 1983.

5.5.5 Assessment of molluscicide in Assiut North

Much time was spent at the Governorate Inspectorate of Snail Control in Assiut. Detailed information was received on all aspects of the molluscicide program. While there are no grounds to criticize the snail control organisation and competence of staff in Assiut, there is little hard evidence that the present once-a-year and recent twice-a-year molluscicide effort has resulted in any significant transmission control. Again, the only "hard" data to shed light on the efficiency of the snail control program since the consolidation phase are the prevalence rates among schoolchildren by season. Table 5.5 shows the seasonal changes from 1981 to 1984.

Table 5.5
Seasonal changes in S. haematobium prevalence rates among schoolchildren, Assiut North

Month	Year	Number of school children examined	S. haematobium prevalence rates, %
October	1981	46756	14.5
March	1982	32416	14.2
October	1982	44895	16.7
March	1983	40882	5.1
October	1983	53001	18.0
March	1984	34288	4.9
October	1984	57710	15.9

It can be seen that chemotherapy initially did not have much effect on reducing prevalence rates in the children, but a significant reduction in level of infection was achieved in March 1983. The rest of the data imply, however, that reinfections and/or new infections were high during each subsequent high transmission season. This logically points to a breakdown in transmission control by the molluscicide operations.

5.5.6 Recommendations to change the strategy of molluscicide in Middle Egypt Project

Now that the Middle Egypt Project is in the maintenance phase and overall progress has been made in the control of bilharziasis, the snail control section in the Endemic Diseases Control Department should re-evaluate the present once-a-year area-wide molluscicide regime along with its present supplementary policy of ad hoc local molluscicide where uninfected vector snails are found. Evidence has been presented to show that the present molluscicide operations do not seem to be significantly controlling transmission of S. haematobium in many areas of Middle Egypt. Therefore, a more logical and cost-effective molluscicide strategy should be considered for the rest of the maintenance phase. It should be a flexible approach, where initial molluscicide would be targeted only in villages or areas where it is needed to help bring down unacceptably high levels of human prevalence rates (and presumably, higher levels of manifest disease) where chemotherapy is not succeeding despite efforts to achieve good compliance rates. This means that there must be good cooperation between the snail control engineers and medical personnel in the governorates as recommended above, mainly to jointly identify high tramsmission-high prevalence villages.

It is recommended that in Middle Egypt, all future molluscicidings be highly selective and the the quantity of Bayluscide® presently used be drastically reduced (see later section for details). Bayluscide® should be applied almost entirely in canals (rarely in drains) serving those villages where overall prevalence rates of S. haematobium in school children exceed 20-30% over a large geographical area (depending on the governorate), or in individual, scattered villages (radius control) where prevalence rates in school children still exceed 30-40% or higher (depending on the governorate).

The criterion to molluscicide or not has to be based first and foremost on human prevalence rates, especially the sensitive indicator of prevalence rates among school children. No generalised molluscicidings should be carried out in villages of low to moderate prevalence rates, including whole districts, even if uninfected B. truncatus are to be found in the canals and drains.

Before more detailed recommendations are made on this subject, it is necessary to define a few molluscicidings terms.

Selective area molluscicidings is defined to mean the following: to molluscicide only those primary and secondary canals which serve clusters of villages, parts of, or at most, areas about the size of a district, and only where prevalence rates of S. haematobium (or S. mansoni if considering the Delta) are sufficiently high to justify the application. In this type of transmission control, Bayluscide® would have to be used, and applied over an 8 hour period by the drip-feed method in the different primary canals immediately feeding the high prevalence villages in question. In most areas of Middle Egypt now, prevalence rates of 30-40% among school children are homogeneously high only in a few broad areas (namely El Edwah and parts of Samalout in Minya). Other rates of this magnitude seem to be mainly scattered or clustered in villages in the other northern districts of Minya.

Where prevalence rates are scattered in a minority of villages per district, selective area molluscicidings is no longer a valid concept. In such circumstances, it should be replaced by a form of focal control called radius control, already described above. But to reiterate, since it is important, this where individual villages are dosed with Bayluscide® by drip-feed application over 8 hours in the canal that passes through the village.

Focal molluscicidings in the strict sense is just what the name implies - molluscicidings individual foci where infected snails are found. These foci can be individual transmission points in a village or on the outskirts of a village. The foci can also be whole stretches of a canal with infected snails; or stretches of a shoreline at the Nile River or at a large carrier canal.

The following strategy of snail control for Middle Egypt is recommended. In Minya, only individual villages with prevalence rates of over 40% in school children should be molluscicided initially (radius control if the villages are scattered). If large areas show a combined prevalence rate of around 30%, they should be treated by selective area molluscicide. To have maximum effect in controlling transmission, it is recommended that the initial molluscicide in these villages or groups of villages be done 3 times just before and during the main transmission season - first in April, second in July, and third in September.

In Assiut North, it is recommended that radius control be the method of choice initially. There is probably no need to do much more molluscicide in Assiut North - except focal applications where justified. The criterion to molluscicide or not in Assiut North for radius control should be a prevalence rate among school children of at least 30%.

In Beni Suef, it is recommended that radius control be carried out only in the scattered villages which register prevalence rates among school children of over 25%. It looks like there is no need to do much more molluscicide in Beni Suef, given the low prevalence rates throughout the governorate. Most of the immediate future molluscicide in the governorate should be aimed at eliminating or controlling the many foci of B. alexandrina which are springing-up in many areas, including the Nile River.

In all 3 governorates in the Middle Egypt Project, it is recommended that the initial selective area molluscicide and/or radius control operations continue for just one year, and then be re-evaluated by the team of joint experts already suggested. It is hoped that after one year of mopping-up the few remaining areas of high transmission and prevalence of S. haematobium, all future molluscicide could be either radius control in fewer and fewer villages, or focal control based on the finding of infected snails (hopefully with improved snail sampling effort).

A word of caution about focal control. It should not be indiscriminate. Treating foci with infected snails should mainly be confined to foci within villages. Foci with infected snails away from the main core of the village where few people have water contact would not necessarily require focal treatment. In other words, focal molluscicide should be directed at foci where many people are in danger of getting infected. The last thing one wants to see in Middle Egypt is a million foci with infected snails discovered, with snail control teams frantically running helter-skelter trying to effect temporary transmission control at each point.

If there is a recrudescence in transmission and infection in any area in Middle Egypt during the future maintenance phase, a flexible response is in order, and more molluscicide would have to be considered - first more possible radius control, and if need be, some more selective area molluscicide. But this contingency seems remote as long as the replacement of metrifonate by praziquantel is effected on a rapid scale. With a one-dose drug available in Middle Egypt in the on-going maintenance phase, there is no reason to suspect a significant long-term upsurge in transmission of S. haematobium. It is felt that continued delivery of praziquantel to infected individuals in schools and health units will eventually lead to the elimination of bilharziasis as a major public health problem.

In summary, in all 3 governorates in the Middle Egypt Project, the once-a-year area-wide molluscicide program backed up with ad hoc local molluscicide should be stopped after 1985. The new strategy outlined above makes sense and seems the best transition towards eventual focal control in the future.

5.5.7 Assessment of molluscicide operations in the Upper Egypt Project

The only governorate in the Upper Egypt Project where it was possible to make a non-superficial assessment of the molluscicide operations over the past few years was Sohag.

Table 5.6 The amount of Bayluscide^{R} applied in an area-wide regimen to the 3 main canals in the governorate from 1981 to 1984.

	Metric tons of Bayluscide^{R} applied in the canals								
	Western Naga Hammadi			Eastern Naga Hammadi			El Gabral		
Year	Spring	Summer	Autumn	Spring	Summer	Autumn	Spring	Summer	Autumn
1981	13	11	16	9	8	11	6.4	5.8	6.2
1982	10.8	8.8	7.9	7.9	0	0	4	0	2.9
1983	11.2	13.8	10.5	7.6	0	6	2.7	2.6	2.9
Consolidation phase									
1984	16.4	-	17.9	0	-	0	2.2	-	2.5

Table 5.6 highlights some deficiencies in the molluscicide programme in Sohag. First, the chemical was applied infrequently in the important Eastern Naga Hammadi Canal (Sharkiya) after 1981. It can only be assumed that no sustained transmission control in that canal could have been achieved since that time. A second defect was the variability in the amount of Bayluscide® used in the other canals - the Western Naga Hammadi and the El Gabral.

Table 5.7 shows the seasonal changes in prevalence rates among school children in Sohag by district from 1982 to 1984. The table indicates that school children in Sohag were successfully treated with metrifonate each October since 1982 (taking into consideration the difficulty in effecting good cure-rates in this age span). In each follow-up examination in March, the prevalence rates were sharply reduced. But from each March to each succeeding October, there is a marked increase in prevalence rates, generally doubling in percentage terms. A logical conclusion from these data is that the molluscicide operations in Sohag have achieved little since 1982, in transmission control, the reduction in seasonal prevalence rates being due to chemotherapy.

Table 5.7 S. haematobium prevalence rates among school children at Sohag

District	1982 O-N	%	1983 M-A	%	1983 O-N	%	1984 M-A	%	1984 O-N	%
Tema	3791/21167	17.9	548/21215	25.8	4617/24798	18.6	2233/24883	9.0	4741/22909	20.7
Tahta	4555/15453	29.5	3838/16060	23.9	375/17090	21.9	2614/17033	15.3	4334/17549	24.7
El Maragha	4946/22009	22.4	2411/19003	12.6	5603/21758	25.7	2060/21265	9.6	5164/22565	22.9
Sohag	8618/25316	34.0	2426/25592	17.4	9878/30556	32.0	4344/30818	14.1	9527/29066	32.8
Akhmim	4176/13458	31.0	2426/13639	17.8	4359/15664	27.8	2207/15747	14.0	6489/22818	28.4
Akhmim	3695/9988	36.9	2077/10003	20.6	2455/11302	21.7	1896/11483	16.5	3196/12151	26.3
Girga	5686/15872	35.8	3527/15982	22.6	4746/18671	25.4	3162/18720	16.8	4792/17981	26.6
Minshat Bardis	7179/20814	34.4	3720/20908	17.7	5929/23733	24.9	2823/24365	11.5	6075/23207	26.2
Dar Es Sallam	1940/5357	36.2	1056/9182	11.5	4425/10811	40.9	1802/11487	15.7	3244/13518	24.0
Sakulta	3906/10553	37.0	1854/10717	17.3	4956/12493	39.7	1827/12520	14.6	5060/13440	37.6
El Balyana	5622/15543	36.2	2374/15766	15.1	4665/17793	26.2	2681/16223	16.5	5136/19372	26.5
Total	54114/175530	30.8	26768/178067	15.0	55382/204669	27.1	27649/204544	13.5	57758/214576	26.9

5.5.8 Assessment of present timing of molluscicide operations in the Upper Egypt Project

At present in the 4 governorates of the Upper Egypt Project, the spring molluscicide campaign is scheduled to begin in "mid May" and the autumn campaign is scheduled to begin at the "end of September". In 1984, the spring application and autumn application began as follows in the Upper Egypt governorates.

Date area-wide molluscicicing commenced

Governorate	Spring	Autumn
Assiut (S)	17-5	3-10
Sohag	16-5	3-10
Qena	19-5	27-10
Aswan	19-5	29-9

From evidence of the monthly number of infected snails collected in Qena Governorate which provide the best data on monthly transmission potentials anywhere in Egypt, it appears that the scheduled spring and autumn applications may be a little late in preventing the 2 major peaks of cercarial transmission each year.

Table 5.8
Monthly numbers of infected snails (B. truncatus with mature S. haematobium cercariae) collected in Qena governorate each month since 1980, and total monthly calculated transmission potential.

1

	Months of year												
Year	J	F	M	A	M	J	J	A	S	O	N	D	Total
1980	5	0	2	8	22	67	21	14	14	2	17	8	180
1981	4	3	18	5	19	6	7	0	22	4	9	6	103
1982	0	4	5	1	26	35	2	2	72	24	4	7	182
1983	13	0	4	10	0	5	16	32	4	5	1	3	93
1984	3	1	20	13	11	9	6	53	48	59	45	0	268
Total	25	8	49	37	78	122	52	101	94	76	24	826	
MTP,%*	3.0	1.0	5.9	4.5	9.4	14.8	6.3	12.2	19.4	11.4	9.2	2.9	100.0%

* MTP = Monthly transmission potentials; calculated by taking the total number of infected snails each month from 1980 - 1984 and dividing each of these monthly totals by the total number of infected snails collected (826) and converting the rates into percentages.

The above results show that 9.4% of the yearly transmission potential already occurs in May, and June accounts for 14.8%. Thus to prevent the buildup of transmission, it would seem that the spring molluscicide operation should be started in April of each year, instead of the scheduled May. The table also shows that the greatest peak in transmission in the year (over 3 consecutive months) occurs in August (12.2%), September (19.4%) and October (11.3%). This suggests that the molluscicide application for the autumn should begin no later than early August. The way the present schedule stands, there is a high probability that the beginning of the autumn application does not prevent the late summer-early autumn transmission peak.

Another way to look at the transmission potential in Qena (which is probably representative for all of Upper Egypt south of Assiut), is to consider the ranking order of the number of infected snails found every month. By ranking each month in order of the importance for transmission (on a scale of 1 to 12) and doing this from 1980 to 1984, the following results appear. These ranking orders of potential are less biased by extreme values than the raw figures of infected snails. But the ranking results are not much different : September and October, and May and June are still just about the most important bimonthly periods for highest transmission potential.

Most important months for transmission, based on ranking results given above in Table 5.8.

1. September	7. July
2. June	8. March
3. August	9. April
4. October	10. January
5. May	11. December
6. November	12. February

The conclusion from these data is that in the consolidation phase of molluscicide in Upper Egypt, if area-wide molluscicide is to continue, it would be more cost-effective to apply the first application in April (before the important transmission month of May) and have the second application begin no later than early August, to prevent the dangerous transmission peak in September.

5.5.9 Recommendation for a change in strategy of molluscicide in the Upper Egypt Project

The information obtained on the molluscicide programme in Sohag raises questions about the present efficacy of molluscicide in the Upper Egypt Project, even though the operations may be better in Assiut South, Qena, and Aswan. It is the conclusion of the evaluation team that the present twice-yearly molluscicide operations in Upper Eqypt, together with the ad hoc attempt at focal control, is no longer cost-effective. It is appreciated that there is enough Bayluscide® to continue molluscicide on the present scale in Upper Egypt to at least 1986. There is not enough time to implement sweeping changes in the operations this year.

Reluctantly, it is the opinion of the evaluation team that the present molluscicíding operations in the Upper Egypt Project remain basically the same until the maintenance phase begins in 1987. In the meantime, it is urged that the timing of the present applications be moved forward one month respectively from the present scheduling as discussed above. It is hoped that by 1987, experience will have been gained from the Middle Egypt Project about applying Bayluscide® only to limited, selected areas. In that year, it is felt that all molluscicíding operations should be sharply reduced in scope, with an approximate 70% reduction in the amount of Bayluscide® used per year. Then, all molluscicíding should be targeted to high prevalence areas and/or villages only, following the recommendations given for the change in molluscicíding strategy for the Middle Egypt Project. Eventually, it is hoped that molluscicíding will be necessary only in limited foci, where it is necessary to prevent cercariae from infecting large numbers of people per village.

5.5.10 Recommendations to control B. truncatus and B. alexandrina in the Nile River in Middle and Upper Egypt.

Much time was spent sampling villages and hamlets located at the Nile River. It has already been reported that in limited, independent snail sampling conducted in some Nile villages in Assiut and Beni Suef in October and November 1984, every Nile shoreline searched yielded at least one infected B. truncatus, and the overall snail infection rate was 5.0%. Moreover, it was seen firsthand in this evaluation mission that B. alexandrina is present all along the Nile from Beni Suef to Isna in Qena. It is common knowledge that the snail is even more widely distributed along the Nile, extending as far south as Aswan. It is the opinion of the evaluation team, however, that control of bilharziasis in the Nile villages be primarily the responsibility of the associated, local health unit, which would have to screen and treat people with metrifonate or praziquantel. Some snail sampling and snail control work should be done in the Nile villages, but basically, only in the following circumstances:-

i) where a Nile village has a very high human prevalence rate of S. haematobium, and it is the joint decision between the medical and snail control personnel that snail sampling and snail control should be initiated;

ii) where a Nile village reports human cases of S. mansoni.

In these two cases, snail sampling and control teams from the relevant districts should monitor and possibly molluscicide the water contact points of the villages. All snail sampling should be carried out in the human water contact points along the shoreline. Any molluscicíding that has to be done should be strictly focal in nature - treating the water contact points only.

5.5.11 Recommendations to control B. truncatus and B. alexandrina in large carrier canals in Middle and Upper Egypt

The evaluation team feels that villages along the main carrier canals be included for regular snail sampling and possible molluscicide only in the following circumstances:-

i) if it is clearly within the capability of the local snail sampling unit and district inspectorate to do so;

ii) only if very high prevalence rates of S. haematobium are reported in the village health unit;

iii) if any cases of S. mansoni are reported in the village health unit or village;

iv) if foci of B. alexandrina are found along the shoreline.

In these villages, focal molluscicide should be carried out if any infected B. truncatus is found, of any B. alexandrina. In most cases, any necessary focal molluscicide would have to be done with copper sulphate. Bayluscide® could only be sprayed in the water contact points in question if sufficient emergent vegetation existed on the sides of the water contact points to prevent rapid dilution of the chemical.

5.5.12 Recommendation to control B. truncatus transmission and B. alexandrina in fish farms in Middle and Upper Egypt

It was possible to see two fish farms in Minya governorate, and through discussions with the senior engineers in the governorate, gain insight into the problems of the other 37 permanent fish farms with presently exist in Minya. Thus, it is possible to make some recommendations about cost-effective and judicious control of S. haematobium transmission and Biomphalaria alexandrina in the fish farms.

Firstly, in dealing with B. alexandrina. If any fish farm contains B. alexandrina (and 2 exist in Minya, in two small lakes near the Ibrahimiya Canal), the owner of the fish farm should be told by relevant representatives of the Ministry of Health (or other relevant government department), that this is an unacceptable focus at present which is a danger to public health. Top priority should be given to treating such a fish farm with a molluscicide to attempt to eradicate that focus of B. alexandrina, whether specimens are infected or not. The fish farm owner should be compensated in some way for the loss of his fish. He should be given prior warning about the mandatory molluscicide, and should be allowed to harvest his present crop of fish. He should also be given health education and told that he might have to find another location for his fish farm if B. alexandrina keeps appearing in it despite repeated molluscicide. B. alexandrina is such a dangerous threat to Middle and Upper Egypt that any focus of the snail in water courses outside of the Nile should be treated with molluscicide as soon as possible.

