

Document of  
The World Bank

Report No: 25552

IMPLEMENTATION COMPLETION REPORT  
(IDA-24030)

ON A

CREDIT

IN THE AMOUNT OF US\$ 26.8 MILLION

TO THE

ARAB REPUBLIC OF EGYPT

FOR A

NATIONAL SCHISTOSOMIASIS CONTROL PROJECT

03/02/2003

**Human Development Sector  
Middle East and North Africa Region**

## CURRENCY EQUIVALENTS

(Exchange Rate Effective 12/31/2002)

Currency Unit = XDR

1 XDR = US\$ 1.35143

FISCAL YEAR

2003

## ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
CAO	Central Audit Organization
CAS	Country Assistance Strategy
CPD	Central Procurement Department
EDCD	Endemic Diseases Control Department
GIS	Geographic Information System
GOE	Government of Egypt
ICR	Implementation Completion Report
IDA	International Development Association
M&E	Monitoring and Evaluation
MNSHD	Middle East and North Africa Human Development Group
MOH	Ministry of Health
MOHP	Ministry of Health and Population
MPC	Mass Population Chemotherapy
MTR	Mid Term Review
NSCP	National Schistosomiasis Control Program
PCD	Project Concept Document
PHC	Primary Health Care
PIU	Project Implementation Unit
PSR	Project Status Report
QAG	Quality Assurance Group
RHUs	Rural Health Units
SAR	Staff Appraisal Report
SPC	Selective Population Chemotherapy
SRP	Schistosomiasis Research Project
USAID	United States Agency for International Development

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**EGYPT, ARAB REPUBLIC OF  
NATIONAL SCHISTOSOMIASIS CONTROL PROJECT**

**CONTENTS**

	<b>Page No.</b>
1 Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	2
4. Achievement of Objective and Outputs	5
5 Major Factors Affecting Implementation and Outcome	9
6 Sustainability	10
7. Bank and Borrower Performance	12
8. Lessons Learned	14
9. Partner Comments	15
10. Additional Information	15
Annex 1 Key Performance Indicators/Log Frame Matrix	16
Annex 2. Project Costs and Financing	17
Annex 3. Economic Costs and Benefits	19
Annex 4. Bank Inputs	21
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	23
Annex 6. Ratings of Bank and Borrower Performance	24
Annex 7. List of Supporting Documents	25
Annex 8 Description of the Main NSCP Strategies	26
Annex 9. Recommendations for follow up on issues of importance	28
Annex 10. Summary of the Results of the Beneficiary Survey	30
Annex 11 Summary of Environmental Impact Analysis of Niclosamide	31



<i>Project ID</i> P005152	<i>Project Name:</i> SCHISTOSOMIASIS CONTROL
<i>Team Leader:</i> Alaa Mahmoud Hamed	<i>TL Unit:</i> MNSHD
<i>ICR Type</i> Core ICR	<i>Report Date:</i> March 13, 2003

## 1. Project Data

*Name:* SCHISTOSOMIASIS CONTROL *L/C/TF Number:* IDA-24030  
*Country/Department:* ARAB REPUBLIC OF EGYPT *Region:* Middle East and North Africa Region  
*Sector/subsector:* Health (97%); Central government administration (3%)

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 10/09/1989	<i>Effective:</i> 11/26/1992	06/15/1993
<i>Appraisal:</i> 06/02/1992	<i>MTR:</i> 06/30/1996	03/24/1997
<i>Approval:</i> 06/25/1992	<i>Closing:</i> 06/30/1999	09/30/2002

*Borrower/Implementing Agency:* GOVERNMENT/MINISTRY OF HEALTH  
*Other Partners:*

STAFF	Current	At Appraisal
<i>Vice President:</i>	Jean-Louis Sarbib	Caio Koch-Weser
<i>Country Manager:</i>	Mahmood A. Ayub	Ram K. Chopra
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<i>Team Leader at ICR:</i>	Alaa Mahmoud Hamed	Frederick L. Golladay
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## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

*Outcome:* S  
*Sustainability:* L  
*Institutional Development Impact:* M  
*Bank Performance:* S  
*Borrower Performance:* S

*Quality at Entry:* QAG (if available) ICR  
U  
*Project at Risk at Any Time:* Yes

### 3. Assessment of Development Objective and Design, and of Quality at Entry

#### 3.1 Original Objective:

**Context.** *Schistosomiasis*, more commonly known as *bilharzia*, has been a serious public health problem in Egypt since the ancient days. There are two forms of Schistosomiasis in Egypt: the hepato-intestinal form, due to *S. mansoni*; and the urinary form, due to *S. haematobium*. The control of Schistosomiasis is recognized as a high priority by political leaders, the general public and health workers. The disease, transmitted through infected snail larvae residing in the Nile waterways, has affected the majority of the rural population in Egypt where high infection rates are observed among children and adolescents. It has been a major cause of incapacity and loss of productivity in these communities. Its advanced cases usually suffer from serious kidney damage, liver disease, enlarged spleen, increased rates of cancer, particularly of the bladder, and vomiting of blood which usually results in death. Until the 1970s, Schistosomiasis control relied primarily on massive pesticide treatment of snail-infested canals, but this approach was proven expensive, logistically demanding and environmentally unfriendly. Treatment of infected persons was limited to a drug (intravenous tartar emetic) which had serious negative side effects, and, therefore, could only be used on a limited number of acute cases. The introduction of Praziquantel in the 1980s provided a major breakthrough for Schistosomiasis control programs around the world as it offered a simple, safe, and effective drug treatment against all human Schistosome species. In 1982, the Government of Egypt (GOE) launched the NSCP, which aimed to "reduce Schistosomiasis to a level at which it is no longer a public health problem" through the application of the new chemotherapy, in combination with snail control and health education. The need to expand the coverage of the NSCP to the Delta has long been recognized, but efforts to address this need have been thwarted by the absence of a cost-effective intervention strategy. In addition, over the past 25 years, Egypt relied on foreign assistance to finance the five Schistosomiasis control projects it undertook.