Second, in dealing with B. truncatus. If the fish farm is located in the Nile River (10 present fish farms in Minya), or a drain (5 fish farms in Minya), it is probably not necessary to do any molluscicidal in the fish farm. All people connected with the farm or who use the water of the fish farm should be examined for S. haematobium, and if found infected, treated with a suitable drug, ie; metrifonate or praziquantel. Intensive and modern health education should be given to the people connected with the fist farm (and those using the water) to help eliminate or reduce contamination.

Third, if the fish farm contains B. truncatus and is located in a flowing canal, it is recommended that no molluscicide be allowed to enter the fish farm. It is hoped that the general reduction in molluscicidal recommended for Middle and Upper Egypt will make blanket molluscicidal obsolete, and even in a zone earmarked for selective area molluscicidal, the application in the area can be planned to be focal in nature near the fish farm to prevent molluscicidal penetration into the farm. Again, examination and possible treatment for S. haematobium should be given to the fish farm owner, his staff, and people who use the water of that section of the canal. Health education should also be included. Snail sampling crews can monitor these fish farms every month, and they can remove any B. truncatus found by hand. Good health education might even be able to convince the fish farm owner and his helpers to regularly search for and destroy B. truncatus, expecially medium to large specimens.

5.6 COSTS OF MOLLUSCICIDING IN MIDDLE AND UPPER EGYPT

5.6.1 Present costs

Table 5.9 which follows has extracted figures on the amount of Bayluscide[R] used in Middle and Upper Egypt (and Giza) in 1984, from internal MOH reports.

Table 5.9. Amount of Bayluscide[R] used in 1984, and approximate cost in US Dollars.

Governorate	Number of applications per year	Total amount of Bayluscide[R] used per year in metric tons	Approximate current cost in US Dollars
Giza	3	48.654	872,172
Beni Suef	1	38.046	684,828
Minya	1	41.247	742,446
Assiut North	1	14.271	256,878
Assiut South	2	28.207	507,726
Sohag	2	39.0o71	703,278
Qena	2	74.895	1,348,110
Aswan	2	46.025	828,450
Total		330.416	5,947,488

5.6.2 Future cost of molluscicide in Middle and Upper Egypt Projects if change-over from blanket molluscicide to selective area molluscicide, radius control, and focal control is followed

Estimates are given in Table 5.10 below on the amount of Bayluscide[R] which would be needed in each governorate each year for selective area molluscicide, radius control, and focal control, during the initial phase of operations.

Table 5.10 Bayluscide[R] requirements in future.

Governorate	Estimate of total amount of Bayluscide[R] needed in metric tons	Approximate cost in US Dollars
Giza	10	180,000
Beni Suef	10	180,000
Minya	16	288,000
Assiut North	5	90,000
Assiut South	8	144,000
Sohag	13	234,000
Qena	20	360,000
Aswan	15	270,000
Total	97	1,746,000

The above calculations are, of course, arbitrary, and are based on the assumption that each governorate can reduce its present usage of Bayluscide[R] by at least 67% and still maintain effective transmission control in those few high transmission areas and/or villages where transmission control is needed. Thus, the amount of Bayluscide[R] needed each year could be reduced initially from the present expense of almost $ 6,000,000 to 1,750,000 - a saving of about 70%. This might be reduced even further in subsequent years as fewer and fewer high transmission-high prevalence areas remain.

5.7 RECOMMENDATIONS FOR FUTURE SNAIL CONTROL IN THE NILE DELTA

What follows are recommendations for theoretical cost-effective snail control in the Nile Dalta, from work carried out by one team member during 6 months in the Delta in 1983 and 1984, looking at many aspects of bilharzia in that part of Egypt.

5.7.1 Epidemiological background

First, some epidemiological information. Two maps are provided (Figs 1 & 2). The first presents estimated overall prevalence rates of S. mansoni and S. haematobium for all age groups living in rural areas in 7 Delta governorates. These figures are based

on the most up-to-date scientific data available. It can be seen that the estimated prevalence rates of S. mansoni are significantly higher than those of S. haematobium in all governorates except Minufiya, and that the prevalence of S. mansoni rises progressively from south to north. The second map attempts to quantify the total number of people infected with "schistosomiasis" in the 7 Delta governorates. This estimate combines S. mansoni and S. haematobium infections in the general population including the urban areas, and takes into account the percentages and total number of people with double infections; therefore, it is slightly different from the figures in Fig.1. The estimates of the total number of people infected with "schistosomiasis" in the 7 governorates are conservative ones.

Fig 3. shows the most probable ratio of B. alexandrina to B. truncatus in the Dalta; there is a clear trend of B. alexandrina dominating B. truncatus in the northern parts of the Delta, but from all recent reports, B. alexandrina is succeeding B. truncatus in the southernmost parts of the Delta as well. If the ecological trend continues, it can be assumed that in the next few decades, B. alexandrina will have succeeded B. truncatus to such an extent, that the latter snail and S. haematobium will fall naturally to low levels.

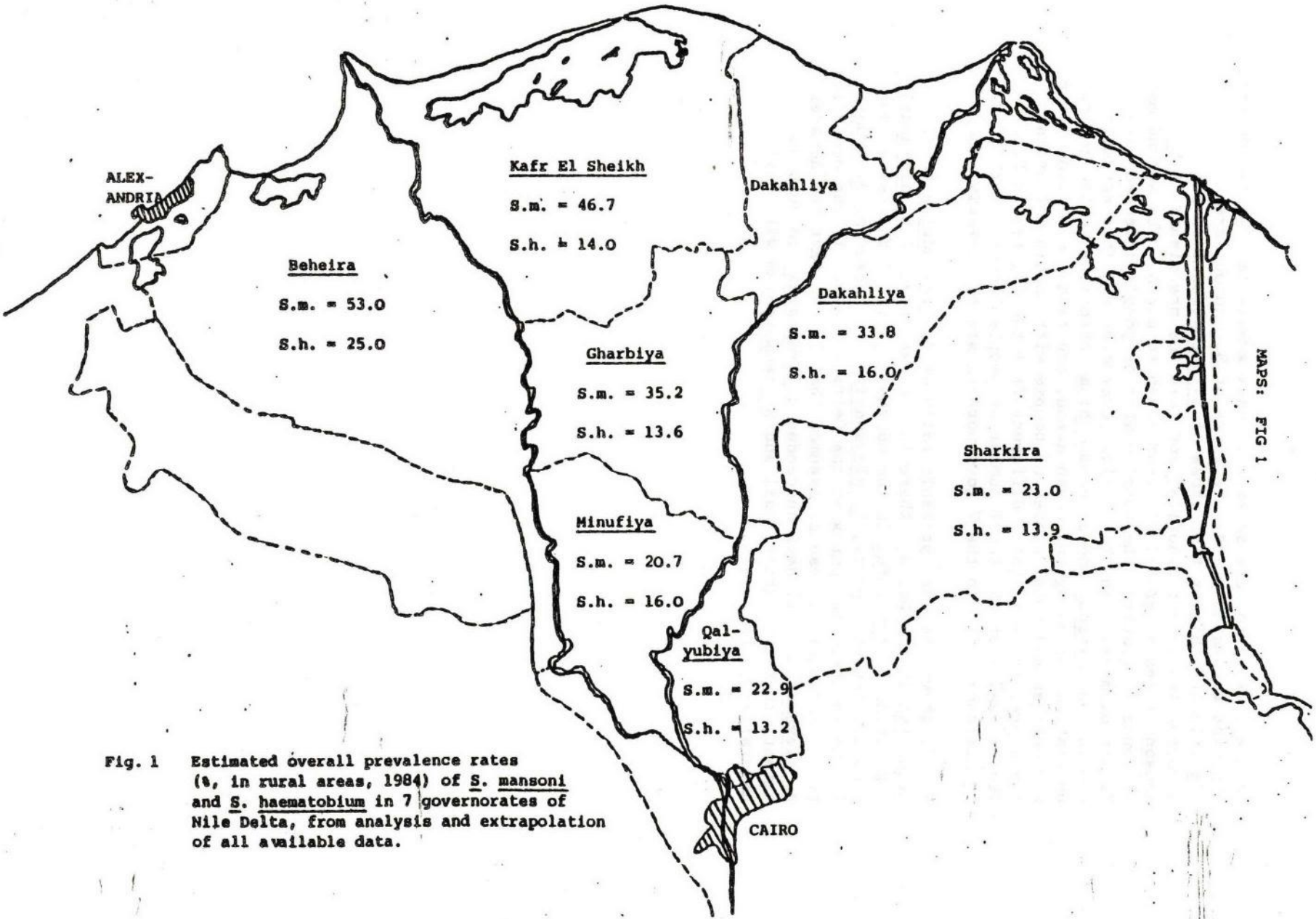


Fig. 1 Estimated overall prevalence rates (%, in rural areas, 1984) of S. mansoni and S. haematobium in 7 governorates of Nile Delta, from analysis and extrapolation of all available data.

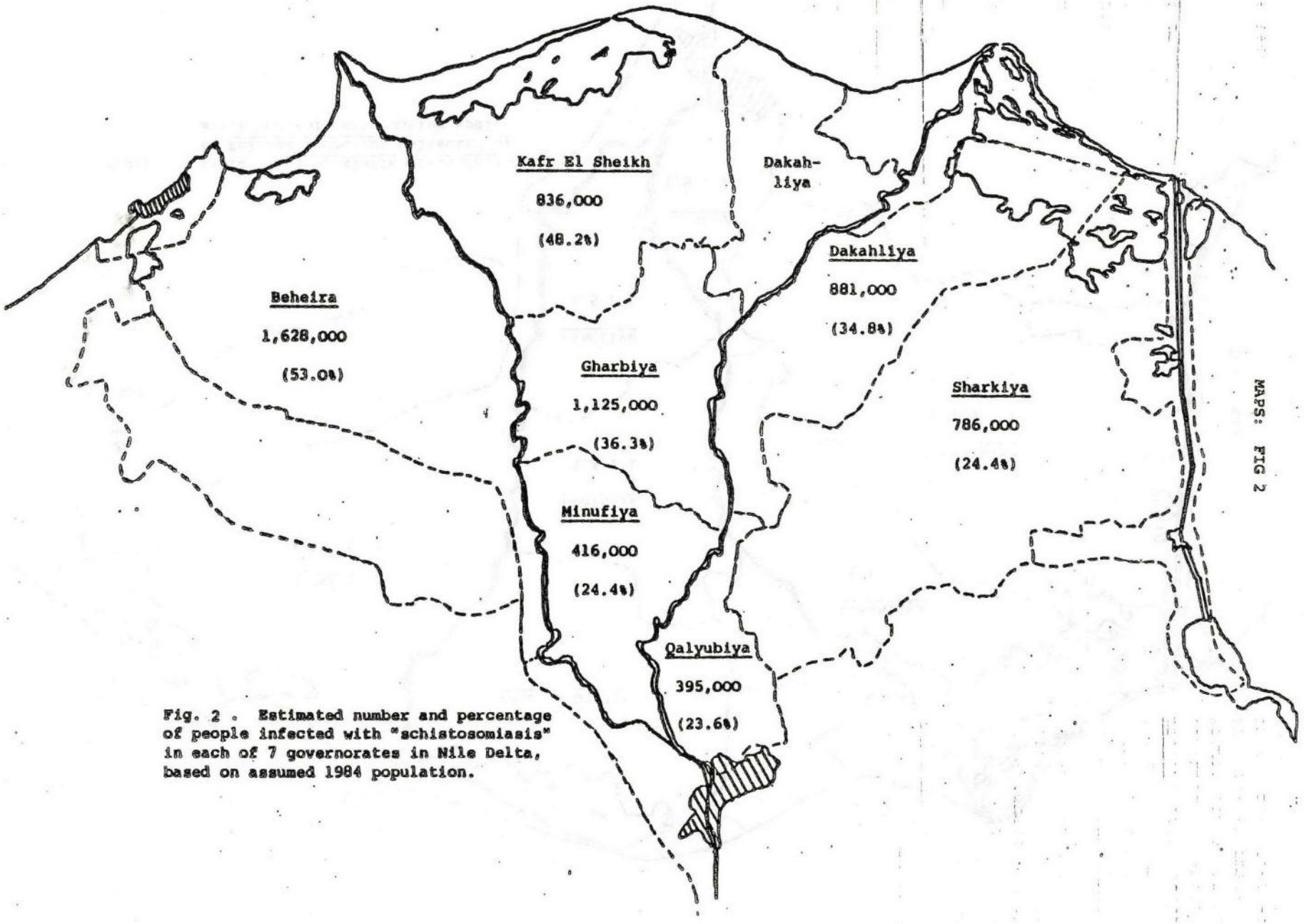


Fig. 2 . Estimated number and percentage of people infected with "schistosomiasis" in each of 7 governorates in Nile Delta, based on assumed 1984 population.

MAPS: FIG 2

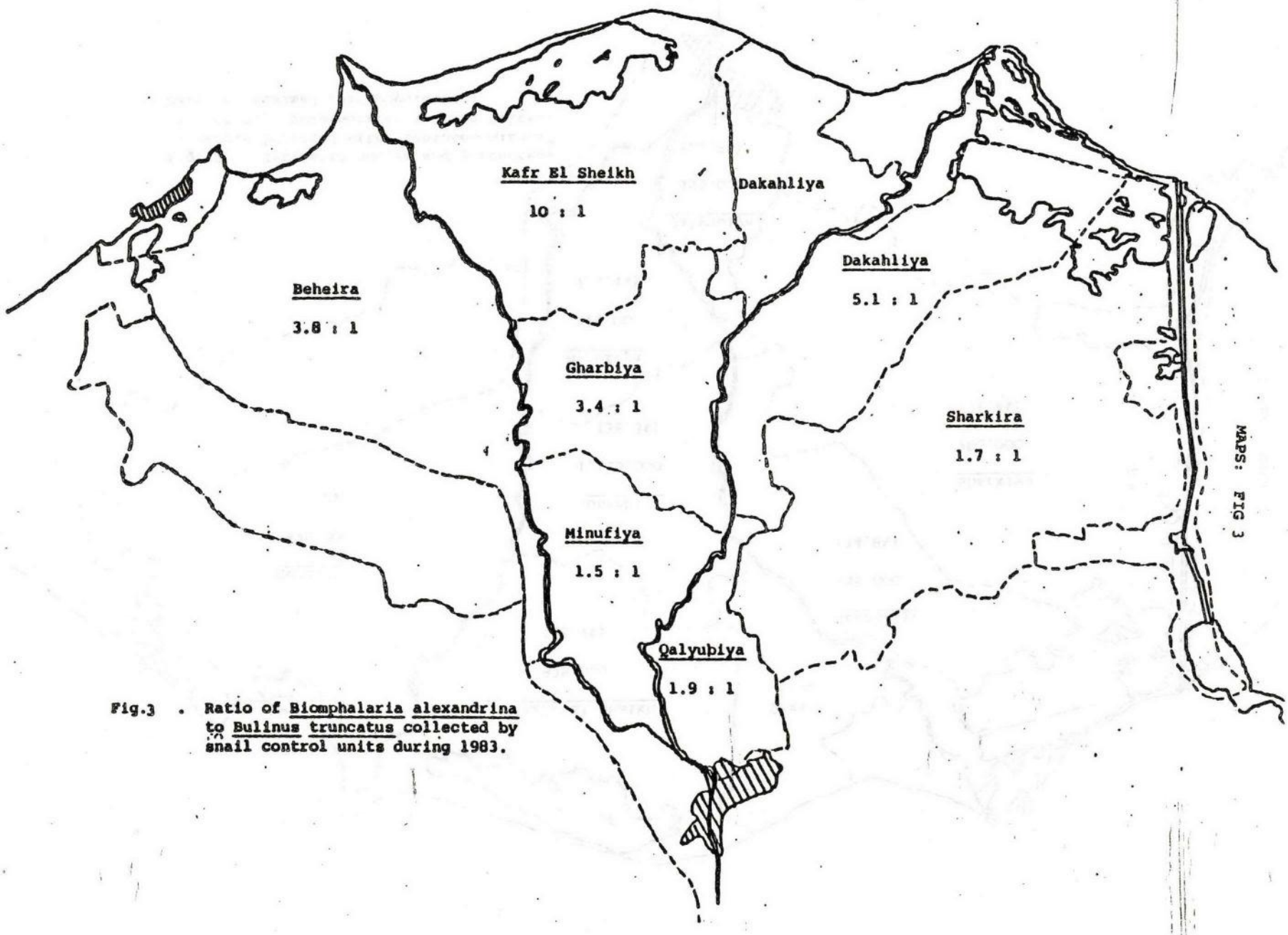


Fig.3 . Ratio of Biomphalaria alexandrina to Bulinus truncatus collected by snail control units during 1983.

5.7.2 Strategy of molluscicíding in the Nile Delta

It would be unscientific and prohibitively expensive to attempt full-scale area-wide molluscicíding with Bayluscide® (or any other molluscicíding) in the Nile Delta. Any further area-wide molluscicíding in the framework of a large-scale bilariziasis control project should be targeted to only those areas with high prevalence rates of infection. Canals should be emphasized more than drains, even though drains are extensive in the Delta. It is the opinion of this evaluator that only 15 - 20% of cercarial transmission in the Delta occurs in drains. Most transmission, as in Middle and Upper Egypt, occurs in primary and secondary canals. The criteria of human prevalence rates and other indicators which should determine which parts of the Delta should be molluscicided if a structured control project were to be in operation, cannot be stated precisely at this time. But with good delivery of praziquantel, which would be the key to controlling bilharziasis in the Delta, there would seem to be no need to apply Bayluscide® to any area on a large scale where the overall prevalence rate of S. mansoni is under about 40% It is recommended therefore, that in the Delta, selective area molluscicíding of whole areas (e.g., large sections of districts or canal networks) be carried out only if the overall prevalence rate of S. mansoni is around 40%; it is felt that this is a logical cut-off point whether to molluscicide or not. In areas where the overall prevalence rate of S. mansoni is less than 40%, but individual villages have higher rates of infection, these villages or groups of them could be selected for initial small-scale selective area molluscicíding and radius control.

Focal molluscicíding in foci where enough people are at risk would be attractive molluscicíding strategy in the Delta after some years of experience with selective area molluscicíding and radius control, and after sustained chemotherapy has reduced human prevalence rates to generally low levels in most areas.

5.7.3 Cercarial transmission seasons in the Delta

From reasearch done by Chu and Dawood, the most important months for transmission of S. mansoni cercariae in the Nile Delta are as follows (calculated from number of infected snails collected each month of the year and how many cercariae they shed per 24 hour period).

Monthly transmission potentials of S. mansoni in the Nile Delta* (From Chu and Dawood, Bulletin of the World Health Organization, 42 : 575-580, 1970).

January	Trace	July	21.9%
February	0	August	21.2%
March	0	September	10.6%
April	Trace	October	3.2%
May	3.5%	November	4.5%
June	34.6%	December	0.5%

* Percent of transmission expected each month in relation to the whole year.

One can conclude from the above figures, that the transmission season of S. mansoni in the Delta is mainly limited to the period of June to September. Therefore, when selective area and radius molluscicidings are carried out in the Delta, these figures should be kept in mind, and almost all the molluscicidings should be limited to the May - September period. If the above data are still representative for the Delta, future molluscicidings operations there could be confined to two applications a year - the first beginning in early May and the second beginning in mid-July.

5.8 ESTIMATED COST OF MOLLUSCICIDING IN THE NILE DELTA

5.8.1 Blanket molluscicidings

The following table is an estimate of the amount of Bayluscide[R] which would have to be used in the Nile Delta (7 governorates) if total blanket molluscicidings were to be the strategy of snail control, and that the applications were to be carried out 3 times a year - like the past strategy for snail control during the active intervention phases in the Middle and Upper Egypt projects. The figures were calculated as follows. First, using the conventional wisdom in Egypt that it requires 200 g of Bayluscide[R] (on average) to effectively treat 1 feddan 3 times a year; and then multiplying this by the total number of feddans under cultivation in each governorate in question (statistics provided by the Ministry of Health).

TABLE 5.11 Estimated Cost of Blanket Molluscididing

Governorate	Cultivated area in feddans	Amount of Bayluscide[R] needed for total coverage 3 times per year (kg)	Estimated total cost per year at present at a price of $18/kg (US$)
Minufiya	318643	63728	1,147,115
Gharbiya	405090	81018	1,458,324
Kafr El Sheikh	473000	94600	1,702,800
Beheira	718928	143786	2,588,141
Qalyubiya	198147	39629	713,329
Sharkiya	649462	129892	2,338,063
Dakahliya	610611	122122	2,198,200
Total	3373881	647775	12,145,972

5.8.2 Estimated cost of molluscicide in the Nile Delta if selective area molluscicide and/or radius control were to be the main strategy

If selective area molluscicide and radius control were to be the strategy of snail and transmission control in the Nile Delta in any future bilharzia control project, it is possible to make some crude estimates on how much molluscicide would be needed initially to treat the high transmission-high prevalence areas based on 2 molluscicide application a year.

Table 5.12 Estimated cost of limited molluscicide

Governorate	Amount of Bayluscide® estimated to achieve transmission control in areas of villages where the initial prevalence of S. mansoni was 40% or greater (metric tons)	Total annual cost of Bayluscide® based on this estimate (US$)
Minufiya	8	144,000
Gharbiya	20	660,000
Kafr El Sheikh	30	630,000
Beheira	40	720,000
Qalubiya	5	720,000
Sharkiya	33	594,000
Dakahliya	31	558,000
Total	167	3,006,000

It must be stressed that the above estimates are crude estimates, and are only intended to serve as a rough guide as to what might be needed for initial transmission control in the 7 Delta governorates.

CHAPTER 6

ECONOMIC AND COSTING ASPECTS

6.1 METHODOLOGY AND INFORMATION COLLECTION

The information was collected mainly from the General Department of Endemic Diseases Control of the Ministry of Health, and those governorates in which the Middle Egypt Schistosomiasis Control Program was implemented. The information collection was achieved working in close contact with the officials of the General Department, through frequent and deep discussions. At each step of the collection process the qualitative and quantitative aspects of information were verified by comparing the total figures from different sources. Although the existing information system is not well oriented for the costing approach, we did our best to obtain the information needed from official documents, to ensure its credibility, and to have the real situation of each cost item and its evolution during the project period.

6.1.2 Cost analysis techniques

Prices of certain cost items, like molluscicides, (Bayluscide^{R}), drugs (Bilarcil^{R} and Biltricide^{R}) and automobiles are given in foreign currencies. To calculate the cost of these elements in Egyptian currency we used the official exchange rates that are published in the economic journal of the Egyptian central bank. This methodology can be justified by the argument that if these items were bought using foreign loans, such loans will be repaid by the Egyptian government through the central bank, which will use the official rates of exchange.

Furthermore, the costs mentioned in our study are expressed according to current prices. If the information published in this study is used for planning for future projects, the prices expressed here must be deflated by a price index that is in accord with the nature of the cost item.

The calculation used for the project purposes of the depreciation of the fixed assets is based on the idea of a constant yearly rate of depreciation. The life expectancy of each fixed asset is determined according to the nature of the asset that was used, according to the specific type of schistosomiasis control project, and according to the conditions of the utilization of the asset in the Egyptian administrative environment. The rates of depreciation were calculated in frequent disucssions with the officials of the General Department of Endemic Diseases Control.

Cost information directly concerns specific control measures within a specific governorate and is considered a direct cost. Other cost information represents a cost item from which the two control activities benefit and is considered an indirect cost item distributed between the control activities and the governorates according to specific criteria. The criteria chosen to load the indirect costs are selected according to the nature of the cost item and its part in schistosomiasis control.

6.1.3 Cost analysis data-molluscicidiing

The quantities consumed in tonnes of Bayluscide® are given in Table 6.1. The cost of the consumed Bayluscide® is calculated first in Deutsche Marks (as given in Table 6.2), secondly in Egyptian pounds (as given in Table 6.3) according to the exchange rate in different years. The quantities consumed in tons of copper sulphate are similarly given in Table 6.4 and their cost is calculated directly in Egyptian pounds as shown in Table 6.5. The costs of both types of molluscicidiing are considered as direct costs of snail control activities in each governorate.

TABLE 6.1 DISTRIBUTION OF CONSUMED MOLLUSCICIDES (BAYLUSCIDE)

In Tonnes

Years/ Governorates	1977	1978	1979	1980	1981	1982	1983	1984	Total
Beni Suef	110.7	112.5	65	65	60	41	59	31	544.2
Minya	112.8	142.3	76.4	62	81	38	62	35	609.5
Assiut(North)	21.7	29	30	47.2	27	15	16	12	197.9
Total	245.2	283.8	171.4	174.2	168	94	137	7.8	1351.6

TABLE 6.2 COSTS OF CONSUMED MOLLUSCICIDES (BAYLUSCIDE) IN DEUTSCHE MARKS (1)

Years/ Governorates	1977	1978	1979	1980	1981	1982	1983	1984	Total
Beni Suef	3099600	3150000	2255500	2255500	2082000	1422700	2539360	1334240	18138900
Minya	3158400	3984400	2651080	2151400	2810700	1318600	2668480	1506400	20249460
Assiut (North)	607600	812000	1041000	1637840	936900	520500	688640	516480	6760960
Total	6865600	7946400	5947580	6044740	5829600	3361800	5896480	3357120	45149320

(1) - TI II 1978 The price of a kg of Bayluscide was equal to 28 D.M.

- From 1979 to 1982 the price of a kg of Bayluscide was 34.7 D.M

- For years 1983 to 1984 the price of kg of Bayluscide was 43.04 D.M.

TABLE 6.3 COSTS OF CONSUMED MOLLUSCICIDES (BAYLUSCIDE)
IN EGYPTIAN POUNDS

Years/ Governorates	1977	1978	1979	1980	1981	1982	1983	1984	Total
Beni Suef	569628.99	610888.95	854117.93	826237.5	693999.3	417797.2	706404.2	371161.6	5050236
Minya	580434.96	772706.65	1003917.1	788103.4	936900	387227.3	742323.1	419053.4	5630666
Assiut (North)	11161.69	157473.6	394208.3	599975.5	312300	152853.9	191567.3	143675.4	2064716
Total	1261725.64	1541069.19	2252243.3	2214316.4	1943200	95787.1	1640294.6	933890.3	12744618

TABLE 6.4 DISTRIBUTION OF THE CONSUMED MOLLUSCICIDES (COPPER SULPHATE) IN TONNES

Years/ Governorates	1977	1978	1979	1980	1981	1982	1983	1984	Total
Beni Suef	-	-	0.320	-	1.904	7.509	16.599	0.584	26.916
Minya	-	-	0.797	0.050	-	4.578	13.367	17.351	36.143
Assiut (North)	0.045	-	1.035	-	-	-	7.958	8.901	17.939
Total	0.045	-	2.152	0.050	1.904	12.087	37.924	26.836	80.998

TABLE 6.5 COSTS OF CONSUMED MOLLUSCICIDES (COPPER SULPHATE) IN EGYPTIAN POUNDS

Years/ Governorates	1977	1978	1979	1980	1981	1982	1983	1984	Total
Beni Suef	-	-	168.960	-	1005.312	3964.752	8764.272	308.352	14211.648
Minya	-	-	42-.816	26.400	-	2417.184	7057.776	9161.328	19083.504
Assiut (North)	23.625	-	546.48	-	-	-	4201.824	4699.728	9471.657
Total	23.625	-	1136.256	26.400	1005.312	6381.936	20023.872	14169.480	42766.809

6.1.4 Cost analysis data -personnel

To calculate the cost of those personnel who worked in snail control activities, the distribution of the staff and their average salary per month was obtained as shown in Table 6.6 and their yearly salaries are calculated also, as given in Table 6.7. Staff training, incentives and costs for staff working in snail control are indicated in Tables 6.8 and 6.9 respectively. The salaries and incentives per year of the staff of the General Department of Endemic Diseases Control are given in Table 6.10. They are considered an indirect cost item of snail control and chemotherapy control. They are also an indirect cost item with regard to a control activity within a given governorate. It is of great importance to explain in detail how and according to what criteria this cost item is distributed in control activities within the framework of governorates.

TABLE 6.6 DISTRIBUTION OF THE STAFF WORKING IN SNAIL CONTROL AND THEIR AVERAGE SALARY PER MONTH (IN EGYPTIAN POUNDS)

Staff by Category/ Governorates	Agricultural Engineer		Assistant Sanitarian		Auxiliary Laboratory Technicians		Clerks		Drivers		Workers	
	Number	Average Salary L.E.	Number	Average Salary L.E.	Number	Average Salary L.E.	Numberr	Average Salary L.E.	Number	Average Salary L.E.	Number	Average Salary L.E.
Beni Suef	9	68	80	76	12	60	12	62	16	70	130	48
Minya	27	67	110	60	18	58	17	55	13	68	179	54
Assiut (all the Governorate)	30	62	897	53	17	53	33	46	10	58	75	40

TABLE 6.7 SALARIES PER YEAR OF STAFF
WORKING IN SNAIL CONTROL
(IN EGYPTIAN POUNDS)

Staff by Category/ Governorate	Agriculture Engineer	Assistant Sanitarian	Auxiliary Laboratory Technicians	Clerks	Drivers	Workers	Total
Beni Suef	7344	72960	8640	8928	13440	74880	186192
Minya	21708	79200	12528	11220	10608	115992	251256
Assiut (North)	7812	19366	3784	6376	2436	12600	52374
Total	36864	171526	24952	26524	26484	203472	489822

TABLE 6.8 COST OF INCENTIVES PAID FOR LABOR IN SNAIL CONTROL IN EGYPTION POUNDS

Year/ Governorate	1982	1983	Total
Beni Suef	7000	10000	17000
Minya	9000	15000	24000
Assiut (North)	3500	5250	8750
Total	19500	30250	49750

TABLE 6.9 DISTRIBUTION OF TRAINING COSTS
FOR LABOUR IN SNAIL CONTROL IN EGYPTIAN POUNDS

Training Costs/ Governorate	Cost of Training Programme paid for Agriculture Engineers	Assistant Sanitarian	Costs of Transport for Trainees	Cost of Trainers	Total
Beni Suef	480	510	90	990	2070
Minya	760	1080	140	1840	3820
Assiut (North)	182	84	56	266	588
Total	1422	1674	286	3096	6478

TABLE 6.10: SALARIES AND INCENTIVES PER YEAR IN EGYPTIAN POUNDS OF THE GENERAL DEPARTMENT OF THE ENDEMIC DISEASES CONTROL

Section	Number of Workers	Net Salaries Per Year	Net Incentives Per Year	Total
Endemic Diseases Control	12	10594.32	11476.2	22070.52
Projects of Schistosomiasis Control	12	11820.36	8145.3	19965.66
Treatment of Endemic Diseases	13	12413.04	7994.22	20407.26
Snail Control Department	20	20785.5	12070.86	32856.36
Total	57	55613.22	39686.58	95299.8

The General Department of Endemic Diseases Control is divided into four sections; the Department of Endemic Diseases Control, the Department of National Projects of Schistosomiasis Control, the Department of Treatment of Endemic Diseases, and the Department of Snail Control. The apportionment of these expenses, on the one hand, among the governorate, and, on the other hand, the two schistosomiasis control activities (snail control and chemotherapy) posed serious problems of estimation. Instead, salaries and incentives of the four sections belonging to the General Department of Endemic Diseases Control are considered as a fixed expenditure, ie. independent of the allocation of other resources. The incentives and salaries of the Department of Snail Control are allocated directly to snail control. The salaries and incentives of the Section of Treatment of Endemic Diseases is allocated directly to the chemotherapy control activity. Following the allocation on an activity basis, the salaries and incentives of the Section of Snail Control and the Section of Treatement of Endemic Diseases will be distributed among governorates on the same basis as the salaries and incentives of the Section of National Projects of Schistosomiasis Control. According to the view of the officials, the salaries and incentives of the two latter departments will be distributed equally between the snail control activity and the chemotherapy control activities as each activity necessitates the same effort.

6.1.5 Allocation of central personnel costs

According to the view of the officials of the General Department of Endemic Diseases Control, their salaries will be distributed among governorates as 75% for governorates of south Egypt (where there are projects of chemotherapy mass treatment and area snail control) and 25% for governorates of the Delta (where there is focal treatment). This criterion will applied for three sections; the Section of the Endemic Diseases Control, the Section of Treatment of Endemic Diseases and the Section of Snail Control. For the Section of National Projects of Schistosomiasis Control, its salaries and incentives will be allocated entirely to projects in south Egypt where all the efforts of the staff of this section are devoted.

For the period from 1975 to 1979, the portion of central salary expenditure of the governorates of south Egypt will be allocated, as 4/5 for governorates of middle Egypt, Beni Suef, Minya and Assiut (North), and 1/5 for the governorate of Fayum. Next, the shares of the governorate of Middle Egypt will be distributed proportionally as 7:9:4 for Beni Suef, Minya and Assiut (North), respectively. The projects of the Schistosomiasis Control Project (during the period from 1975 to 1979) were limited in south Egypt to these three regions.

For the period from 1980 to 1984, the allocation of salaries between the governorates of south Egypt and governorates of the Delta will follow the same basis as for the period from 1975 to 1979, but the portion of south Egypt will be allocated proportionally as 20:5:28 for Middle Egypt governorates, Fayum governorate and Upper Egypt governorate, respectively, as the Schistosomiasis Control Project was implemented during this period in Upper Egypt governorates in addition to the already existing projects in Fayum governorate and Middle Egypt governorates. The share of Middle Egypt will be allocated proportionally among its governorates as 7:9:4 for Beni Suef, Minya and Assiut (North), respectively.

6.1.6 Allocation of incentive costs

Concerning the incentives, they are accounted only for the years 1982, 1983 and 1984 because no incentives had been paid before this period. The incentives are allocated only for regions where schistosomiasis control projects are applied and are proportionally distributed as 20:5:28 for Middle Egypt, Fayum and Upper Egypt, respectively. The share of middle Egypt governorates will be proportionally distributed as 7:9:4 for Beni Suef, Minya and Assiut (North), respectively. The results of the distribution of the overhead expenses of the General Department of Endemic Diseases Control are summarized in Tables 6.11 and 6.12. Table 6.11 illustrates the portion of salaries and incentives of snail control activities within each governorate from the overall salaries and incentives of the General Department of Endemic Diseases Control. Table 6.12 indicates similarly the portion of salaries and incentives that is allocated for chemotherapy control activities within each governorate.

TABLE 6.11 THE PORTION OF SALARIES AND INCENTIVES OF THE GENERAL DEPARTMENT OF ENDEMIC DISEASES CONTROL THAT IS ALLOCATED TO SNAIL CONTROL ACTIVITIES DURING THE PERIOD FROM 1975 to 1984

	SALARIES			INCENTIVES			
	From 1975 to 1979	From 1980 to 1985	Sub Total	From 1975 to 1981	From 1982 to 1984	Sub Total	Total
Beni Suef	35661	16821	52482	-	6906	6906	59388
Minya	45850	21627	67477	-	8879	8879	76356
Assiut (North)	20378	9612	29990	-	3946	3946	33936
Total	101889	48060	149949	-	19731	19731	169680

TABLE 6.12 THE PORTION OF SALARIES AND INCENTIVES OF THE GENERAL DEPARTMENT OF ENDEMIC DISEASES CONTROL THAT IS ALLOCATED TO CHEMOTHERAPY CONTROL ACTIVITIES DURING THE PERIOD FROM 1975 to 1984

	SALARIES			INCENTIVES			
	From 1975 to 1979	From 1980 to 1985	Sub Total	From 1975 to 1981	From 1982 to 1984	Sub Total	Total
Beni Suef	26870	12675	39545	-	5695	5695	45240
Minya	34547	16295	50842	-	7321	7321	58163
Assiut (North)	15354	7243	22597	-	3254	3254	25851
Total	76771	36213	112984	-	16270	16270	129254

6.1.7 Snail control equipment costs

Total depreciated snail control equipment costs for all three governorates for the whole project period were 51108.8 Egyptian pounds.

Costs of furniture and building depreciation for each governorate for buildings bought or constructed for snail control activities are shown in Tables 6.13 - 6.16. Table 6.17 shows the costs of technical formalities, rent, electricity, water and miscellaneous costs of governorate, district, centre and unit levels of snail control activities.