According to the Staff Appraisal Report dated June 2, 1992, the project would support the development of a sustainable national program to control Schistosomiasis, Egypt's most prevalent parasitic disease. The project had three specific objectives: (i) to extend the National Schistosomiasis Control Program (NSCP) to five governorates in the Eastern and Western regions of the Nile Delta; (ii) to modernize and rehabilitate the existing program in Middle and Upper Egypt, and the Suez Canal area in order to increase its efficiency and effectiveness; and (iii) to support operational research and strengthen management of the Ministry of Health's Endemic - Diseases Control Department (EDCD) in order to further increase operating efficiency and to control operating costs. The project objectives were consistent with the priorities of the GOE to develop a nation-wide program to control Schistosomiasis that could be financed and operated independently by GOE.

#### 3.2 Revised Objective:

The project objectives were not revised during the lifetime of the project. However, the credit agreement (dated July 29, 1992) stated only two objectives as follows: (a) to expand the coverage and improve the operation of the NSCP, and (b) to strengthen the capacity of EDCD to design, evaluate and adjust the national control strategy for the control of Schistosomiasis. The merging of objectives (a) and (b) compared to what was stated in the Staff Appraisal Report (SAR) was found to be relevant as the activities of NSCP under both objectives were similar and were, therefore, consolidated into one program. This change did not affect the content of the objectives; their relevance remained the same.

#### 3.3 Original Components:

Based on the project's objectives, three main components were:

##### A. Expanding the coverage of the NSCP into the Nile Delta Component (US\$23.7 million)

Extension of the NSCP to the Eastern and Western areas of the Nile Delta in five governorates: Beheira, Sharkiya, Daqahliya and Qalubiyah, and the rural area of Alexandria to increase NSCP coverage from 15 million to 32 million people through the provision of drugs and molluscicides, laboratory supplies and equipment, operation vehicles, in addition to technical assistance and training. This component aimed to reduce the prevalence and intensity of infection to a level that is unlikely to result in disease from more than 35% to less than 10%. In the five governorates 871 PHC facilities would screen all school children

twice a year; evaluate all outpatients suspected to be infected; and examine 10% of the population of the catchment area of each health facility monthly.

**B Modernizing and rehabilitation NSCP in Upper and Middle Egypt and in the Suez Canal (US\$15.5 million)**

Consolidation of existing control activities would be done to rehabilitate the facilities and modernize the activities of earlier projects by purchasing equipment, vehicles, and supplies to adopt modern diagnostic technologies and maintain control of prevalence of Schistosomiasis. This consolidation would (a) enable the adoption under the NSCP of modern diagnostic technologies, (b) replace defective microscopes and upgrade lab equipment, diagnostic materials and drugs, and (c) retrain laboratory technicians and physicians.

**C. Strengthening the management capacity of the Endemic Disease Control Department Component (US\$0.7 million)**

**C.1 Provision of technical assistance to EDCD** to (a) strengthen its accounting and budgeting functions and (b) to train staff in modern methods of policy analysis and management. It will enhance the strategic planning and modernization of the program by: (a) Training EDCD staff in modern methods of policy analysis and management; (b) providing consulting services to assist in strengthening its accounting and budgeting functions; (c) providing consulting services to assist in developing studies of operational efficiency and program effectiveness; (d) developing capacity for strategic planning at both central and governorate levels as a step toward further decentralization of planning and control of the program; (e) developing and implementing a refined disease control strategy (more focal approach to surveillance and control in maintenance program); and (f) developing a management-oriented accounting system: supplement existing systems, stress control of physical inputs, develop a chart of accounts, implement a system to account for capital assets, prepare cost analysis on a cost center basis.

**C.2 Carrying out of an operational plan** to introduce more efficient, decentralized and cost-effective management methods for the control of Schistosomiasis, based on recent developments in the technology for its diagnosis and treatment, including (a) research with a view to developing a new control strategy; (b) evaluation of the feasibility of using simple dipsticks to test for the presence of blood in the urine, and of using paper filters to remove ova from standardized volume of urine; (c) evaluation of the Kato technique for diagnosis of intestinal Schistosomiasis, (d) studies and surveys to formulate more effective intervention strategy; and (e) design and evaluation of innovative proposals for Schistosomiasis control, including proposals for improving domestic water supply and waste water disposal as well as strengthening health education.

The three project components were well designed. The project took into account that another credit was approved in 1992 by the African Development Bank (AfDB) covering the Middle Delta, where the project's first component aimed to expand the coverage to East and West Delta. The second component was designed to maintain and improve operations of existing programs. The third component was designed to develop better surveillance, more sensitive diagnosis, and more effective treatment that would enable NSCP to control morbidity at a cost that is affordable to GOE.

The project design took advantage of the presence of a breakthrough represented by the application of a new chemotherapy, Praziquantel, and the introduction of new diagnostic techniques that shifted the existing strategy from mollusciciding to chemotherapy. The credit addressed the weakness in NSCP design and management at that time.

The SAR included a detailed report on the use of the pesticide Niclosamide to control Schistosomiasis limiting its finance to a maximum of 40 metric tons of the pesticide annually for use nation-wide. The report addressed the toxicity of the pesticide, its persistence in the environment, and the precautions required to

package and distribute it.

The project accounted for risks such as parasite resistance to the drug over time; effects of using the pesticide on marine life; use of the pesticide in areas that do not suffer from exceptionally high transmission, where IDA ensured that the GOE would conduct all snail control activities in compliance with specific criteria; and commitment of senior officials to strengthen the capacity of MOH.

The project design drew on the important lessons learned from earlier IDA operations in the population and health sector in Egypt: (a) it addressed a problem that is recognized as important by the GOE as well as IDA; (b) it relied on a detailed, jointly prepared strategy for the long-term development of the program to control the disease; (c) it financed a small number of clearly defined goods and services; (d) it allowed rapid implementation of the findings of analyses of the program and its performance; and (e) it was modest in scale and was directed at one of the more focused programs being carried out by the Ministry of Health

#### *3.4 Revised Components:*

The project components were not substantively revised during the lifetime of the project, however, original components one and two were combined in order to group activities which were undertaken under the NSCP and those undertaken under the EDCD. This required unified procurement packaging for the project inputs such as drugs, pesticides, lab equipment, and vehicles.

#### *3.5 Quality at Entry:*

The overall quality at entry is **unsatisfactory**. The positive elements of the design were discussed under 3.1 *Original Objectives* and *Original Components* 3.3. There were certain shortcomings that were not adequately addressed at the time of appraisal denoting that the project was not ready for implementation. They are summarized as follows:

- (i) The GOE assured IDA that it would designate the Director of Project Administration, EDCD, with staffing and terms of reference acceptable to IDA. This was delayed and, in turn, delayed the project start and implementation.
- (ii) The capacity and role of management at the governorate and district levels to implement the project were not assessed in relation to the role of the central level. This would have adequately addressed the process of decentralization and the expected role of the local-level management of the program.
- (iii) Most of the procurement of project goods were packaged for ICB, equipment lists and technical specifications were prepared, but bidding documents for goods themselves were not prepared for the first year.
- (iv) A very simple implementation schedule in the form of a one-page Gantt chart was developed for the whole project period and no available detailed implementation plan was found.
- (v) A clear economic analysis was conducted, in which sensitivity analysis was performed and internal rate of return was calculated; however, the calculations were based on mortality rates from Schistosomiasis which are small compared to morbidity.
- (vi) Although agreement on a formal set of performance indicators was not an IDA requirement at the time of the project, the SAR contained a set of input, process and outcome indicators for annual reporting. However, some of these indicators were difficult to measure, and there was no monitoring and evaluation system in place for data collection and analysis of the proposed indicators.
- (vii) Financial management arrangements were not adequately elaborated to ensure proper recording, monitoring, and reporting of project components, activities, and expenditures. They were short from determining the kind of auditor (i.e., governmental or private) or the nature of accounting system (i.e., manual or computerized).

## **4. Achievement of Objective and Outputs**

### *4.1 Outcome/achievement of objective:*

In terms of the overall project objective, the project is **satisfactory**. It was successful in supporting the

development of a sustainable national program to control Schistosomiasis. Under the project, the NSCP achieved (i) national coverage of the program, including its extension to the newly reclaimed areas; (ii) operational integration of the program into existing health service delivery systems, (iii) introduction of new diagnostic techniques and treatment protocols, including the use of pediatric Praziquantel formula and development of mass treatment strategies; (iv) introduction of modern technology, such as GIS mapping, to support epidemiological surveillance; and (v) establishment of quality control systems and strengthening of research and project management capacity within EDCD. As of the end of 2002, the NSCP covers the entire rural population of Egypt of about 35 million people, and the prevalence of Schistosomiasis decreased to less than 5 percent of the population, compared with 35 percent of the population for *S. haematobium*, and 38.6 percent for *S. mansoni* in 1983. As standards of health and hygiene in rural Egypt improve, Schistosomiasis prevalence should continue to decline. In Upper Egypt, the prevalence of *S. haematobium* is found to be below 5 percent, and *S. mansoni* is still absent. However, in the Nile Delta, *S. mansoni*, which replaced *S. haematobium* as the dominant species, is proving difficult to eliminate, and prevalence remains at around 10 percent with some villages continuing to exhibit higher prevalence rates.

The first objective, “to extend the National Schistosomiasis Control Program (NSCP) to five governorates in the Eastern and Western regions of the Nile Delta,” is **satisfactory**. The extension of the NSCP to the Delta governorates has been completed. In Lower Egypt, the MOHP data in 2001 for *S. mansoni* showed a positive rate of less than 3 percent in school children, less than 6 percent in outpatients, and less than 5 percent overall. The total positive rate from consolidated results of stool examination in RHUs for *S. mansoni* has dropped almost seven folds between 1996 and 2001, from 11.9 percent to 1.6 percent. This decline was in all three groups where it was reduced from 17 percent to 2.7 percent in outpatients, from 5 percent to 1.4 percent in community surveys, and from 6 percent to 0.8 percent in school children. The most important reductions in high-prevalence governorates were: Beheira from 23 percent to 2.2 percent, Kafr El Sheikh from 19 percent to 3.5 percent, Sharkya from 14 percent to 0.9 percent, Demyatta from 13 percent to 1.3 percent, Dakahlyia from 12 percent to 1 percent. The number of communities (with a high prevalence over 20 percent) decreased from 517 “hot spots” in 1996 to 166 in 1999 (with a prevalence less than 10 percent). The results of 2001 show that the prevalence in every targeted village or school is now below 2-4 percent.