TABLE 6.13: COSTS OF FURNITURE
IN EGYPTIAN POUNDS

	Governorate Level	District Level	Centre Level	Unit Level	Total	Depreciation per year	Total Depreciation for all the Period of the Project
Beni Suef	15000	4800	4050	11750	35600	3560	28480
Minya	15000	5400	11250	21750	53400	5340	42720
Assiut (North)	5250	2400	1800	5500	14950	1495	11960
Total	35250	12600	17100	39000	103950	10395	83160

TABLE 6.14: INVESTMENT IN BUILDINGS IN BENI SUEF GOVERNORATE
IN EGYPTIAN POUNDS

	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
Value of Investment	10000	10000	20000	20000	-	-	-	-	50000
Value of Yearly Depreciation	200	200	400	400	-	-	-	-	1000
Cost of Depreciation during the period of the project	1600	1400	2400	2000	-	-	-	-	7400

Table 6.15: INVESTMENT IN BUILDINGS IN ASSIUT (NORTH) GOVERNORATE IN EGYPTIAN POUNDS

	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
Value of investment	-	30000	-	-	-	-	10000	-	40000
Value of Yearly Depreciation	-	600	-	-	-	-	200	-	-
Cost of Depreciation during the period of the project	-	11470	-	-	-	-	140	-	1610

TABLE 6.16: INVESTMENT IN BUILDINGS IN MINYA GOVERNORATE
IN EGYPTIAN POUNDS

	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
Value of Investment	40000	-	5000	-	-	-	-	-	45000
Value of Yearly Depreciation	800	-	100	-	-	-	-	-	900
Cost of Depreciation during the period of the Project	6400	-	600	-	-	-	-	-	7000

TABLE 6.17: GENERAL EXPENDITURE FOR SNAIL CONTROL ACTIVITIES IN EGYPTIAN POUNDS

	Governorate level				District Level				Centre Level				Unit Level				
	Cost of Technical Formalities	Rents Electricity Water	Other Expenditure	Sub-Total	Cost of Technical Formalities	Rents Electricity Water	Other Expenditure	Sub-Total	Cost of Technical Formalities	Rents Electricity Water	Other Expenditure	Sub-Total	Cost of Technical Formalities	Rents Electricity Water	Other Expenditure	Sub-Total	Total
Beni Suef	2400	4800	1600	8800	12800	38400	-	51200	7200	28800	-	36000	37600	48880	7520	34000	190000
Minya	2400	4800	1600	8800	14400	43200	-	57600	20000	80000	-	100000	69600	90480	13920	174000	340400
Assiut (North)	840	1680	560	3000	6400	19200	-	25600	3200	12800	-	16000	17600	22880	3250	44000	88680
Total	5640	11280	3760	20680	33600	100800	-	134400	30400	121600	-	152000	124800	162240	24960	312000	619080

6.1.8 Transport costs

For the cost of transport, the life expectancy of automobiles is estimated at ten years according to the common rates of depreciation and operational rates applied in Egypt. Following the Egyptian experience the life expectancy of motorcycles is calculated to be five years. Hence, to calculate the share of each governorate in the depreciation of motor vehicles, the yearly rate of depreciation is multiplied by the number of years since a motor vehicle was put in use. For motorcycles and bicycles their purchasing values are loaded completely to the period of the Middle Egypt project of Schistosomiasis Control.

The cost of transport is calculated separately for each governorate. To distribute these costs between snail control and chemotherapy control, the officials of the General Department of Endemic Diseases Control (MoH) estimate that 2/3 of motor vehicle use is devoted to snail control while 1/3 of motor vehicle use is devoted to chemotherapy control. For motorcycles, the officials estimate that half of their capacity is devoted to snail control and the other half to chemotherapy control. They estimate that all bicycle use is devoted to snail control.

Summary data for transport costs are given in Table 6.18 for snail control cost and Table 6.19 for chemotherapy costs.

TABLE 6.18: COSTS OF TRANSPORT (FOR ALL THE PROJECT PERIOD) FOR SNAIL CONTROL

IN EGYPTIAN POUNDS

	MOTOR CARS			MOTORCYCLES				
	Depreciation	Operational Expenditure	Sub-Total	Depreciation	Operational Expenditure	Sub-Total	Costs of Bicycles	Total Costs of Transport for Snail Control
Beni Suef	30074	37333	67407	11055	18000	29055	13800	110262
Minya	29439	41067	70506	10075	50000	60075	18814	149395
Assiut (North)	22040	17547	39587	7315	8000	15315	4140	59042
Total	81553	95947	177500	28445	76000	104445	36754	318699

TABLE 6.19: COSTS OF TRANSPORT FOR CHEMOTHERAPY (FOR ALL THE PROJECT PERIOD)

IN EGYPTIAN POUNDS

	MOTOR CARS			MOTORCYCLES			
	Depreciation	Operational Expenditure	Sub-Total	Depreciation	Operational Expenditure	Sub-Total	Total Costs of Transport for Chemotherapy
Beni Suef	15037	18667	33704	11055	18000	29055	62759
Minya	14720	20533	35253	10075	50000	60075	95328
Assiut (North)	11020	8773	19793	7315	8000	15315	35108
Total	40777	47973	88750	28445	76000	104445	193195

The preceding presentation indicates in fact all types of direct and indirect costs devoted to snail control activities and the indirect items of costs devoted to the chemotherapy control activities in terms of cost of transport and the portion of salaries and incentives of staff of General Department for Endemic Diseases Control.

The direct costs devoted to the chemotherapy control activities are the relevant salaries and operational expenditures of rural health units, endemic diseases hospitals and general hospitals. These types of expenditures are shown in Table 6.20, where column 4 represents the percentage by which each type of health unit contributes to schistosomiasis control in terms of laboratory examinations and drug administration. Table 6.21 gives these costs items for the entire project period and for each governorate.

Summary costs of metrifonate (Bilarcil®) used in the project are given in Table 6.22, and praziquantel (Biltricide®) in Table 6.23.

TABLE 6.20: YEARLY EXPENDITURES OF HEALTH UNITS AND HOSPITALS FOR PURPOSES OF TREATMENT OF SCHISTOSOMIASIS

IN EGYPTIAN POUNDS

Type of Expenditure / Type of Health Unit	Salaries	Operational Expenditure	Total	Percentage Devoted to Schistosomiasis Control (Treatment)	The Part of total expen- expenditure devoted to Schistosomiasis (Treatment)
A Rural Health Unit	4000	3400	7400	20%	1480
An Endemic Hospital	9000	15000	24000	70%	16800
A General Hospital			40000	5%	2000

TABLE 6.21 SALARIES AND OPERATIONAL EXPENDITURE SPENT ON THE TREATMENT OF SCHISTOSOMIASIS IN HEALTH UNITS DURING THE PERIOD OF THE PROJECT IN MIDDLE EGYPT

IN EGYPTIAN POUNDS

TYPE OF HEALTH UNITS GOVERNORATES	RURAL HEALTH UNITS	ENDEMIC HOSPITALS	GENERAL HOSPITALS	TOTAL
BENI SUEF	1302400	940800	16000	2259200
MINYA	2214080	1209600	16000	3439680
ASSIUT (NORTH)	592000	537600	5600	1135200
TOTAL	4108480	2688000	37600	6834080

TABLE 6.22: COSTS OF THE CONSUMED BILARCIL^{R}
IN EGYPTIAN POUNDS

YEARS / GOVERNORATES	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
BENI SUEF		45319.283	49205.645	25498.55	27970.56	27639.75	8637.551	10365.061	194636.4
MINYA	82891.719	37768.452	38934.600	56238.363	35063.996	5788.147	28638.281	8322.760	293646.313
ASSIUT (NORTH)	9574.678	17153.374	15152.594	23816.739	6444	9594.052	15470.814	14223.17	111429.421
TOTAL		192707.901	103292.639	105553.652	69478.556	43021.949	52746.646	32910.991	599712.134

TABLE 6.23: COSTS OF THE CONSUMED BILTRICIDE[R] IN EGYPTIAN POUNDS

YEARS / GOVERNORATES	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
BENI SUEF	-	-	-	-	2215.21	4430.412	55380.16	-	62025.782
MINYA	-	-	-	-	-	-	222074.43	-	222074.430
ASSIUT (NORTH)	-	-	-	-	-	-	19576.89	-	19576.890
TOTAL	-	-	-	-	2215.21	4430.412	297031.48	-	303677.102

6.2 ANALYSIS OF COSTS AND BENEFITS

So far, this chapter reviews the cost of the control operation and analyzes the cost structure. The cost analysis focuses on Middle Egypt, where the program has been in existence for the longest period. The total cost of the Middle Egypt Schistosomiasis Control Project was more than 26 million Egyptian pounds from 1976 to 1984. Snail control accounted for 69.1% of total cost and chemotherapy accounted for 30.9%. Distribution of cost showed 42.6% for personnel, 49% for molluscicide, 3.5% for drugs and 4.9% for transport and other miscellaneous items.

6.2.1 Structure of Cost

Snail control activities accounted for 69.1% of total cost. The breakdown of the cost for snail control activities was about 23% for personnel, about 71% for molluscicides and 6% for other cost items, including equipment, transport, furniture, building depreciation and general expenditure.

Chemotherapy activities were 30.9% of total cost. The breakdown of cost for chemotherapy control was about 86.4% for personnel, 11.2% for drugs, and 2.4% for transport and miscellaneous costs.

The cost of the project by governorate from 1976 to 1984 was as follows: 36.8% for Beni Suef, 47.7% for Minya, and 15.5% for Assiut (North). The cost of snail control by governorate was 38.7% for Beni Suef governorate, 46.3% for Minya and 15% for Assiut (North). The cost of chemotherapy control activities at the governorate level was 32.6% for Beni Suef, 51% for Minya and 16.4% for Assiut (North).

For Beni Suef governorate, from 1977 to 1984, the total cost was more than 9.5 million Egyptian pounds, divided as follows: 27.3% for chemotherapy control activities and 72.7% for snail control activities. For chemotherapy control activities, 87.8% went for personnel, 9.8% for drugs and 2.4% for transport. Of the cost of snail control, 22.5% went for personnel, 72.6% for molluscicides and about 4.9% for the other cost items.

For Minya governorate, of total cost, 67% went for snail control activities and 33% for chemotherapy control activities. For chemotherapy control activities in Minya, 85% went for personnel, 12.6% for drugs and 2.4% for transport. Of the cost of snail control activities, 25.4% went for personnel, 67.8% for molluscicides and 6.8% for other cost items.

For Assiut (North), chemotherapy control activities absorbed 32.9% of the total cost, while snail control activities absorbed 67.1%. Of chemotherapy control activity cost, 87.5% went for personnel, 9.9% for drugs and 2.6% for transport and miscellaneous costs. Of the cost of snail control activities, 17.1% went for personnel, 76.6% for molluscicides and about 6.3% for other cost items.

For the Middle Egypt Schistosomiasis Control Project as a whole and at the level of each governorate, the cost of snail control is far more significant than that of chemotherapy control. The cost of chemotherapy for the entire project is less than one half that of snail control. The structure of cost of snail control indicates that molluscicides are the largest cost component, while for chemotherapy the cost of personnel is the largest component.

6.2.2 Analysis of benefit

The concept of benefits gained from snail control activities is completely different than the concept of benefits gained from chemotherapy control activities. The two are analyzed separately below.

6.2.3 Benefit of snail control

The benefits gained from molluscicide derive from the reduction in total length of snail infested canals and the reduction in the density of infected snails. In addition, benefits can be gained from efforts to reduce the level of infection in the human population by reducing human contact with water through changing human behaviour patterns.

The results of applying the snail control measures in Middle Egypt given in Chapter 5 indicate that the molluscicide efforts led to a reasonable reduction in the percentage of number of infested canals at the end of 1984 as compared to the percentage existing in 1977. The results are very good in Beni Suef (from 11% to 0.3%), moderate in Assiut (North) (from 10.2% to 3.5%), and weak in Minya (from 14.4% to 8.3%). The scale of difference between the governorates can also be observed in the percentage length of infested canals in 1984 as compared in 1977.

If we use the reduction in the density of infected snails per 100 dips, as a measure of the success of snail control activities performed during the project, we find that the percentage in Beni Suef governorate had dropped by the end of 1984 to one third of its 1977 level, and, for the governorate of Minya, the percentage in 1984 had dropped to one half of its 1977 level. For Assiut (North), however, the density of snails per 100 dips increased at the end of 1984 as compared with any previous year since the beginning of the program. The increase for Assiut (North) is reflected also in the percentage of infected canals and the percentage of length of infected canals.

In 1983 the density of infected snails per 100 dips increased in all the governorates after having experienced a reasonable decline in the years before 1983. Unfortunately, the status of infection in 1984 (as measured by the density of snails per 100 dips) maintained about the same level as in 1983. This situation was created by a shortage of molluscicides in 1982. It is worth mentioning that, when the problem of molluscicide supply was solved in 1983, snail densities remained the same in 1984 as in 1983. The reason is the existence of fish farms, which could not

be molluscicided because the fish farms form a continuous part of the other water ways. Furthermore, the results of the microscopic examination of Bulinus snails indicate an increase in percentage of infected snails in years 1983 and 1984.

The interruption of molluscicide in 1982 and incomplete spraying in 1984 make it difficult to use the evolution of the percentage of infected snails as an indicator for the gains from snail control activities. The methodological solution for this problem will be discussed in the section below on the cost/benefit interrelationship.

6.2.4 Benefit of chemotherapy control

The evaluation of the chemotherapy control activities was carried out at four different levels. The first level was through data gathered by sampling surveys in villages in each governorate. The sample unit was the family in order to obtain a representative sample of the population by age and sex, in addition to the other, demographic characteristics; results are presented in Chapter 4 of this report, and show a reduction in prevalence in all governorates.

The second level of evaluation was the records of individual out patients of rural health units and centers. Chapter 4 shows a good reduction in rates of prevalence among patients in all governorates at the end of 1984 as compared to the prevalence of infection at the beginning of the project period.

The third level of evaluation was the examination of school children. Since the 1979/80 school year, school children have been examined twice during the school year, once in October and once in March. Chapter 4 illustrates the results obtained. The prominent observation upon these results is that in October the rate of prevalence is normally high and in March, due to chemotherapeutic intervention, the rate of prevalence decreases. The pattern is always repeated, which indicates that the school children are reinfected in summer as a result of their contact with water.

The fourth level of evaluation of the chemotherapy control activities is the yearly survey of a fixed sample "cohort" at index villages. Chapter 4 contains in detail the results obtained from this evaluation. The results confirm that prevalence shows a reasonable and rapid reduction in the first two years of the project, then a very slow reduction in prevalence in the following years.

6.3 THE COST/BENEFIT RELATIONSHIP

6.3.1 Cost/Benefit analysis of snail control activities

The preceding discussion of benefit raises the problem of measuring the gains from snail control activities. The problem is due to, on the one hand, the fluctuation in the density of snails

per 100 dips and, on the other hand, that the percentage of infected snails does not display a regular evolution on which one can base an evaluation.

However, for purposes of cost/benefit evaluation, we have constructed an indicator to measure the benefit from snail control activities. This measure is based on the density of infected snails per 100 dips. In simple terms, we consider the increase in the density of infected snails per 100 dips from one year to another as a negative result for molluscicide efforts. Hence, an increase in the density of infected snails per 100 dips is indicated by a negative sign. At the same time, we consider a decrease in the density of infected snails per 100 dips from one year to another as a positive result of molluscicide efforts. A decrease in the density of infected snails per 100 dips is then indicated by a positive sign. The variation from one year to another in the density of infected snails per 100 dips is calculated for each governorate and the values are summed, taking into account the sign of each value. Table 6.24 indicates for each governorate the results obtained from the application of this methodology. The results in Table 6.24 indicate that for the governorates of Beni Suef and Minya the molluscicide efforts achieved a success that is estimated at +2.2 for Beni Suef and +1.3 for Minya, while for Assiut (North) the ultimate achievement is negative and estimated at -0.2. However, although the ultimate achievement for Assiut (North) is negative, this does not mean a complete failure. The molluscicide efforts in this governorate have, in general, had a definite effect in reducing the density of infected snails, which has consequently reduced the rate of infection in the human population.

TABLE 6:24 ANNUAL VARIATION IN INFECTED SNAIL DENSITY PER 100 DIPS, MIDDLE EGYPT, 1977 - 1984

GOVERNORATES VARIATION IN DENSITY OF INFECTED SNAILS PER 100 DIPS FROM YEAR TO YEAR	BENI SUEF	MINYA	ASSIUT (NORTH)
1977 - 1978	0	+1.4	-1.0
1978 - 1979	+2.5	+0.6	+2.5
1979 - 1980	0	-0.6	-1.8
1980 - 1981	-0.15	+0.24	-0.5
1981 - 1982	+0.38	-0.04	+2.2
1982 - 1983	-0.53	-0.2	-0.9
1983 - 1984	0	-0.1	-0.7
TOTAL SUM (ULTIMATE ACHIEVEMENT)	+2.2	+1.3	-0.2

Comparing the cost of snail control activities (over the project period) to the ultimate results obtained from these activities, we find that:

- for Beni Suef governorate a reduction of 1% in the density of infected snails per 100 dips costs about 3,172,232 Egyptian pounds.
- for Minya governorate, a reduction of 1% in the density of infected snails per 100 dips costs about 6,410,428 Egyptian pounds.
- For Assiut (North) the measure cannot be calculated because of the negative result.

6.3.2 Cost/Benefit analysis for chemotherapy control

Our analysis of the cost/benefit of chemotherapy control activities is based mainly on a comparison of the overall cost of the activities with the difference between the rate of prevalence at the end of the project and rate at the beginning. Data on prevalance is available through 1983, so our analysis covers the period through this year. Our analysis will also consider the rates of prevalence obtained from the epidemiological evaluation of individuals treated in health units and centers. This is done because the cost of chemotherapy control activities that we have been estimating is of a comprehensive nature. That is, the cost does not concern a specific category of the population but covers infected individuals without distinguishing between age, sex, or any socioeconomic class. So we consider that the figures of prevalence obtained for families, school children or the fixed cohort are not available to be compared with cost.

Accepting the above, we can conclude that:

- for Beni Suef governorate, a reduction in rate of prevalence by 1% cost 186,089 Egyptian pounds.
- for Minya governorate, a reduction in rate of prevalence by 1% cost 190,226 Egyptian pounds.
- for Assiut (North), a reduction in rate of prevalence by 1% cost 221,194 Egyptian pounds.