The second objective, “to modernize and rehabilitate the existing program in Middle and Upper Egypt, and the Suez Canal area in order to increase its efficiency and effectiveness,” is **satisfactory**. In Upper and Middle Egypt, the MOHP data in 2001 for *S. haematobium* are now well below 5 percent in most governorates. According to local physicians, clinical disease in those areas has disappeared, as haematuria is rarely seen. The total positive rate from consolidated results of urine examination in Rural Health Units (RHU) for *S. haematobium* shows that it declined between 1996 and 2001 from 5.3 percent to 1.3 percent. This decline was in all three groups where it was reduced from 5.6 percent to 1.7 percent in outpatients, from 4.1 percent to 1.1 percent in community surveys, and from 5.5 percent to 1.2 percent in school children. However, for *S. mansoni* there might be imported infection from nearby governorates in Lower Egypt (0.03 percent in Giza). A recent study suggests that *S. mansoni* is emerging as the main transmitted species in Giza. The snail *biomphalaria* is widely present in Middle and Upper Egypt. The gradual replacement of *S. haematobium* by *S. mansoni* that occurred in Delta over the past few decades is not well understood and the trend might be progressing southwards.

The third objective, “to support operational research and strengthen management of the MOHP’s EDCD in order to further increase operating efficiency and to control operating costs,” is **unsatisfactory**. The management of the program has considerably improved; new control strategies were developed and have been consistently implemented. The change in control strategies resulted in decreased use of Praziquantel and Niclosamide and cost savings. However, most of the operational research objectives, pursued primarily through the Schistosomiasis Research Project (SRP) (financed by USAID and MOHP), were not satisfactorily met. The technical capacity of the EDCD at the central level in terms of staffing, training and equipping remained insufficient.

#### 4.2 Outputs by components:

As noted earlier, during the course of project implementation, it became difficult to differentiate the inputs and activities for components A and B. The project provided the following inputs: Praziquantel (110 million tablets and 2.26 million suspension bottles), Niclosamide (60 Tons); laboratory equipment; vehicles (210 pick-ups, 20 minibuses and 3 four Wheel Drives), motorcycles (350), bikes (4,000); IT equipment; family folders and office equipment; and medical equipment and other goods. Procurement was handled at the national level and then distributed to governorates based on criteria developed at the central level. The NSCP organized training for all physicians and laboratory technicians on qualitative and quantitative stool and urine examination techniques. Snail control training was also offered on snail sampling, snail identification, mapping of canals, snail infection, and application of molluscicides. Health education campaigns were conducted through printed material and centrally produced TV spots disseminating national messages.

A. Expanding the coverage of the NSCP into Nile Delta

The first component is **satisfactory**. Extension of the NSCP to the Eastern and Western areas of the Nile Delta in five governorates was achieved through the coverage of 17 million additional people. Laboratory supplies and equipment, operation vehicles, drugs and molluscicides, in addition to technical assistance and training, were provided. The necessary organizational structure at all levels in the governorates was created and staffed. The Director of the tropical disease department coordinated the work of four units: Bilharzia Control Unit, Snail Control Unit, Vector Control Unit, and Malaria Control Unit. A chief lab technician at the governorate level regularly checked the quality of the lab technicians. Training of staff at all levels on implementation strategies was conducted. The control operations as selective chemotherapy and focal mollusciciding were implemented by all RHUs and snail control units. Kato Katz technique for diagnosis of *S. mansoni* was introduced in all Lower Egypt governorates.

*Selective Population Chemotherapy.* In 1999, a total of over 30 million stool and urine examinations were performed, and more than 600,000 persons received Praziquantel treatment on the basis of a positive stool or urine sample. In 2001, over 37 million examinations were performed and over 300,000 persons received treatment.

*Mass Population Chemotherapy:* In Lower Egypt, MPC covered an estimated total of 16 million children in school MPC and 7 million people in community MPC from the period 1997 to 2001. In the same period, during school MPC campaigns, the number of children receiving treatment decreased from 4 million to 1.8 million, and during community MPC, the number of people receiving treatment decreased from 2.7 million to 0.5 million.

*Snail Control:* Due to the success in changing control strategies, the amount of Niclosamide consumed decreased from 44 to 26 tons, which was reflected in the decreased number and length of water courses treated. During the period 1997 to 1999, the number of water courses requiring treatment decreased from 30,000 to 14,000, and the length of water courses treated decreased from 25,000 km to 13,000 km.

*Newly reclaimed lands:* During the project period, the EDCD expanded to new areas: Al Salam land reclamation project areas in Suez and Sinai, and Toshka project near Aswan Lake. The Al Salam project, which brings Nile water to the Sinai desert, will irrigate 620,000 feddans in Sinai and Suez and will become the home to 3 million immigrants mainly from Delta. Near Toshka, a huge pump station is under construction to irrigate 540,000 feddans in the Western Desert and will become home for an estimated 6 million immigrants. No transmission has yet been established in these new areas according to EDCD surveys, but the EDCD is closely supervising the health staff and assuring systematic screening of incoming settlers, as well as surveying the new canals for snail colonies.

B. Modernizing and rehabilitation of NSCP in Upper and Middle Egypt and in the Suez Canal

The second component is **satisfactory**. The consolidation of existing control activities to rehabilitate the facilities and modernize the activities of five projects previously implemented (in Middle and Upper Egypt

and the Suez Canal region) has been achieved. Coverage of Schistosomiasis has been maintained for the existing 15 million people in 21 governorates. The adoption of modern diagnostic technologies was completed and included replacing defective microscopes, upgrading laboratory equipment and diagnostic materials, introducing a new drug, and retraining laboratory technicians and physicians. Urine dip sticks are now used to diagnose *S. haematobium* for all schoolchildren of Egypt, and positive samples are checked by urine sedimentation technique.

*Selective Population Chemotherapy:* In 1999, a total of over 21 million stool and urine examinations were performed, and more than 800,000 people received Praziquantel treatment on the basis of positive stool or urine samples. In 2001, over 20 million examinations were performed and over 200,000 people received treatment.

*Mass Population Chemotherapy:* In Upper and Middle Egypt, MPC has covered an estimated total of 3.8 million children in school MPC and 0.8 million people in community MPC from the period 1999 to 2001. In the same period, during school MPC campaigns, the number of children receiving treatment increased from 0.9 million to 1.5 million, and during community MPC, the number of people receiving treatment decreased from 0.3 million to 0.08 million.

*Snail Control.* As explained earlier, the amount of Niclosamide consumed decreased from 41 to 21 tons due to the successful change in the control strategies. From 1997 to 1999, the number of water courses that required treatment decreased from 19,000 to 9,000, and the length of water courses treated decreased from 18,000 km to 8,000 km.

#### C Strengthening the management capacity of the EDCCD

The third component is **unsatisfactory**.

C.1 Provision of technical assistance to EDCCD to strengthen its accounting and budgeting functions and to train its staff in modern methods of policy analysis and management.

The capacity for strategic planning at the central level has improved, mainly due to the exposure in applied research that has strongly contributed to more evidence-based policies and strategies. Training EDCCD staff in modern methods of policy analysis and management was limited. Only key staff were involved in a limited number of study tours and conferences. A very limited number of staff received training in epidemiology. In spite of constant recommendations by IDA, technical strengthening, procurement of modern equipment and international exposure of the central EDCCD team have remained insufficient. The disease control strategies were well developed, but the EDCCD still needs to increase refinement effort to a more focused-approach to surveillance and control. A number of inputs were recently procured that will assist better surveillance and implementation of micro-focal strategies by working with the National Communicable Disease Surveillance Department and the Family Medicine Program. Their impact cannot yet be evaluated as these inputs were delivered at the end of the project. The EDCCD used consulting services to strengthen its procurement, on the other hand it did not develop a management-oriented accounting system and did not strengthen its accounting and budgeting functions. In addition, the EDCCD did not develop studies of operational efficiency and program effectiveness.

C.2 Carrying out of an operational plan to introduce more efficient, decentralized and cost-effective management methods for the control of Schistosomiasis.

The project was successful to a certain extent in evaluating the use of suspension formula of the drug Praziquantel as one new option under Egyptian field conditions and incorporating it into the national program. However, most of the operational research objectives, pursued primarily through the SRP-project, have not been satisfactorily met. There was no economic evaluation study related to the national Schistosomiasis control program comparing costs and effects.

*Screening methods* - most of the related studies were carried out. They have helped the NSCP to move from qualitative techniques, depending on identifying positive or negative cases, to quantitative techniques that would enable the NSCP to determine the morbidity indicator and intensity of infection. However, the quantitative techniques were applied in limited areas on a small scale in index villages and have not yet been expanded.

*Intervention strategy and Innovative interventions* - most of the related studies were not carried out.

*Institutional strengthening* - establishing criteria for shifts between program phases; outlining the contents of the program during each phase; documenting changes in program content; and defining and documenting cut-off values for intensive focal intervention were not done.

*Strategic planning and decentralization* - the EDCD is developing an annual strategic operational plan and budget and is organizing biannually planning seminars, one for the Lower Egypt governorates and the other for the Upper Egypt governorates.

#### 4.3 *Net Present Value/Economic rate of return.*

In the 1992 SAR, the economic rate of return (IRR) was estimated based on conservative assumptions using mortality due to Schistosomiasis as an effectiveness measure and neglected morbidity. Using mortality rates gave minimum estimates of IRR. If morbidity had been included the estimates of project benefits would have been much greater. Two scenarios were estimated: the first yielded 40 percent assuming at least 4,600 deaths would be averted each year due to Schistosomiasis prevention, and the second yielded an IRR of 17 percent assuming that the number of deaths averted would be only 2,300 or half the estimated number. The estimations took in consideration that Egyptians are willing to pay from US\$2.2 to US\$0.5 a day, for an additional year of life expectancy. These estimations were based on projected costs.

Using actual costs to replicate the analysis during the ICR: for the first scenario, the IRR ranged from 35 to 41 percent (compared to the projected 40 percent in 1992), while for the second scenario, the IRR ranged from 25 to 29 percent (compared to the projected 17 percent in 1992). By comparing the IRR estimates, the differences are found to be minimal, indicating achievement of actual economic benefits over the lifespan of the program. These IRRs are deemed respectable and reflect the net economic benefits of the NSCP over the last 10 years, assuming a reduction of mortality due to Schistosomiasis and increased life expectancy are considered long-term goals of the national program.

#### 4.4 *Financial rate of return:*

The change in control strategies has resulted in a decrease in the use of the quantities of Praziquantel and Niclosamide. In addition, a marked reduction has occurred in their international prices. These reductions have resulted in significant cost savings that will enable the GOE to finance the Schistosomiasis control activities.