The difference among governorates in the cost of reducing the rate of prevalence by 1% can be attributed to many factors.

- differences in management efficiency
- differences of number of health units and centers in each governorate
- sampling errors affecting the calculations of rates of prevalence.

6.4 RECOMMENDATIONS

To conclude our study we can say that our measure of benefits from the application of chemotherapy control is based mainly on the reduction in prevalence without extending the analysis to cover the economic impact of such reductions. Conceptually, the economic impact of schistosomiasis chemotherapy control measures could take into account the future expenditure for treating the pathological implications of the disease that could have been saved as a result of reducing the level of infection. This expenditure, considered as an indirect cost of disease control at present, requires a more detailed study. Also, the reduction in levels of schistosomiasis infection in the human population could save the resources and capacity of health units and centers which could then deliver services for other diseases. This is the health opportunity cost that ought to be studied more deeply. The economic impact of the disease in rural areas of Egypt ought to be given serious study.

The influence of health education on human contact with water and the stimulation of community participation, in addition to molluscicide efforts, are also of great importance.

Finally, a real evaluation of the existing administrative, financial and logistic information system is seriously needed to design a new one that can be recommended to future disease control projects.

CHAPTER 7

INSTITUTIONAL ORGANIZATION AND MANAGEMENT

7.1 ORGANIZATION OF CENTRAL MINISTRY OF HEALTH

This analysis of the central Ministry of Health indicates the organization of the central government health activities. The Minister of Health is appointed by the President and works in coordination with the board of health composed of distinguished health specialists.

The First Undersecretary of Health, a top civil servant, is administratively in charge of 10 so-called central administrations, each directed by either an undersecretary or a director-general.

The units are:

- preventive medicine
- basic health care and family health
- curative care
- complementary medical services
  - laboratory
  - nursing
  - social medical services
  - radiology services
- administrative development
  - training
  - health education
  - research
  - mobilization of manpower in emergencies
- dentistry
- pharmaceutical affairs
- development
- supplies
- ministerial secretarial

Directly under the minister's command is the Ministry Office Affairs section. This unit has the following departments: communication, legal affairs, complaints, public relations, medical bureaux abroad, information, follow-up and supervision, governorate management affairs, planning, and specialized institutions.

The ministry is centrally in charge of all public health activities in Egypt. The execution of the orders and policies throughout the country are with the health directorates in the governorates.

7.2 ORGANIZATION OF GOVERNORATE HEALTH DIRECTORATE

The Director-General (DG), a senior civil servant and physician, either in the rank of Undersecretary or Director General, is in charge of the health department of the governorate. He reports directly to the Governor (who, in turn, is appointed by and represents the President) as well as to the MOH in Cairo. The DG is in charge of all matters concerned with health in the governorate, overseeing several departments, each headed by a medical director. These departments include:

- preventive medicine, including epidemic diseases;
- primary health care, including endemic diseases;
- curative medicine;
- dentistry;
- pharmaceutical affairs;
- supplies and logistics;
- school health.

In addition, the DG is in overall charge of these sections:

- legal affairs;
- finance, administration, and supervision;
- planning;
- training;
- paramedical training schools;
- public relations;
- complaints;
- health councils;
- secretariat.

The DG is appointed by the Ministry of Health in collaboration with the Governor.

7.3 ORGANIZATION OF BILHARZIA CONTROL

The Ministry of Health has the overall responsibility for the bilharzia control program in Egypt. The Endemic Diseases Control Department (EDCD), with its able director, Dr. Saleh El Hak, is responsible for the planning, timing, supply, logistics, central supervision, central data collection, and evaluation of all MOH bilharzia work in Egypt. There are three main sections or departments in the EDCD: epidemiology and chemotherapy, snail surveys and molluscicide, and administration and supervision. Each of these departments is headed by a specialist who is supported by full-time back-up staff. The Director General is supported by a consultative committee composed of experts in schistosomiasis in Egypt.

ORGANOGRAM OF THE ENDEMIC DISEASES CONTROL DEPARTMENT

Supreme Committee	Minister of Health (Dr. Sabri Zaki)	
Consultative committee	Undersecretary for Endemic Diseases Control (Dr. (Mrs.) Alia Ayoub	
	Director-General, Endemic Diseases Control Department. Executive Director of all Bilharzia Control Projects (Dr. Saleh El Hak)	
Snail Control (Eng. Mustapha (Ibrahim)	Project Administration Dr. Mahmoud Mustapha	Chemotherapy Evaluation Endemic Diseases Hospitals (Dr. Samir Nassif)

PROJECTS: Lake Nasser, Upper Egypt, Middle Egypt, Fayoum, Giza, Canal Zone, West Nubaria, Abu El Matamir (UNICEF)

At the governorate, district, and local level, the percentage of work time devoted to full-time bilharzia control work is shown below.

Governorate Level	Director-General/Undersecretary	10 - 20%
	Chief Engineer, Snail Control	100%
	Executive Director, Endemic Diseases	- 50%
District Level	District Health Officer	10 - 20%
	Chief Engineer, Snail Control	100%
Rural Health Unit Level	Physician in charge	20%
	Assistant Lab Technician	100%
	Fully-trained Lab Technician (in a hospital, etc.)	80%

7.3.1 Governorate Level

The Executive Director is to supervise all bilharzia control activities and coordinate the snail control work, (similar to the organization in other ministries: Agriculture, Land Reclamation, Education, Religious Affairs, Communication, etc.), through the local committee for bilharzia control. Due to staff shortage and the long distances involved in travelling to all parts of the governorate, it is not possible to supervise adequately the work at governorate and district level.

Travel time and distances to bilharzia-control-areas from Cairo (especially Middle and Upper Egypt) are considerable, and this cuts short the actual time available for field supervision. The recent introduction of the 5 day work week for all government employees will further shorten time for supervision.

7.4 PROCUREMENT AND LOGISTICS

The efficient execution of procurement and distribution by the EDCD has certainly contributed to the success of the Bilhazia Control Project in Middle Egypt.

For procurement of drugs:

- EDCD calculates the drug needs.
- EDCD transmits order to the Egyptian Organization for the Procurement of Drugs and Chemicals (EOPD). This is an affiliate of the MOH.
- In the case of the presently-used schistosomal drugs (since there is only one supplier in the world), the EOPD places orders directly and without international tender. However, prices are checked by EOPD and EDCD superiors before a definitive order is executed.

- Goods arrive by boat in Alexandria and are then trucked to the Cairo EOPD store.
- EOPD delivers goods to the EDCD store.
- EDCD distributes the drugs to governorate by truck.
- Governorate then distributes drugs to districts by truck.

For procurement of molluscicides:

- Quantity needed is calculated by EDCD.
- EDCD requests purchase by Department of Medical Supplies (DMS).
- DMS calls for international tender using the services of the Egyptian Embassies abroad.
- Offers are collected and evaluated by DMS.
- Evaluation is checked and final decision on the supplies is made through an interdepartmental committee in which the EDCD is represented.
- Decision to supply is approved by Minister.
- Order by DMS is then made.
- Goods arrive in Alexandria by ship and are directly trucked with private carriers to the stores in the various governorates, the transport charges paid by the MOH.
- Governorate store distributes molluscicide according to district needs and mollusciciding schedules.

7.5 TRANSPORT

The transport fleet is well controlled, mileage books are kept for each motor vehicle. The life expectancy for cars and trucks is 10 years; for motorcycles, 5 years.

Below is a summary of vehicles known to be in use in the 3 governorates of Middle Egypt (EDCD data).

Governorate	Total cars/trucks	Motorcycles	Bicycles
Beni Suef	24	8	?
Minya	23	13	?
Assiut (North)	18	18	?
Total	66	39	277*

* Overall estimate for the whole of Middle Egypt

7.6 PERSONNEL MANAGEMENT

In Egypt, all university and secondary technical school graduates are guaranteed employment by the government. The Ministry of Health regularly informs the relevant ministry for providing personnel about its needs, and sends names of candidates to the governorates.

- Specialist selection: replacement for retirees is usually done by looking at potentially suitable candidates in the different departments in the MOH. It is not customary to go for public advertising to fill a specialist vacancy.
- Junior staff, after a period of working in a department, may be sent for further study (special postgraduate courses) in Egypt or abroad if possessing the required competence.
- Firing (sacking) is not possible.
- Transfers are possible.
- Promotion is by seniority or merit.

The control program in the field is executed, supervised and reported by the health directorate of each governorate participating in the control activities. The overall responsibility for bilharzia control in the governorate rests with the respective director of health services - the Director-General or Undersecretary. The executive director in charge of endemic diseases is directly overseeing the control activities. He is assisted by specially-trained staff: snail control engineers in the Governorate Inspectorate of Snail Control, and the Senior Laboratory Technician for the governorate.

The second level of field organization is on a district by district level. Physicians are in charge and one physician per district is the district medical officer. He supervises the execution of the control program in the district health establishments - rural health units and centres, village hospitals, and endemic disease hospitals. In each district there is also a District Inspectorate of Snail Control, with an agricultural engineer in charge to direct all day to day snail control activities.

The rural health unit is the core of the local level of organization. Each unit or centre (if larger) is usually headed by a young physician (male or female). In bilharzia-related work, his or her job is to ensure adequate examination of urines and stools for bilharzia and treatment of all positive cases as soon as examination results are received. Most regular attenders for such screening and treatment are outpatients from the village or villages which the unit serves. School children are mainly examined in mass school surveys twice a year. The RHU is the basic unit for primary health, and is involved in many kinds of preventive and curative health activities. Family planning, vaccination programs, oral rehydration and health education are especially emphasized in these units.

The working time of the different senior health officials at the EDCD who are involved exclusively in bilharzia control work is as follows (work expressed as a percentage of the total time worked in the EDCD).

Ministry of Health, Cairo	Director-General, Endemic Diseases	100%
	Chief Engineer, Snail Control	100%
	Projects Administrator and Supervisor	100%
	Epidemiologist; Chief, Chemotherapy	80%

7.6.1 Summary of personnel

Statistics from the Ministry of Health.

Department of Endemic Diseases, Cairo

4 physicians
6 agricultural engineers
4 administrators
16 clerks
8 technicians
15 paramedical staff
3 drivers

Health Directorate - governorate level (average figures)

10 physicians
25 administrators
50 clerks
40 paramedical staff

Health Directorate - district level (average figures)

1 physician
5 technicians
5 clerks
15 paramedical staff

Rural Health Unit (average figures)

1-3 physicians
18 paramedicals (probably an overestimate)
2 clerks (varies greatly between health units)

Snail control personnel:

Governorate Inspectorate of Snail Control (average figures)

2 agricultural engineers
2 technicians
5 clerks
2 paramedics
2 drivers

District Inspectorate of Snail Control (average figures)

1 agricultural engineer (minimum)
2 technicians
1 clerk
1 paramedical (minimum)
1 driver

Snail Control Unit (village level) (average figures)

1 technician
2 paramedicals

7.7 RECOMMENDATIONS

7.7.1 Training

i) All levels of staff except the most junior should be exposed to training on management with particular emphasis on the cost factor involved in all health projects.

ii) Professional medical staff should be better prepared for rural work by the universities, with special emphasis on practical matters such as: microscopy, management of personnel, guidance of personnel, supervision, practical laboratory work, collection of useful epidemiological data based on simple, reliable procedures.

iii) Training of supervisors, both medical and technical must be institutionalized by means of refresher courses with formal lectures, practical seminars and regular examinations to assess the knowledge and stimulate learning. Successful passage of exams and efficient work should be considered the basis for future promotion rather than seniority.

7.7.2 Establishment

i) The staff complement at the MOH level should be increased. It is recommended that one or two additional full-time posts for additional professional supervisory staff be established within the directorate of endemic diseases.

ii) The persons to be selected for this post should be experienced physicians with an extensive field background. The applicants must be prepared to spend a considerable time away in the field. The work is to be carried out under the direction and guidance of the Director-General, as is being done in the section of projects administration and supervision, but with a link to the epidemiologist.

iii) The district medical officer positions should, whenever possible, be converted into full-time positions, with adequate remuneration in order to stimulate active, full-time field supervision.

iv) The doctors at the rural level should be made to stay for a minimum of 3 years in the field before they are allowed to continue their clinical specializations. An extended period of rural service should, if certified to be satisfactory, give the doctor additional credits if she/he intends to pursue specialist postgraduate training.

v) Each rural health unit should have a laboratory technician.

7.7.3 Transport

- The number of motorcycles for the snail-control-centre supervisors should be increased - one per centre and one per district inspectorate.

CHAPTER 8

INFORMATION, EDUCATION AND COMMUNICATION ASPECTS

8.1 INTRODUCTION

The following aspects have been covered in the report on health education and information:

i) Executive summary on findings, conclusions and recommendations.

ii) Findings and recommendations - a more detailed discussion on what has been found and some proposals with regard to:

- Strategy and approaches
- Manpower, equipment and material.

iii) Major target groups and specific activities in health education on bilharzia.

a) For groups which support the transmission of information about bilharzia, (medical staff, snail control units, health education teachers).

b) For major at-risk groups in the general population.

iv) The role of television in bilharzia.

v) The evaluation of information and health education activities in bilharzia.

vi) Cost estimates for information activities.

8.1.1 Summary : Findings

i) Due to the wide variety in time spent, availability of material, and access to mass media, no minimum impact can be measured on a country wide basis.

ii) There seems to have been a tendency to overburden messages thereby making them boring or difficult to absorb.

iii) Few attempts seem to have been made to create an understanding that some water-contact points are now more dangerous than others.

iv) The overall strategy on health education seems to be to increase information activity so that it reaches the highest intensity in the maintenance phase. In order to achieve sufficient impact when entering the maintenance phase, health education on bilharzia has to start much earlier than at present.

v) Transmission places are not used for communication purposes.

vi) The preparatory phase has not played any significant role in the health education strategy and few attempts have been made to use this phase to prepare the ground for future information and community participation aiming to reduce bilharzia.

vii) Frequently recurring communication opportunities on bilharzia, for instance when school children are called to be examined and treated, are not sufficiently used for communication on bilharzia.

viii) No examples have been found where different project activities are used as or turned into communication opportunities.

ix) Many attempts have been made to use radio to communicate messages on bilharzia, but evidence shows that in some geographical areas, target audiences have difficulties to remember ever having heard a radio program on bilharzia.

x) School teachers have not been given sufficient advice on how they can contribute to reductions in prevalence rates.

xi) Monthly figures on changes in prevalence rates are not used for monitoring health education activities on bilharzia.

xii) Since the health staff and health education staff have many subjects to cover, only a very small proportion of time is assigned to bilharzia, which to some extent may be due to the perceived unimportance. Also many nurses seem to think that informing people about bilharzia is purely the duty of laboratory technicians.

xiii) In places where films are available they are often in bad physical condition and only available in single copies.

8.1.2 Summary: Conclusions

Due to lack of data indicating how knowledge about bilharzia and its prevention have changed over the project period, it is difficult to draw any well-founded conclusions on the effect of the health education activities carried out. It seems however, that there is a high general awareness among the public and schoolchildren of bilharzia, on what causes the infection and on transmission. In spite of this knowledge, wrong behaviour is still practised and when entering the maintenance phase evidence from field observations seems to suggest that health education activities have had a rather insignificant impact on attitudes and behaviour; the major reduction in prevalence rates achieved can mainly be attributed to chemotherapy and snail control activities.

Many reasons may be identified for the lack of obvious impact on bilharzia through health education and information activities, but the most important ones seem to be:

i) There is a lack of perceived importance of bilharzia in the minds of many people.

ii) The content of messages used has often been of such a nature that it has been almost impossible to follow; for instance:

   a) Schoolchildren will go swimming during summer, in spite of contrary advice.

   b) Women will use canals for washing until alternatives are provided which serve the same social functions.

   c) Occupational groups such as farmers and fishermen have to be regularly exposed to water.

iii) Health education activities such as lectures, seminars and film-shows are often carried out at random, and not targetted on the basis of which villages should be given special attention due to high prevalence rates.

iv) Even in places where health staff are taking their responsibilities in health education seriously, there is a genuine lack of support material on bilharzia.

v) Mass media, particularly radio and TV, have not been used in any systematic way.

8.1.3 Summary: Recommendations

i) Produce a special campaign where television and radio commercials are used, when messages are reinforced through different types of support material.

ii) Make more systematic use of frequently occurring activities on bilharzia, for communication purposes.

iii) Make messages and communication efforts more selective and concentrate on the major target groups, school children, pregnant women and women in the reproductive age, high risk occupational groups and teachers.

iv) Change the content of messages into a style which may increase the chance to break the transmission cycle.

v) Stimulate health education staff to concentrate their work in high risk areas and in villages with high prevalence rates.

vi) Review the availability of films on bilharzia and the quality of copies now being used, and where found necessary reprodùce the one used for schoolchildren in sufficient numbers.

vii) Produce a film or videocassette to be used early in the preparatory phase of any future programmes or programme extensions.

viii) Include in the health education and information activities on bilharzia evaluation mechanisms to monitor future activities.

8.2 FINDINGS AND RECOMMENDATIONS

8.2.1 Strategy and communication approach

Obviously most people, including schoolchildren, know about the relation between water contact behaviour and the transmission of bilharzia. At least they know that they get bilharzia from swimming or through other types of water contact; in spite of this they frequently practise wrong behaviour.

Some of the reasons for this wrong behaviour may possibly be handled and influenced through different types of communication activities. Other reasons can only be tackled by actively trying to find solutions, for instance on how to solve problems of access to potable water or lack of privacy in urinating or defecating, or inadequate sanitary facilities.

The role of communication could for such circumstances be to stimulate community participation in identifying and actively solving such problems.

The fact that most people pollute water in spite of knowing that this may spread bilharzia most probably indicates a need for change in the communication approach. In order to increase impact, a more in-depth analysis must be made to identify what are the actual reasons among different target groups for urinating or defecating in water. Once having made such an analysis, messages can be tailored more directly to influence the reasons. An attempt to do such an analysis by linking reasons among different target groups to different types of messages is made in Section 8.3.