#### 4.5 *Institutional development impact:*

The impact of this project on institutional development is modest. The project was not designed to undertake major sectoral reforms, but was directed toward addressing the more immediate needs of the GOE. Given the limited experience of the ministry in implementing investment projects, an attempt was made to keep the project components simple and manageable. The successful institutional development impacts of the project have helped in the effective use of human and financial resources. This was reflected in the integration of the NSCP activities within the operational structure of the MOHP, the EDCD and its regular health care structure. At central level, capacity for strategic management and improved decision making was partially strengthened where new control strategies were developed and consistently implemented. At governorate level, the implementation capacity is adequate at different levels to implement the control strategy of treatment and mollusciciding, to collect routine surveillance data and to report to the central level regularly, while their capacity to provide health education to the public is limited. At district level, the implementation capacity is less developed, while it is adequate at the RHUs. Annual review meetings are held to discuss and attempt to

solve difficulties. Strategic decisions were taken by the High National Committee for Schistosomiasis Control to determine the role of the MOHP, as compared to other ministries, in the control of schistosomiasis, but with insufficient effectiveness for the other sectors related to Schistosomiasis control.

## 5. Major Factors Affecting Implementation and Outcome

### 5.1 Factors outside the control of government or implementing agency:

**The international price decrease of Praziquantel and Niclosamide:** The prices of both Praziquantel and Niclosamide fell dramatically, allowing for huge project cost savings, and the subsequent inability to use about SDR 3.4 million of the funds allocated that was cancelled after the closing date.

**Delayed results of international testing:** The international testing of the drug, Praziquantel, and the pesticide, Niclosamide, during the procurement process took much longer than expected and delayed the disbursement for these procurement packages.

### 5.2 Factors generally subject to government control:

**Delayed effectiveness:** Project effectiveness was delayed for almost one year due to the lengthy ratification process in Egypt from November 1992 to June 1993.

**Special Account:** The opening of the special account was delayed for one and one half years in February 1995, which in turn delayed disbursements of the project. This was mainly due to obtaining the necessary governmental approvals to open the special account.

**Preference for national suppliers:** A governmental decree exists that does not allow the import of locally produced goods, ignoring the necessity to ensure competition and transparency for sound procurement. Requesting needed exceptions was a long and difficult process that delayed disbursement.

### 5.3 Factors generally subject to implementing agency control:

**Delays in recruiting professional staff:** There was a delay in the recruitment of professional staff to implement the project due to uncompetitive salaries and undesirable working conditions offered by the PIU, thereby causing the slow disbursement of project funds.

**Delay in procurement procedures:** There were two factors related to procurement that delayed the project: (i) the cancellation of five large procurement packages between 1996 and 1999 after the selection of the qualified least evaluated bidder (for 100 Tons of Niclosamide, for vehicles, and for lab equipment), and (ii) delays in the preparation of the technical specifications of the bidding documents and the length of time taken to evaluate the bids - reaching 3 to 6 months.

### 5.4 Costs and financing:

#### *Project Cost*

The project cost and quantity estimates were based on (i) the USAID-funded SRP study and the AfDB-financed project in the Central Delta areas; (ii) district-level surveys; and (iii) records of current operations. Both costs and quantities were confirmed by the Bank during project appraisal. The total project cost was estimated to be US\$43.25 million (US\$23.73 million for expanding the NSCP, US\$15.56 million for modernizing and rehabilitating the NSCP in Middle and Upper Egypt, and US\$.75 million for strengthening the management capacity of EDCCD). Of the total project cost, US\$5.99 million equivalent was in local currency and the remaining US\$37.26 million in foreign currency.

### ***Project Financing***

A Bank credit of US\$26.84 million was approved by the Board to the GOE in June 1992. The Government committed US\$5.99 million equivalent in local funds, with the MOHP assigned as the implementing agency. The Bank credit was used for the following categories: equipment, including operation vehicles and materials; drugs; pesticides; and consulting services and training. The government financed the customs and duties on ICB packages, with its share for ex-factory and locally produced goods financed by IDA. The co-financing of an unidentified financier for \$10.42 million (post-appraisal) did not materialize during the lifetime of the project. This was the main reason for the difference between SAR cost estimates and actual project costs by the end of the project.

IDA disbursed about US\$21.5 million (82 percent) of total the US\$26.84 million credit. IDA financed the procurement of Praziquantel (110 million tablets and 2.3 million suspension bottles) costing US\$10.2 million, the procurement of Niclosamide (60 Tons) costing US\$0.7 million, the procurement of lab equipment and other equipment costing US\$2.6 million, the procurement of vehicles) costing US\$3.5 million, IT equipment costing US\$2.8 million, family folders and office equipment for health facilities costing US\$1.9 million, and US\$0.07 in the form of training, consulting services and printing materials.

## **6. Sustainability**

### ***6.1 Rationale for sustainability rating:***

**Project sustainability is likely**, given the low risk factors related to policy environment; government ownership; stakeholder ownership; technical, environmental, financial, economic viability; social impact and local participation, and institutional/ management effectiveness.

*Policy environment:* The political urgency to control the disease has not decreased, and Schistosomiasis is still considered a public health problem. The political commitment is maintained and demonstrated by follow-up from the President, political leaders, stakeholders, and the beneficiaries themselves. However, given the decreasing prevalence of the disease and as the morbidity and mortality rates fall, there is a risk that this political urgency could wane.

*Government ownership:* Government ownership is expected to continue given the strong support shown by the Ministry of the Health and Population. The GOE maintains an annual budget allocation of LE 7.0 million for the purchase of Niclosamide that is sufficient to meet the annual need.

*Stakeholder ownership:* A beneficiary survey conducted by IDA, during the ICR, stated that the Information, Communication, and Education (IEC) campaigns raised the awareness of the public about the impact, prevention and treatment of the disease, thereby creating a demand to maintain the outcomes achieved by the project and improve the individual health-seeking behavior for prevention and treatment. Public and the community leaders are ready to provide support to ensure sustainability of the Schistosomiasis control activities.