Evidence suggests that schoolchildren will, even if told not to, go swimming in canals during the summer; women will continue to go to canals for washing clothes and utensils until they have easy access to washing places which would serve the same social and practical purposes as canals. Information activities and health education up till now persist in providing advice which those groups most certainly will not follow. Instead it is recommended that they should be given advice on how they can reduce exposure, and risk of infection by bilharzia. Such messages would read for instance "if you absolutely have to use the canal for swimming or

washing, make sure that you go to a place which is less dangerous than others". Such a message would have a stronger impact if high and low risk places were marked, so that people could easily see which places to choose and which ones to avoid. It is therefore recommended to find out if it is possible from a practical point of view, to use snail control units for this purpose. If so, they could, as an integrated part of their work, map out high and low risk transmission places and preferably have them marked with signboards (in the water or at the edge of the canals). Since more attention in the future may be given to focal molluscicide, this marking exercise may become a more logical contribution from the snail control staff. If so, high risk places could be marked with red and low risk places with green signboards. Information about the meaning and purpose of these marks could be given by radio and TV-announcements produced to motivate women and schoolchildren to avoid red marks and choose green ones.

At present it seems as if the language and approach used in messages on bilharzia (in posters and hand-outs where available) is too general and therefore most probably not causing people to seriously reflect and question their own behaviour. Consequently the messages and the style of language used in the future should:

(a) Be simpler and more straightforward

(b) Help different target groups to recognize and question their own behaviour

(c) Stimulate the audience to seriously reflect about why they have to do things which are contrary to what they know is right and how to change attitudes and behaviour

Up till now there has been a tendency to utilize the same type of messages and information activities for many different target groups and situations. It is recommended that the communication approach becomes more target specific in the sense that messages and activities are more directly tailored to different target groups and relevant situations. Also the content of messages must become more action oriented and try to give advice on what possibly can be done to overcome some of the incorrect water behaviour patterns. For instance instead of telling schoolchildren not to go swimming in canals, they should be told how to reduce the risks of bilharzia and to urinate or defecate before they enter the water.

It seems as if there is a tendency to overburden messages on bilharzia with too much information. This may make the messages boring, and people may not even manage to read through the whole message or easily remember it. Therefore it is recommended that messages are made shorter, simpler and presented in such a format that headings and major points can easily be recognized.

At present no information seems to be available or exposed close to places where transmission actually takes place. Since it may be very effective from a communication point of view, to be reminded at the point of doing something which may cause infection or spread bilharzia, it is recommended that special attention is given to the problem of how transmission-places can be used more effectively for communication purposes.

The overall strategy in health education appears to be that health education activities should increase in intensity continuously from the intervention phase to the maintenance phase of a project. It should however be stated more clearly that the purpose is to achieve maximum impact from health education activities at the beginning of the maintenance phase. Since it takes time to change behaviour, health education and information activities have to be intensified during earlier stages of the project, because when the maintenance phase is reached, behaviour, habits and attitudes have been established in earlier phases. For instance, in order to have full effect when entering the maintenance phase, on the age group 10-15 years (which in many areas has the highest rates of prevalence), persons should become involved when they are 7-10 years old. By doing so, there may be a chance to cut the peak of reinfections which otherwise is frequently found in the yearly re-examination of this age group.

Up till now the preparatory phase has played no significant role in communication and information about bilharzia. No particular objectives have been formulated on how this phase of a project can be used to pave the ground for future communication efforts and community participation. It is therefore recommended that the preparatory phase be more actively used to serve as a stepping-stone for future communication efforts. One way to achieve this would be to utilize the substantial experience available on what happens during the life-cycle of similar projects, and produce a film or video-cassette which can be used during the preparatory phase before any activity takes place. This can be shown to Boards of Health Units, Health Societies for schools, to relevant officers in governorate and district administration, religious leaders, headmasters, and any other group which the public expects to be well informed about what is supposed to take place in the community. The content of such a video-cassette/film could for instance be:-

(i) An introductory speech by Dr. Saleh El Hak (and if to be used in TV, it could be considered if also the President could participate).

(ii) Some examples from other projects on what has been done in terms of snail control, examination and treatment, health education and information about bilharzia, results achieved etc.

(iii) Different examples on successful health education activities particularly showing good models and examples of community participation and support from different professional groups in schools, mosques etc.

(iv) Short briefing on the time schedule for the project and when different activities can be expected to take place.

(v) A vivid demonstration on what takes place during a bilharzia life cycle (preferably by using the equipment available in CET when different stages, for instance eggs hatching, can be demonstrated through a microscope linked to a video-camera). After having seen such a video-programme and been given time to discuss and ask questions, participants could be given a hand-out or small card reinforcing what they have seen. This could also serve as support to their own memory if and when they would like to carry the information further to other people in the community. Such a card could include some of the messages from the video and also in summary form some facts on bilharzia.

To further support the launching of a project and to prepare the public for what will happen, it is suggested that a poster is produced on how the general public can help support the project and what actions to take to reduce the risk of becoming infected. Such a poster should be displayed in each health unit and in every school where the project takes place. It should be hung in a place where it is easily recognized (not only in the laboratory where posters on bilharzia today most frequently can be found) for instance where outpatients gather before examination.

It has been found that frequently occurring contacts with the general public and schoolchildren are not systematically used to communicate information about bilharzia. Such occasions occur, for instance, when schoolchildren or other groups are called for examination and treatment. In order to utilize these occasions more effectively and systematically it is suggested that special cards are preprinted, and are used by doctors when sending invitations to headmasters calling classes for examination. Such a device would not only serve a communication purpose but also help the doctor to save time. These cards should be preprinted, so that the doctor would only have to fill in the date and his signature. The back page of the card could carry some messages on bilharzia which the teacher could use as a support to explain why it is important to be regularly examined and what to think about to reduce the risk of being infected or spreading bilharzia.

In the same way the laboratory technician could be provided with preprinted cards which could be given to the schoolchildren after treatment. This card could on the first page indicate if they have been found positive or negative and when to come back for second treatment. On the back page it could carry some messages on bilharzia. For instance it could mention:-

(i) The types of behaviour which will increase risk of infection

(ii) Some swimming places are more dangerous than others

(iii) Urinate or defecate before entering water (or in the same place they use during the winter when not swimming)

(iv) Ask them to tell the rest of the family what happened in school today and what they have learnt about bilharzia.

During the preparatory phase it is important to identify the role of different cadres of project staff in communicating with the general public. No systematic attempts seem to have been made to make a more efficient use of different types of project activities as a lever to communicate messages on bilharzia. It is therefore recommended that the curriculum for training of project staff during the preparatory phase is reviewed, to ensure that different cadres working in the project have been able to identify what roles they can play in information to the general public. Such a review of the curriculum should also state how much time should be allocated to training in communication skills, to the use of different types of audio-visual aids, and what to think about to achieve effective communication.

Television as a mass medium seems to be underutilized particularly since almost all households, even in rural areas, either have their own TV or easy access to one. At least one TV-programme should be produced (or a film which can be used for TV-transmission) trying to reach particularly schoolchildren. It is suggested that the time chosen would be between 19.30 and 21.00 hours, preferably on a Thursday or Friday. It would concentrate on a story where someone admired by schoolchildren is used as the main star (football player, singer or famous young male actor)

Also 2-3 short TV announcements should be produced concentrating on messages about transmission places (showing typical scenes from high risk and low risk transmission places), the importance to urinate or defecate before entering water and the need to get urine and stools regularly examined.

Up till now the general public as a whole does not seem to have heard many (if any) particular radio programmes about bilharzia. Exceptions may be found in Minya, where the broadcasting station has been very active to promote health education covering many different subjects. Since the radio can be a very efficient medium special efforts should be made to find new ways to use the radio to involve the general public, schoolchildren and teachers in attempts to control bilharzia. An account of how this could be achieved is given in Sections 8.3-8.5.

Schoolchildren are a major target group for many reasons:-

(i) They have frequent water contacts during the summer and get reinfected which causes increased costs for treatment.

(ii) Through educating schoolchildren, it may become possible to prepare the ground for future improvements in water behaviour and health.

(iii) They can be used to convey information to the general public through communications on bilharzia with their family-members.

To achieve any substantial impact on television among schoolchildren, teachers must be given more support in their efforts to educate children about bilharzia. Up till now the schools and the teachers have been given very little support in terms of simple, unsophisticated teaching aids on bilharzia. The invitation card mentioned above could serve this purpose. As a major effort the curricula for primary and preparatory classes could also be reviewed in order to find out what is being taught at different levels on bilharzia and what should be included in the future, and libraries in schools supplied with up to date literature on bilharzia.

The consequences and meanings of different phases of a project are not known or communicated to the people. It should be investigated if the fact that molluscicide activities will become less intensive from a certain date when entering the maintenance phase can be used to increase the consciousness and cautiousness among the general public in water contacts.

There does not seem to be any general awareness about the meaning of transmission places nor where they are and very few attempts to describe or illustrate them have been found in the information material used at present. In order to achieve any long term impact, efforts should be made to find out if there are ways and means to increase this awareness and knowledge. By making teachers (at least biology teachers) more aware about this and how to trace high risk transmission places, they may be able to stimulate community participation either directly or through the schoolchildren.

One cadre which should be in the position to alert the public on the meaning of transmission and indications of high risk transmission places would be the bilharzia staff working on snail control activities. If there is any doubt as to whether or not this cadre has adequate knowledge and experience on snail biology and snail ecology and how to identify high risk transmission places, it is recommended that their present knowledge is evaluated on a sample survey basis in order to find out in which aspects additional knowledge is required. This could also be carried out as an integral part of a refresher course for this group. Based on the outcome of such an evaluation the curricula for training of this cadre should be adapted accordingly.

Since the beginning of the project substantial evaluation efforts have been made to follow the development of treatment and snail control activities. No attempts seem to have been made to follow the change of behavioural patterns or changes in knowledge and attitudes with regard to bilharzia. It is suggested that efforts are made to build into the project, some kinds of feed-back mechanism to get indications of the effect of information activities as well as serving the on-going monitoring of communication efforts. In the future, whenever a project is to be launched, it is recommended that some kind of base-line survey is carried out on knowledge, attitudes and practices with bearing on bilharzia. In order to follow continuously, the impact of educational and information activities, a sample survey should be undertaken before the start of each new phase of the project. In addition to what is covered in the base-line study, the consecutive surveys should also try to measure the coverage of different information activities such as radio programmes, films, hand-outs and seminars and assess to what extent the general public has been exposed to these different inputs. Evaluation of information activities is discussed further in Sections 8.4, 8.5, and 8.6.

It has been found that the monthly figures showing results and performance in terms of prevalence rates, are not used for communication purposes. For instance these figures are not used for monitoring and guiding the health education efforts and in selecting villages which should be given special attention. Neither have the figures been used to reinforce good performance; Some proposals on how this could be done by using the radio are made in Section 8.5.

At present there is not much curiosity caused by snail control activities. Since these activities do not attract many people to come and watch what goes on, they cannot effectively be used for communication purposes. Unfortunately so, since this is a type of situation where information on transmission places could be provided through practical real-life demonstrations in the canals. Therefore it should be considered if such events could be turned into teaching opportunities. For instance by using radio announcements to notify teachers (or at least biology teachers) to bring their classes to a particular place at a certain time, in order to see a demonstration on water contact points which are more dangerous than others due to transmission of bilharzia.

No serious attempts seem to have been made to liaise with other health education programmes, where obvious links can be found. For instance, the oral rehydration programme which is concerned with the well-being of children since the reasons for diarrhoea may be due to incorrect water behaviour or lack of sufficient sanitary facilities, could be linked to prevention of bilharzia. Therefore it is suggested that efforts are made to find out if and how much messages, which may have a positive impact on bilharzia as well, could logically be included in information activities aiming to prevent other diseases.

8.2.2 Manpower

Findings in the field seem to indicate that a rather small proportion of the health education officers time is spent on bilharzia. Also there are great variations between different governorates with regard to transport, equipment and support material. Health education officers do not get, as a matter of routine, regular access to monthly figures on performance and changes in prevalence rates. It is difficult to say if this is mainly a lack of coordination between health education staff and the rest of MoH-staff. However, if changes in prevalence rates are to be used to monitor the input of health education activities, arrangements must be made to provide health education staff with these figures on a regular basis. At present there seems to be no clear strategy guiding the work by health education officers on bilharzia. Such a strategy should give guidance on which villages to select for special activities with what type of material, and what objectives should be achieved. It is recommended that the curricula for training of health education officers is reviewed and that a refresher course on communication is considered for those already working in health education departments.

The total number of health educators in the field is too small to have any substantial impact on behaviour changes at village level, unless they allocate their time to the most relevant activities. Such activities would be:

(i) Supervising efforts at village level, and concentrating attention on those villages which show high rates of prevalence

(ii) Acting as resource persons and initiating discussions with relevant bodies in the villages on what support they would need to intensify health education activities

(iii) Assisting school teachers in carrying out health education activities on bilharzia

(iv) Publicizing available material and advising how it can be used for different target groups

(v) Suggesting to the Ministry of Health in Cairo what additional material is needed to improve health education activities

(vi) Keeping an up-to-date record on which villages should be selected as high priority villages for health education on bilharzia

(vii) Initiating regular discussions with mass media to reinforce health education activities.

A common attitude among health staff (nurses in particular) seems to be that they consider the spreading of information on bilharzia as something which is purely the responsibility of the laboratory technician.

8.2.3 Equipment and material

In Cairo as well as at the Governorate level there is a sufficient amount of the equipment needed for production of information material. CET (Centre for Educational Techniques in health services) has the resources and capacity to produce video programmes even by using special equipment to link a microscope to the video camera), films, tapes, slides, teaching material and booklets. For posters they would have to turn to some other institution for printing. Up till now they have not been requested to produce anything on bilharzia except for a rather small section in the book used by nurses on general health education.

There are a few films available on bilharzia of which the two most recent ones were produced in 1977-78. The quality of the copies used in the field is poor due to regular use. Since both of these films seem to be effective, it is recommended that the quality of the prints used in the field is reviewed and that a sufficient number of high quality copies is produced and distributed.

Broadcasting facilities are of high quality with sufficient resources to cover all of the project area. Since every household has a radio it is suggested that the radio is used more intensively in the future. Some suggestions on how to integrate radio programmes in bilharzia projects are made in Section 8.5.

Only one poster seems to be used, it is mainly found hanging in health facilities. A few hand-outs have been produced centrally but it has been difficult to find out any particular system which describes how they are supposed to be used, for what target groups and what purposes. A small amount of money is available for local production which would not allow for printing more than one or two one-page handouts a year.

In general, it seems as if different groups such as health staff, project staff, and schoolteachers are not aware of what types of material are available for what purposes. It is therefore recommended that the curricula for training of project staff also includes information about material available and how it is supposed to be used.

8.3 MAJOR TARGET GROUPS: OBJECTIVES AND ACTIVITIES

8.3.1 Introduction

This section summarizes discussions with Egyptian staff of the Ministry of Health on the major objectives to be achieved by health education and information in bilharzia. Activities proposed are derived from the findings and overall recommendations

in Section 8.2. Due to lack of time it has not been possible to discuss and evaluate the feasibility of all the activities mentioned. In spite of this they are included in case they may serve as stepping stones for future efforts to create and design information activities.

In order to avoid messages which are either incorrect, misleading or contradictory it is suggested that any new activity to be launched is examined and approved by a small expert committee in the Ministry of Health. This procedure would not only reduce the risk of ineffective information activities, but also serve as a tool for the Ministry of Health to coordinate, supervise and follow this type of work carried out in the different governorates.

8.3.2 Objectives for groups which can contribute to the improvement of health education and information on bilharzia

8.3.2.1 Medical Staff

(i) To know the life cycle of bilharzia and be able to inform the general public when coming for examination and treatment.

(ii) To know how to communicate with the public and to take a positive attitude in spending time on a dialogue with the patient. What to think about on bilharzia in order not to get reinfected.

(iii) To know what types of message to tell people.

(iv) To set good examples on how to behave in order to prevent transmission of bilharzia.

(v) To understand that only slight relaxation in attention may cause a sudden increase in prevalence rates and damage the good results achieved when entering the maintenance phase.

8.3.2.2 Staff in snail control units

(i) To know about the life cycle of bilharzia and be able to inform the general public about it and how bilharzia can be prevented.

(ii) Have a basic knowledge about snail biology and snail ecology in order to inform people, when possible, about high risk places of transmission.

(iii) To play an active role in the diffusion of information to the public.

(iv) To know what messages to communicate to the public.

8.3.2.3 Health education staff

(i) To be able to read figures on monthly performance and to use this information for selecting villages which should be given special attention.

(ii) To inform about what material is available, and on request from teachers, health staff or other local leaders assist in carrying out information activities to the general public, schoolchildren and out-patients.

(iii) To ensure optimum use of health education material available.

(iv) To collaborate with mass media staff and assist in the production of radio programmes and newspaper articles.

8.3.2.4 School-teachers

(i) To know about what causes bilharzia and how it can be prevented.

(ii) To take an active role in giving lectures in connection with bringing classes for examination and treatment to health units.

(iii) To actively try to identify how the school and its nearest surroundings can be changed to improve the prevention of bilharzia.

(iv) To set good examples to the schoolchildren on how to behave to reduce the risk to get infected or to spread bilharzia.

(v) To know what messages to tell the schoolchildren.

(vi) To stimulate the schoolchildren to carry the information to their families.

(vii) To take initiatives for film shows and discussions on bilharzia with health education staff.

8.3.3 Objectives to be achieved for major target groups for education and information

8.3.3.1 Schoolchildren

Most schoolchildren seem to know that they get infected by bilharzia because of swimming in the water canals. But still they take the risk because they need to cool off particularly during the hot summer vacation days. Having seen that not everyone who goes swimming gets infected, they may be even more prepared to take the risk. There is however a common habit to urinate and defecate in water when swimming; they do this in spite of knowing that such habits may increase the risk of bilharzia. There may be several reasons for this behavior (except for a purely uncontrolled urinating reflex) for instance:

(i) Some schoolchildren may not know about the relation between urinating and defecating in the water and the transmission of bilharzia, even if evidence seems to suggest that this is valid for only a small minority.

(ii) It is more convenient to urinate in the water.

(iii) There is no privacy nor any hidden place alongside the canal.

(iv) They know it is wrong but nobody would notice anyhow.

(v) They do not feel sick or weak and therefore they do not consider themselves as carriers of bilharzia.

(vi) They think it does not hurt if they urinate in the canal because it would have almost no effect in the huge amount of water.

(vii) Everyone else does, so why should you not do the same.

(viii) They may think that out of the total amount of what they urinate or defecate, only a small proportion will end up in the canal anyhow.

In order to achieve any long term effect it is recommended that information to schoolchildren should focus on all these aspects, or if it is found that some of these reasons are less valid, concentrate on the most relevant reasons for incorrect water behaviour. It is suggested that the language chosen should create keen attention and make them feel strongly about their incorrect behaviour; this is important in order to break the present ignorance among schoolchildren. To achieve this, it is recommended that messages are straightforward, indeed, almost shocking and in order to stimulate them to think about and seriously question their own incorrect behaviour, messages could be formulated in terms of questions instead of statements.

Here are some possible messages aimed at schoolchildren:

i) "Next time you go swimming in (mention the name of the canal) - urinate and defecate before entering the water"

ii) "During the winter you don't have to urinate in the water - canal, do you? So why couldn't you use the same place in summer instead of doing it when you are swimming?"

iii) "In Minya there are about 350,000 schoolchildren between 6-15 years of age. If everyone would urinate 0.5 litre of urine per day in the water during the hot summer between May to August how much urine would that be? 21,000,000 litres! And much of it may carry bilharzia? Is that a place where you would like to swim? If not - urinate or defecate before entering the canal!"

(iv) "To urinate or defecate under water just because there is no privacy alongside the canal is a foolish and shortsighted way to solve the problem. Instead you should discuss with your friends if there are any ways to arrange for privacy on the shore"

8.3.3.2 Women

A number of reasons can be found why women practise wrong water behaviour, for instance:

i) Washing clothes together with the other women from the village serves as an entertaining and social event.

ii) The water in the canals may often be softer and require less soap.

iii) The problem is often not to get access to clean and safe water but to get rid of it easily after washing. This problem will not occur when going to the canal.

iv) The water in the canals is often considered safe and clean for washing clothes and utensils when the water-level is high and you cannot see the dirt.

v) There is no easy access to potable water due to availability or inadequate maintenance of pumps.

Possible messages aimed at women:

(i) "If you absolutely have to go to the canal for washing clothes or utensils try to reduce the risk to become infected by bilharzia, by using places which are less dangerous than others. Ask the biology teacher in the school about advice on what place to choose".

(ii) "Even if you cannot see any dirt in the water you can still get bilharzia from it".

(iii) Since you are using the water canals for cleaning utensils and washing clothes try to persuade others not to urinate or defecate in the water!".

(iv) "You do not want your baby/child to become infected by bilharzia when following you to the water canals. Therefore try to find places less dangerous than others".

(v) "In Minya there are about 350,000 schoolchildren between 6-15 years of age. If everyone urinates 0.5 litre of urine per day in the water during the hot summer between May to August, this means 21,000 litre of urine goes into the water. And much of it carries bilharzia. This is the water you need for washing clothes and utensils. Therefore try to persuade others to urinate or defecate <u>before</u> entering water".

(vi) "Even if you have been treated for bilharzia you can still become reinfected!"

8.3.3.3 Occupational Risk Groups

It is obvious that some groups run a higher risk than others to become infected. Also spending many hours at work, farmers and fishermen will need access to water for ablution.

Possible messages for occupational risk groups:

i) "Urinating and defecating in the water makes it unsuitable for ablution".

ii) "Since you need clean water for ablution, try to persuade others not to urinate or defecate in the water".

iii) "Try to think in advance, and whenever possible, urinate or defecate when you are close to places with safe water".

iv) "By the time you need to urinate or defecate it may be too late to think about where you can find safe water! Therefore try to think ahead!"

v) "Remember that bilharzia is like a slow poison which silently comes sneaking into your body. So even if you don't feel anything today, one day you might wake up and find yourself with severe damage to your health which may be difficult to cure. Therefore remember to get your urine and stools examined at least once a year!"

vi) "Since you are at a special high risk because you have to work in water, try to persuade others not to urinate or defecate in the water. Ad for your own sake ask the health unit to get your urine and stools examined in January or February each year, and take a treatment course if necessary".

8.4 THE FUTURE USE OF TELEVISION:

TV has not been utilised up till now to increase knowledge or change attitudes and practices with regard to bilharzia. Since most households either have their own TV or easy access to one, it is recommended that TV is used to increase the impact on attitudes and practices in order to further reduce prevalence rates. For this purpose it is recommended that 5 one minute commercials are produced to become a major part of a complete campaign on bilharzia, one for each of the following target groups.

8.4.1 Schoolchildren

Objectives:

(i) To convince them that bilharzia is something they must take seriously.

(ii) To make them ashamed and start reflecting about their own incorrect behaviour.

(iii) To change their behaviour in selecting places for swimming and not to urinate or defecate in water.

N.B. This commercial could use, as the main star, either a famous and well-known football player or a young male artist.

8.4.2 Pregnant women and women in reproductive age groups

Objectives:

i) To increase awareness of how to reduce the risk to get infected by bilharzia.

ii) To make them interested to convince their sons and other schoolchildren not to urinate or defecate in the canals because they need clean water for cleaning and washing.

iii) To increase knowledge on how to prevent their small children being infected when accompanying the mothers to the water canals.

For this target group it would be ideal if the same female artist could be used as in the OR-campaign. Not only because she is a well-known and famous artist, but also because she will easily become connected with the positive image from OR activities.

8.4.3 High risk occupational groups

Objectives:

(i) To create an understanding that they belong to groups at high risk for bilharzia.

(ii) To make them persuade others not to pollute water since they have to work in it.

(iii) To convince them of the importance of getting their urine and stools regularly examined (preferably during January/February each year when they may be less busy working).

For this commercial it may be advisable to find an authority with high credibility. For instance someone from the Ministry of Agriculture, or a successful farmer or fisherman.

This commercial should be considered for repeated transmission in January to serve as a reminder.

8.4.4 Moslems

Objective:

i) To make them motivated to persuade others not to urinate or defecate in water because such habits make the water unsuitable for ablution.

ii) To understand the advantage to adjust habits when possible to the use of safe water.

For this commercial, it is suggested that a religious authority is used.

8.4.5 School teachers

Objectives:

i) To understand the life cycle in order to be able to explain if asked what causes bilharzia.

ii) To understand and get examples of how to contribute to the prevention of bilharzia.

iii) To recommend that they contact health education staff for special lectures and filmshows.

iv) To understand what are the major reasons why school children practise inadequate water behaviour.

This commercial should concentrate on examples of what teachers can do to promote prevention of bilharzia for instance by showing good examples of how to involve schoolchildren in making their own drawings illustrating bilharzia, making dramas in classes about incorrect behaviour etc.

It is suggested that the commercials are pretested on the target groups they are intended for, before being finally produced and transmitted.

8.4.6 Supportive campaign activities

To increase the impact of the campaign it is suggested that a number of activities are carried out to reinforce messages in the commercials. For this purpose the following items should be considered.

8.4.6.1 Development of a "trademark" or logotype. The commercial should carry a particular symbol for bilharzia activities in order to make it easy to recognize.

8.4.6.2 Booklet on Bilharzia

The purpose would be to have something which can reinforce the messages in the TV commercials, and be used for selective distribution by health education staff after having carried out health education activities on bilharzia. The following format and content should be considered.

To be produced in format 15 x 17 cm., using photos instead of drawings and run to 8 pages with a content designed to achieve the following objectives:

Page 1 (front cover page)

i) The importance of taking bilharzia seriously.

ii) Everyone needs water and therefore runs the risk of getting bilharzia but there are four groups in particular, which are at higher risk because they are more frequently exposed to water, namely schoolchildren, women, farmers and fishermen.

The front cover page should carry the logotype.

Pages 2-3

i) Advice to schoolchildren on what they must think about and what they can possibly and easily do, to contribute to the reduction of bilharzia.

Pages 4-5

i) Advice to women on what they can do to reduce the risk for themselves and for their children, utilizing every mothers concern for their small children.

Pages 6-7

i) Advice to high risk occupational groups on the importance of attending at health units to get urine and stools examined regularly.

Page 8 (back cover page)

i) Advice on where to go and who to ask for more information about bilharzia.

Before being finally printed, the booklet should be pretested and examined by the expert committee mentioned above. It is recommended that a poster is produced to carry the same basic messages for the high risk target groups. The size could be 40ÑxÑ60 cm., and printed in sufficient numbers to cover all

health units and those schools which are located in high risk areas or in villages with exceptionally high prevalence rates. These posters should carry photos and not drawings, if high printing quality can be ensured.

8.4.7 Timing of the TV campaign

In order to increase the chance to get sufficient impact from such a campaign it is recommended that the commercial be placed each day for the whole month of April or May, 5 days a week, each day covering one target group. To ensure good exposure they should be aired between 19.30 - 21.00 hours preferably close to programmes known to be popular such as films, dramas etc. To ensure that the messages are remembered throughout the whole summer period, it would be of great advantage if commercials appear at least once every week. It is also suggested that before the commercials are televised health staff could be informed by letter, and alerted to watch the commercials; such a letter could also inform them about what role they can play and how to reinforce the campaign.

8.4.8 Evaluation of campaign activities

In order to be able to assess the impact and measure the effectiveness of intensified use of TV on bilharzia, well-planned evaluation activities are suggested as an integral part of the campaign. For this purpose it is recommended that before the campaign is launched, a base-line study is carried out in some selected districts where the prevalence rates ar high and with high percentages of high risk occupational groups.

The interviews should be carried out on a random sample basis with a total number of around 400-500 people. Simultaneously, and if found possible, a special study could be made to measure the amount of drugs to treat bilharzia being used per month in these areas. The purpose of the sample survey would be to collect data about what people know about bilharzia; from where they receive information about it; what sources they would prefer to get it from; what credibility attaches to different sources; the importance attached to bilharzia and preventive measures; knowledge about what steps can be taken to prevent the risks of transmission and infection.

If possible it is recommended that data are collected to identify common practices with regard to:

i) Water behaviour and water contact patterns

ii) Selection of water contact points for swimming and washing

iii) General habits with regard to treatment and examination of urine and stools.

The same study could also cover questions on listener habits, ability to read, access to radio and TV.

Some months after the campaign has taken place a follow-up survey should be conducted (August or September) to study the impact.

This study would measure how many have seen the commercials, how much they remember, common misinterpretations of messages. If it has had any impact in terms of interpersonal discussions on bilharzia, in which ways it has changed attitudes and behaviour. This same study should also measure the exposure to other activities such as the poster and the hand-out. Since special efforts are made to reach teachers and schoolchildren a special survey may be needed to find out if and how the campaign has had any influence on these target groups, for instance, by finding out the change in number of health education activities, initiatives to ask health educators for special lectures and film shows etc. It is recommended that the evaluation activities suggested are carried out by an independent body with substantial experience of these types of studies, for instance consultants on marketing and advertising.

8.5 THE FUTURE USE OF RADIO

8.5.1 Repetition and Reinforcement

Short messages repeating important aspects of bilharzia and how to prevent it may become very important during the maintenance phase. By frequently repeating short messages you may prevent people from relaxing. If the results in infection and intensity achieved during the intervention and consolidation phase can be maintained bilharzia will not in the future be a major disease; radio is an ideal medium for repetitive short messages.

8.5.2 Assistance to Schoolteachers

At present not very much is being done to produce educational programmes on bilharzia to be broadcast to schoolchildren; such programmes could be produced to function as a support to the teachers if broadcast during schoolhours. There may be a need to produce one programme for primary and one for preparatory classes.

8.5.3 Broadcasting of Achievements

Since it will become important to maintain the good figures for treatment, intensity and infection achieved up till the end of the consolidation phase, it may be important to keep people in villages informed about their performance in this respect. Therefore it may be of interest to broadcast results as a regular programme at times when monthly reports are available. To make this more exciting the radio station could also mention which villages have been most successful. It can be made as a regular competition including mentioning names of the 3 best villages in performance, names of health staff and those working in these villages on bilharzia control topics.

8.5.4. Stimulation of group pressure

The radio could be used for production and broadcasting of dramas where schoolchildren could be the actors and produce their own stories. Such dramas could concentrate on themes which have been reflected in the Section on common attitudes and behaviour among schoolchildren. Particularly, such dramas could be effectively used to stimulate schoolchildren to help each other to prevent different types of malpractices by using group pressure.

8.5.5 An evaluation tool

Could the radio become involved in some kind of ongoing evaluation on how peoples attitudes, knowledge or behaviours are being changed as a result of different types of information activities? By doing so, it would be possible to get a regular contct with different audiences and feedback on how different types of messages have been interpreted; could for instance the "club" - idea be used for such a purpose?

8.5.6 The integral approach to communication

The type of health education session which took place at Hoda Shaarah primary school is an excellent way to promote the messages on bilharzia. It combines community participation, the role of the school children, teachers participation, films, question and answers and opportunities to inform the general public - everything in a beautiful blend. By telling the children when the programme will be broadcast they will be keen to listen to it together with their parents in order to hear their names on the radio. If possible in the future, it would be an advantage if such activities could be carried out in schools which are located in villages which have shown good performance in monthly figures since it can act as a type of reward.

8.6 EVALUATION OF INFORMATION ACTIVITIES

As indicated previously no systematic attempts have been made to measure changes in knowledge and behaviour patterns or to evaluate the impact of different health education activities. It is therefore recommended that some kind of evaluating mechanism is built into the project. No only would such a mechanism serve as a tool for monitoring information efforts but to those involved, such a continuous measurement of knowledge about bilharzia may also indicate that it is a matter of concern. Different models can be considered for instance:

i) Try to link the evaluation of these information aspects to the evaluation of prevalence and intensity in the index villages.

ii) Take a sample of schools and carry out a test on knowledge, attitudes and coverage of exposure to different types of information activities on bilharzia. If such a model is chosen, teachers can use the test occasion to give a lecture immediately afterwards on the correct answers.

iii) Try to carry out on a regular basis, a random sample survey among the general public. To do this may be administratively difficult and expensive.

iv) Each year a number of informal discussion groups could be carried out with representatives from the different target groups mentioned. Such studies will not provide data to be used for statistically scientific purposes, but would give regular indications of successes and failures in information activities. At the same time, such studies could serve as a tool to expose areas of ignorance, and provoke new ideas for information activities and messages.

8.7 COST ESTIMATES FOR INFORMATION ACTIVITIES IN BHILHARZIA

All costs in Egyptian pounds per annum, March 1985

Proposed Activity	Minimum Approach	Medium Approach	Maximum Approach
1. TV-commercials			
a) Production of 5 one minute commercials LE 5000 each	LE 25,000	LE 25,000	LE 25,000
b) Airing time (April, 20 days) LE 900/min.	LE 18,000	LE 18,000	LE 18,000
2. Radio-commercials			
a) Production of 5 commercials LE 50 each, 26 Governorates	LE 6,500	LE 6,500	LE 6,500
b) Broadcasting time (April, 30 days, LE 15/min)	LE 11,700	LE 11,700	LE 11,700
3. Hand-out 600,000 copies @ 15 pts/copy		LE 90,000	LE 90,000
4. Film/Video for preparatory phase			
a) 20 min, produced by CET	LE 5,000	LE 5,000	LE 5,000
b) Production of one copy per governorate	LE 1,000	LE 1,000	LE 1,000
5. Reprints of present films for schooldren			
LE 10 per min. 16 mm 15 minutes, one print per governorate	LE 3,900	LE 3,900	LE 3,900
6. Cards to be used by doctors when calling for examination 400,000 schoolchildren average 30 per class 150,000 copies, 5pts each	LE 7,500	LE 7,500	LE 7,500
7. Reminder cards for lab. technicians to give to schoolchildren found positive 70,000/year, 5 pts each			LE 35,000

Proposed Activity (cont'd)	Minimum Approach	Medium Approach	Maximum Approach
8. Evaluation and pretesting			
a) Base-line study	LE 8,000	LE 8,000	LE 8,000
b) Follow-up study	LE 8,000	LE 8,000	LE 8,000
c) Pretesting of commercials	LE 3,000	LE 3,000	LE 3,000
Total amount	LE 97,600	LE 187,600	LE 222,600
Proposed HE-activities as % of yearly costs for molluscicides	6.8%	13.0%	15.5%
Proposed HE-activities as % of total cost for drugs for treatment of bilharzia	5.5%	10.6%	12.6%
Proposed HE-activities as % of total estimated bilharzia project costs for Middle and Upper Egypt	1.6%	3.1%	3.7%

CHAPTER 9

OPERATIONAL RESEARCH

9. It is recommended that the Endemic Research Control Department make a strong effort to carry out the following operational research which would be of significant scientific and public health value.

9.1 CHEMOTHERAPY

Continue to monitor closely and evaluate the effect of chemotherapy alone in reducing prevalence rates and egg intensities of S. haematobium and S. mansoni, as is presently being done in a section of the Giza Bilharzia Control Project. This research should continue to be on-going, and data on prevalence rates and levels of egg output should be reviewed every six months by the EDCD.

Do the same type of detailed data collection and monitoring in selected village health units in the Middle and Upper Egypt Projects, during the maintenance phases, in villages which will receive no mollusciciding (except for occasional, limited focal treatments where mandated).

9.2 MOLLUSCICIDING

Snail sampling in water contact points of villages that are to be molluscicided by radius control. First, before application, and then every month after application —— to assess rates of snail infestation and the length of time it takes for infected snails to develop.

9.3 PATHOLOGY

Use of low-radiation, mass radiography in cross-sectional surveys to monitor and assess pathology in people infected with bilharzia (urinary and intestinal) who have never received drug treatment, according to such parameters as age, sex and occupation. Egg counts of urine and/or stools collected from these same people at the time of their radiological screening, will allow the relation of worm burden as expressed by egg output to be correlated with pathology assessments.

ANNEX

A FIELD TRIAL TO TEST THREE FILTERS FOR S. HAEMATOBIUM EGG COUNTS: NYTREL®, NUCLEPORE® AND FILTER PAPER

INTRODUCTION

This trial is referred to in Chapter 4, Section 4.7.7, of this report. The trial was conducted in Assiut during February 1985 by the staff of the Governorate Bilharzia Egg Counting Laboratory and the evaluation team.

The main objective of the trial was to see what, if any differences in egg counts resulted when single, 10-ml sub-samples of the same known positive urine samples were passed separately through each different filter at the same time. A second, minor objective was to record the time it took to count all eggs on each filter, and report the differences in total time reading beteen the 3 filters. A final piece of information from the work was to determine the amount of washing and scrubbing necessary to remove eggs from the Nytrel® filters so that these could be re-used. Most of the latter work was done in the Qena Governorate Bilharzia Laboratory.