*Institution/management effectiveness:* Under this project, EDCD achieved the project objectives in terms of national coverage of the program, decreasing the intensity of infections and the prevalence of the disease. The capacity of EDCD central- and governorate- level staff to manage the program effectively is present. There is commitment of primary health care physicians and technicians demonstrated by their interest in maintaining the Schistosomiasis control activities to improve the health status of the rural population. The EDCD was successful through its various inter-ministerial committees to ensure that the national program for sanitation and sewer construction give priority to "hot spot" areas; that canals in new land reclamation areas are lined with concrete to prevent establishment of snail colonies; that new villages have adequate and safe water supply and sanitation to stop the transmission; and that immigrants to newly reclaimed areas are systematically screened and treated for Schistosomiasis and that the local health staff in these areas are supervised by EDCD.

*Economic viability:* The NSCP is economically viable as a cost-effective intervention that reached the final beneficiary and that improved the health status of the population in Egypt. By comparing the IRR estimated in

the SAR with the IRR calculated based on actual costs at the end of the project, the differences were found to be minimal, indicating achievement of actual economic benefits over the lifespan of the program. The economic gains of the investment were reflected in the form of additional output, such as the augmentation of the productive labor force due to prevention of mortality and subsequent increase in life expectancy, and the improved living conditions and community welfare.

*Financial viability.* A marked reduction has occurred in the prices and quantities used of Praziquantel and Niclosamide. These reductions resulted in significant cost savings that will most likely allow financing of the Schistosomiasis control activities by the GOE. The price of Praziquantel has decreased dramatically from LE 0.98 in 1995 to LE 0.24 in 2001, and the price of Niclosamide has decreased from US\$ 50,000/ ton to US\$ 12,000/ ton during the same period. In addition, changes in control strategies decreased the quantities used of Praziquantel and Niclosamide. Nationally, the use of Niclosamide began to decrease gradually beginning in 1998 and Praziquantel beginning in 2001. The projected annual use of Niclosamide is approximately 10-12 Tons costing US\$120,000 – US\$148,000 annually, while the consumption of Praziquantel is expected to decrease to 6 million tablet costing US\$ 1.5 million annually.

*Technical viability:* The development of a safe and effective drug that can be administered in a single dose has revolutionized Schistosomiasis control. The control strategy depends on administering Praziquantel to persons who are infected. It reduces the intensity and duration of parasitic infection and, thereby, lowers the probability that disease will develop. Local production of Praziquantel is available at a price affordable for the GOE. There was consensus that the consolidation and maintenance activities need to be maintained at the existing level. Relaxation due to lowered prevalence rates and decreased morbidity could lead to a resurgence of high infection levels as happened previously in Fayoum governorate.

*Environmental viability:* It can be concluded that the project is environmentally viable. Niclosamide, the main molluscicide used by the NSCP, is used to kill freshwater snails and their eggs, especially the intermediate host for *S. mansoni* and *S. haematobium*. Water treated with niclosamide by the molluscicidal concentration can be safely used for irrigating crops. It has little impact on aquatic plants, however, at high concentrations, it is toxic to algae and aquatic vegetation. Niclosamide is lethal to all Nile fish species at the concentrations used for molluscicides. Although Niclosamide is likely to have an immediate effect on the majority of the aquatic community, most organisms recover quickly and the treatment area community structure returns to pretreatment conditions within weeks or months.

*Social Impact and local participation:* The previously mentioned beneficiary survey concluded that the rural population and the community leaders realized the positive social impact of the NSCP activities. The beneficiaries generally perceived the outcomes of the project in terms of improved health and reduced complications due to Schistosomiasis, and perceived the outputs in the form of improved screening, diagnostic techniques, and treatment conducted by the RHUs. The beneficiaries showed commitment in the form of readiness to raise awareness; distribute drugs, and provide RHUs with community/ village information. However, there were mixed results related to financial contribution by beneficiaries, where most perceived the MOHP as the responsible agency for covering the costs related to control of Schistosomiasis and treatment of infected cases.

#### 6.2 Transition arrangement to regular operations:

All NSCP regional areas have been integrated into one intensive national program, implemented through the regular health care system, coordinated and managed by the EDCD. The MOHP is the implementing agency for the NSCP, and the Executive Director of the NSCP is a staff member of the EDCD. NSCP has consciously attempted to integrate some of its activities within the existing health delivery system through: the integration of Schistosomiasis case management training in the rural primary health care units, and the integration of planning of Schistosomiasis treatment and control programs at the local and district public health offices, which have adequately been staffed, trained and equipped. The MOHP is responsible for three of the four interventions available to control Schistosomiasis (chemotherapy, snail control and health education), whereas water quality and environmental management is the responsibility of other agencies such as Water Resources and Irrigation. In order to coordinate these multisectoral activities, regular meetings are held by the High

National Committee for Schistosomiasis Control, chaired by HE the Minister of Health and Population, and which comprises representatives of Water Resources and Irrigation, Electricity, Agriculture, Environment, Social Affairs, Education, Information, Religious Affairs, Interior and Health Insurance Organization. The effectiveness of this committee will need to be reviewed. There are two main shortcomings related to EDCD. The first is the over centralization of planning of the NSCP at the EDCD central level, where there is room for a defined group of decisions that can be taken at the governorate level. The second is resistance to professional modernization apparently due to central frugality on one hand and reliance on the USAID project, the SRP, on the other. Procurement of modern office equipment, e.g., computers, and the installation of internet and internal network facilities, have remained insufficient.