Materials and Methods

Separate urine samples were collected in clean screw-top containers from class 5 and 6 schoolchildren at Kom Abu Sheel Primary School with the help of the Assiut "Moving Laboratory". Each day, 34 urines were collected between 10 and 11 a.m., and each day, 30-31 of these were found to be positive upon rapid microscopic examination (after 5-20 minutes of sedimentation). The positive urine samples were at least 30ml of urine each, and were returned to the Assiut Central Laboratory in the original containers within 2 hours of collection.

During processing at the Central Laboratory, 2 sets of 30, 13-mm diameter holders were numbered consecutively, one set with Nytrel® filters inside, the other set with Nuclepore® filters. Another set of 30 processing containers with 10 ml of carbol fuchsin was also ready for the paper filtration.

The Nytrel® and Nuclepore® filters were of 20 microns and 12 microns pore-size respectively. The paper filters were all of 47- microns diameter and cut from Whatman No.1 paper.

After vigorously shaking each urine container to randomize S. haematobium ova, 10-ml sub-samples were extracted in separate syringes at the same time. The urine in the syringe for each Nytrel® was injected through the Nytrel® holder; the same was done for each Nuclepore® filter. The syringe with 10-ml urine for each paper filter was injected in the correctly-numbered bottle already containing the carbol fuchsin.

When all the sub-samples were processed, the Nytrel® and Nuclepore® filters were removed separately from the holders and placed on numbered glass microscope slides - the Nytrel® face-up and the Nuclepore® filters face-down. The paper sub-samples were processed in the standard way, each urine-carbol fuchsin mixture being filtered in a Millipore® funnel.

Soon after being placed in the microscope slides, a single, small drop of tincture of iodine-formalin solution was added to each moist Nytrel® and Nuclepore® filter. The carbol fuchsin-stained paper filters were allowed to dry overnight.

Due to incorrect insertion of some Nytrel® and Nuclepore® filters in the holders, 6 sub-samples could not be used. A total of 55 common sub-samples of each filter was processed correctly.

Staff from the Assiut Governorate Counting Laboratory counted the eggs on all the paper filters and the team did the egg counts on all the Nytrel® and Nuclepore® filters. To aid counting, a drop of saline solution was put on each filter just before examination (or many drops on the large glass slide under each paper filter); then, each was covered with a glass counting graticule (etched with counting squares). Tally counters were used to register the egg counts. The time in minutes to examine each filter microscopically was recorded by each person.

The microscope used for all counts was an Olympus binocular model with artificial illumination and 4X and 10X objectives.

Results

The egg counts for each of the common sub-samples are shown in TableÑ1. It can be seen that the total geometric mean of the egg counts was highest for the Nytrel® filters (208.03), followed by the Nuclepore® filters (159.45), with the paper filters giving the lowest overall value (107.91).

To perform a statistical test of significance between the egg counts, each count was first converted into its logarithmic value. This resulted in approximately log-normal distributions when all log-egg counts for each filter were tabulated.

The test of "paired samples" was applied, using the log values of the egg counts. The difference of each log egg count between Nytrel® and paper filters was calculated first. The total sum difference was divided by 55 (n) and represented the mean of the log differences, d. With a Casio calculator with built-in programming, d was calculated directly, along with the sample standard deviation of the log differences, represented by s_d.

The t test was applied to test the null hypothesis that the population mean difference of the egg counts (log values) between the Nytrel® and paper filters was zero. The calculation of t was

$$t = \frac{d - s_o}{s_d / n}$$

where s_o (the population mean difference) = o, d = .28506, s_d = .37646, and n = 55.

For Nytrel^R vs. paper t = 5.6155. Since t is greater than approximately 2.005 for 54 degrees of freedom, it can be concluded that the egg counts on the Nytrel^R filters were significantly higher than on the paper filters (p .001), and that this difference, therefore, was not due to chance.

Table 1. Egg counts of 10-ml sub-samples from the same, single urine samples as enumerated on Nytrel®, Nuclepore®, and paper filters.

Sample No.	Nytrel®	Nuclepore®	Paper	Sample No.	Nytrel®	Nuclepore®	Paper
2.	353	57	30	37.	1103	1023	170
3.	132	53	36	38.	83	67	20
4.	256	105	45	39.	48	27	15
6.	196	996	430	40.	80	11	55
7.	197	283	200	41.	34	18	30
8.	755	1520	394	42.	15	32	17
9.	113	296	155	43.	869	1048	180
11.	198	22	29	44.	309	161	110
12.	39	19	39	45.	13	40	86
14.	376	861	283	46.	183	211	186
15.	202	27	135	48.	554	848	324
16.	940	657	180	49.	74	26	45
17.	193	41	62	51.	464	457	130
19.	83	160	64	52.	818	2286	600
20.	205	38	24	53.	47	62	53
21.	306	67	195	54.	130	129	118
23.	47	125	261	55.	145	214	55
25.	316	207	129	56.	138	326	71
26.	1137	1037	750	57.	88	107	48
27.	211	358	401	58.	549	297	158
28.	371	149	224	59.	881	517	450
29.	1288	782	1600	60.	371	363	93
30.	19	274	15	61.	143	134	40
31.	135	231	188	62.	715	1110	222
32.	220	97	158	63.	1545	1628	438
33.	1284	171	223	64.	129	95	46
34.	575	17	305				
35.	124	37	35				
36.	234	151	55	Geometric Mean	208.83	159.45	107.91
				95% C.I ±	1.34	1.42	1.31

Doing the same test for the Nytrel® and Nuclepore® egg counts revealed no significant difference between the 2 filters, even though the overall geometric mean for the Nytrel® filters was much higher than for the Nuclepore® filters (208 vs. 159).

t test for difference in egg counts between Nytrel® and Nuclepore® filters:

$$t = 1.8196 \quad (p \quad 0..05)$$

In the final test of significance using the above t test, the egg counts on the Nuclepore® filters were significantly higher than on the paper filters.

t test for difference in egg counts between Nuclepore® and paper filters:

$$t = 2.990 \quad (p \quad 0.01)$$

Mean time of counting eggs

The mean time in minutes (plus standard deviation and range) it took to count the eggs on the 3 sets of filters is shown below.

	Minutes		
Filter	Mean time	Stand. Dev.	Range
Nuclepore®	3.000	2.224	1-10
Nytrel®	3.618	2.077	1- 9
Paper	11.654	3.821	6-25

Clogging problem

Clogging was encountered only with the Nuclepore® filters. Out of 55 sub-samples injected through the holders with the 12 microns poresize polycarbonate filters, clogging occurred on 10 occasions. On 9 occasions, only a fraction of 10-ml sub-samples could be injected through the filter in the first attempt; a second filter in another holder had to be used before complete passage occurred. In one instance, only 4 ml of urine could be injected through a total of 2 Nuclepore® filters.

Problem in counting eggs

The majority of Nytrel® filters were clean and easy to read with the 4X objective. Sixteen of the 55 sub-samples, however, were either dirty (pus, blood clots, crystals, dirt, cotton fibers and other debris) or overstained, and therefore more difficult to read. The eggs on 10 of these filters had to be counted with the 10X objective.

For the Nuclepore® filters, 36 were clean and easy to read with 4X objective. Nineteen were dirty and/or overstained and difficult to read. Of the latter, 7 had to be examined with the 10X objective.

Some paper filters were dirty and full of pus, blood and other debris, but no assessment was made on how this hindered egg counts.

Removing eggs from Nytrel® filters for re-use

Two quick tests were made. The first was in Assiut with filters already stained with the tincture of iodine-formalin solution. The table below shows the egg reduction after 5 of these filters were washed in the following manner: first soaked overnight in Dettol® solution; second, washed in detergent by vigorously moving the filter back and forth through the solution with forceps; and third, repeating the second step after rinsing the filter in clean water, and then giving the filter a final rinse in clean water.

No. of eggs before washing	No. of eggs after washing
124	9
234	65
1103	500*
83	20 - 49
48	10 - 19

* subsequently reduced to 2 eggs after hard scrubbing with a toothbrush.

The second test was made in the central egg counting laboratory in Qena. Fresh, positive urine samples were collected from El Gabalao school a few kilometres from Qena, and transported back to the Qena lab within 1.5 hours of collection.

All of the Nytrel® filters were initially unstained. After a quick inspection for positivity of S. haematobium, each filter was washed 2 times in detergent solution. After washing and rinsing, each filter was stained with tincture of iodine to make clear any remaining eggs. If any did appear, the filter was then scrubbed with a toothbrush for about 1 minute in detergent solution, held in at least 2 positions with forceps. The filter was then rinsed in clean water and re-examined for ova after a second staining with iodine. The results of this exercise are shown below.

Egg counts on unstained filters before washing	Egg counts after washing 2 times in detergent	Egg counts after filters were scrubbed with a toothbrush
20 - 29	0	NA
1 - 9	0	NA
1	1	0
1 - 9	1	1
1 - 9	2	0
50 - 99	10 - 19	0
50 - 99	3	0
10 - 19	0	NA
1 - 9	0	NA

NA = Not applicable

The results of the above 2 tests show conclusively that it was difficult to remove S. haematobium eggs from positive Nytrel[R] filters whether they were stained or unstained. Washing in detergent solution alone failed to remove all of the eggs on most occasions, and had no effect on eliminating eggs from stained filters. The only effective method of removing the ova from the Nytrel[R] filters was by vigorous scrubbing of them with a toothbrush; but even this did not guarantee complete egg removal. Moreover, scrubbing caused fraying and weakening of the polyamide mesh.

In conclusion, for routine field work in Egypt, it is probably best to use Nytrel[R] filters only once, regardless of whether they are initially positive or negative. It is not worth the time and effort to try to make them clean again.

WHO/WB COLLABORATION

September 25, 1986

To: Tony Measham

From: Nancy Birdsall

Tony -

1. Is January 7 OK for WHO? I had impression in Geneva that January is bad for them. Early February?

2. Is "detailed discussion" of the paper the highest priority for the agenda? What about: next steps, joint studies or action on specific issues (training in health econs; new insurance approaches; managing financial decentrtalization; organizing other donors to avoid big investment mistakes.)

3. Is there a way to involve more PHN staff? (Otherwise I feel we are talking to the same people all the time.) Perhaps a few PHN operational staff could brief this group on country financing reforms.

Nancy

FORM NO. 75
(6–83)

THE WORLD BANK/IFC

ROUTING SLIP	DATE: 9/24

NAME	ROOM NO.
Mrs. N. Bidsale	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
✓	CLEARANCE		PER OUR CONVERSATION
	COMMENT		PER YOUR REQUEST
	FOR ACTION		PREPARE REPLY
	INFORMATION		RECOMMENDATION
	INITIAL		SIGNATURE
	NOTE AND FILE		**URGENT**

REMARKS:

Nancy:

Thanks.

FROM:	ROOM NO.:	EXTENSION:

D R A F T

September 24, 1986

Dear

Re: Inter-agency Working Group on Health Costs and Financing

As agreed in our second meeting at the U.S. State Department in May, the World Bank will host the next get-together of the inter-agency working group. We are pleased, therefore, to invite you to join us for a small group working session from 10:00 a.m. - 4:00 p.m., Wednesday, January 7, 1986 in Room N 550, 801 19th Street, NW, Washington, D.C.

We propose that the January 7 meeting be dedicated to a discussion of the Bank's soon to be completed Health Financing Policy Paper. The paper's topic coincides well with that of next year's World Health Assembly. A copy of the paper will be sent to participants approximately one month prior to our meeting.

We hope you will be able to join us for lunch on January 7 and suggest we break from 12:30 - 1:30 p.m. We propose that the remainder of the time be spent in a detailed discussion of the draft paper. In order to facilitate the discussion, we suggest limiting participation to a maximum of fifteen, with not more than five from each of the three agencies.

We look forward to working with you on this task. Please let us know at your earliest convenience who will attend from your agency and whether it will be possible for each participant to join us for lunch.

With kind regards,

Sincerely yours,

John Akin
Economist

Anthony R. Measham
Health Adviser

Population, Health and Nutrition Department

To: Ms. Ann Tinker, USAID
Dr. Michel Jancloes, WHO

cleared with and cc: Ms. Birdsall
Mr. North

Possible Participants

WHO	Khanna
	Jancloes
	Creese
	Abel-Smith
USAID	Bart
	van Dusen
	Tinker
BANK	Akin
	Barnum
	Birdsall
	McGreevey
	Measham

ARMeasham/rmf/cjm

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N. B.

Typewritten Character Must Fall Completely in Box!

PAGE 1 OF

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UNISANTE, GENEVA

FOR MRS BRUGGEMANN. PLEASED TO RESPOND TO YOUR MAY 28 LETTER REGARDING AGENDA FOR SEPTEMBER MEETING. PROPOSED AGENDA LOOKS EXCELLENT. SUGGEST WE SUBSUME ITEMS UNDER FIVE OR MAXIMUM SIX TOPICS TO FACILITATE DESIGNATING LEAD DISCUSSANTS ON BOTH SIDES AND ENSURE SUFFICENT TIME FOR DISCUSSION EACH TOPIC. DETAILED COMMENTS AND SUGGESTIONS FOLLOW. AAA) DISTRICT HEALTH SYSTEMS TOPIC WOULD PROVIDE USEFUL OPPORTUNITY TO SHARE EXPERIENCE AND VIEWS, INCLUDING IMPORTANCE BANK ATTACHES TO SYSTEMS APPROACH TO INVESTMENT OF WHICH HARDWARE ONLY PART. BBB) WE WELCOME OPPORTUNITY TO SHARE VIEWS ON CRITICAL ISSUE OF FINANCING HEALTH FOR ALL. DRAFT OF PHN HEALTH FINANCING PAPER MIGHT PROVIDE VEHICLE FOR DISCUSSION. WILL MAIL COPY. CCC) ELEMENTS OF YOUR ITEMS 3, 4 AND 6 MIGHT BE COMBINED TO ADDRESS CRITICAL QUESTION OF HOW TO EVALUATE IMPACT OF HEALTH PROJECTS AND PROGRAMS, DEVELOPMENT OF NECESSARY DATABASE, AND FUTURE ACTION OF WHO AND BANK IN ENSURING PROGRESS IN THIS NEGLECTED AREA. DDD) WE AGREE REGARDING IMPORTANCE OF DISCUSSING RESEARCH AGENDAS OF BOTH ORGANIZATIONS AND WILL SEND COPY OF POLICY AND RESEARCH WORK PROGRAM AS ONE INPUT. EEE) BANK FINANCING OF INTERNATIONAL HEALTH EFFORTS MIGHT USEFULLY FOCUS ON RESEARCH SUPPORT, E.G. TDR,

END OF TEXT

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SUBJECT: WHO Strategy Meeting | CONTACT: ARMeashm/cim | EXTENSION: 61573

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PROSPECTS FOR OTHER SIMILAR EFFORTS, E.G. SUPPORT FOR HRP, AND WHO ROLE IN FACILITATING SUCH ASSISTANCE. FFF) A SIXTH TOPIC MIGHT DEAL WITH THE COLLABORATION AND COMMUNICATION PROCESS AND HOW WHO AND THE BANK MIGHT WORK CLOSER IN THE FUTURE ON SECTOR ANALYSIS, PROJECT PREPARATION AND PROJECT IMPLEMENTATION. GGG) WE SUGGEST INFORMALITY BE STRESSED TO FACILITATE OPEN COMMUNICATION AND WONDER WHETHER POSSIBLE TO MEET OUTSIDE WHO HQ AS DISCUSSED PREVIOUSLY. WE BELIEVE TWO DAYS SHOULD BE SUFFICIENT TO COVER AGENDA AND WOULD APPRECIATE YOUR SUGGESTIONS ON TIMING WITHIN AGREED SEPTEMBER 3-5 TIMEFRAME. HHH) MY COLLEAGUES NANCY BIRDSALL, STEPHEN DENNING, ISHRAT HUSAIN, ANTHONY MEASHAM, EMMERICH SCHEBECK AND EYE ARE LOOKING FORWARD TO PRODUCTIVE MEETING. REGARDS NORTH, INTBAFRAD, WASHINGTON.

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cc: Bak, Birdsall, Denning, Husain, McDonald, Measham, Sai, Schebeck

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WHO/WB

John North July 10, 1986

John,

You asked some time ago that we consider issues that ought to be raised at the September "strategy meetings" WHO will be holding with other donors in September. I have asked Vic Paqueo to solicit ideas from PHNPRD staff and to send you a note through whomever is Acting for me by the end of July.

There is one issue which I wish to mention now which I hope can be on the Department's list for discussion with WHO: the need for systematic collection of information across countries that would allow evaluation of the impact of health interventions. This sort of need is apt to solicit a yawn from many parties, so let me illustrate the point by analogy. We know family planning programs work in part because beginning more than ten years ago a tremendous effort was put into the series of national fertility surveys conducted under the auspices of the World Fertility Survey, and a series of surveys of fertility and contraceptive prevalence known as the CPS. The cost (most of which was borne by USAID) was well worth the effort. I believe there were problems with the WFS and CPS (especially insufficient information on the "supply" or program side to link changes in people's behavior to changes in program inputs) but even so, the returns to the population community have been very high. (Even much of the information demonstrating definitively that there have been declines in mortality comes from the these surveys). In contrast it is difficult to generalize about declines in morbidity and in specific diseases across countries, and there are no data to use to evaluate across countries the impact of health programs, in the manner that Mauldin, Freedman, Lapham, and earlier Berelson have done.

It seems to me that WHO ought to take the lead in mounting such as effort, but the Bank ought to provide much of the backing and technical assistance. The Bank has already invested in a methodology for doing a WFS-type survey to cover other sectors (i.e. the LSMS) and the Bank is going to have a continuing interest in monitoring the effects of macroeconomic policy changes on health and other aspects of "living standards". There is already started a successor to WFS, the Demographic and Health Surveys, but input from the Bank (and from WHO unless I am wrong) has been minimal; the DHS is also funded by AID (also the Office of Population) and much of the technical work is being done by the demographers and others in the U.S. academic community who worked on WFS.

Randy Bulatao and Althea Hill are aware of the DHS activity. Howard and Tony have expressed interest in the general problem of improving the data base for health program evaluation. Perhaps they will have reactions to this idea and, if they agree with my general premise, will provide better background and motivating information in the next several weeks.

Nancy

cc: Paqueo, Bulatao, Hill, Barnum, Measham

NBwhostrat