*IDA and MOHP should follow-up on a few issues of importance that are emerging.* These are needed to redefine the objectives of the NSCP, the emphasis on community participation and health promotion strategies, the integration of the NSCP within the Health Sector Reform Program (HSRP); the proper extension of control activities into newly reclaimed land areas; the monitoring of the potential drug resistance to Praziquantel; the enhancement of the process of monitoring and evaluation of the NSCP; and the integration of SRP capacity into Reference & Operations Research Unit for Endemic Diseases Control in MOHP. IDA recommends that in due course a scientific paper to be written jointly with MOHP and a reputable scientific institute. This can be followed up with a symposium to share experiences between countries in dealing with similar problems, transition arrangements and how to manage the risks to sustainability and effective control.

## **7. Bank and Borrower Performance**

### **Bank**

#### ***7.1 Lending:***

The Bank's performance during project preparation is **unsatisfactory**. The Bank has assisted the GOE's efforts to control Schistosomiasis in Middle and Upper Egypt through components of drainage and irrigation projects. There was no CAS available at the time of project identification and the Bank had to initiate a sector dialogue during project preparation. The operation, at that time, was expected to lead to further Bank Group participation in the health sector in Egypt that would strengthen programs through strategic planning and improved management. The Bank reviewed the health situation in Egypt including life expectancy, mortality and morbidity rates, the national health policies, and assessed the overall performance of the health sector. The Bank examined in more depth the prevalence of schistosomiasis, the consequences of the disease in terms of public health on individuals and the public, its impact on the socio-economic status of the country, and the possible control strategies to combat it. These were used to identify the priority areas for the Bank's assistance. The Bank invested adequate project resources, however, the preparation and appraisal were carried out by a team which had a good technical and experienced staff but lacked experience in implementation. This was reflected in the design of the project where it was not ready for implementation as discussed in the section on QAE. Given the Bank's limited knowledge of the sector institutions, and the unfamiliarity of these institutions with the Bank's operational policies and procedures, more Bank resources should have been invested up front to strengthen their institutional capacity.

#### ***7.2 Supervision:***

The performance of the Bank regarding supervision is **satisfactory**. Initially, Bank supervision was unsatisfactory and inadequate especially in terms of staff capability. The frequency and staff composition of missions were limited from the first through the third year of project implementation specially in terms of operations officers to help the implementing agency address implementation issues and to build capacity in the MOHP. Given the slow start of the project, the Bank, at that time, should have carried out dialogue with the Ministry of Planning and International Cooperation about the slow disbursement of the project, and should have heavily invested in supervision and training of PIU and MOHP staff in project implementation issues. The situation was addressed and improved as missions were held more regularly starting 1995. It was not until the last three years of the project that supervision teams were well staffed to better address implementation issues and supervision became satisfactory. This improvement was complemented by recruiting a health specialist based in the resident mission in Cairo for the supervision of the health portfolio including the Schistosomiasis project. During the course of this project, four task managers were hired but were not been given enough budgetary resources to undertake proper

supervision. The mission teams maintained the presence of the same technical expertise during the remaining supervision period and included operations officers/ implementation specialists. They provided technical assistance related to public health issues and implementation issues. The mission teams produced quality technical reports that directed the shifting of control strategies developed by NSCP. The technical assistance identified areas of concern that would need proper attention from the EDCD and NSCP and supported their interventions. Supervision became proactive in identifying bottlenecks in implementation, alerting the EDCD, and following up with EDCD on resolving them. A midterm-review team conducted adequate field visits. The Bank was flexible in providing an extension for one year to give the MOHP an opportunity to develop strategies for sustaining the project by shifting to selective micro-focal strategies to address the "hot spot" areas and later a limited extension of three months to complete the procurement of packages related to the implementation of these strategies. Given the cost savings resulting from the project, the Bank ensured that sufficient quantities of drugs, pesticides, chemicals, consumables, and laboratory equipment were procured to sustain the control activities during the lifetime of the project by the NSCP for another two years after the closing date of the project.

### *7.3 Overall Bank performance:*

**Overall, Bank Performance is satisfactory.** The project identification, preparation assistance, and appraisal have been carried out satisfactorily. The supervision of this project needed to be much more intensive. Supervision budgets near the beginning of the project were insufficient given the nature of the institutional structure of MOHP, and the attempt to implement a politically visible project in a ministry where the Bank has very little experience. However, it should be added that both Bank management and staff were very responsive in giving good quality technical advice and in providing assistance to resolve project implementation issues in a timely manner. It should also be noted that the Bank was able to provide the GOE with state of the art support in the fields of Schistosomiasis control on a constant basis during the supervision of this project and provided appropriate links with health sector reform.

### **Borrower**

#### *7.4 Preparation:*

The Borrower's performance during preparation was **satisfactory**. The Borrower expressed interest in the Bank's technical and financial assistance and provided the Bank with adequate support and cooperation during project preparation. However, the Borrower's unfamiliarity with Bank operational guidelines and procedures presented real difficulties in the preparation and implementation of the project

#### *7.5 Government implementation performance:*

The Government implementation is **satisfactory**. This view is based on the commitment shown to eliminate the disease and responding to the public health needs of the community. The GOE made available enough of its own funds for the project. The project implementation unit was changed only once during the project's life time, which provided stability to the implementing team. However, the Government's cumbersome administrative procedures, combined with differences between the Egyptian procurement law and the Bank procurement guidelines, resulted in protracted project implementation. In addition, these procedures delayed project effectiveness for one year and delayed the opening of the special account for an additional year and a half. For intersectoral collaboration, a High Committee of Schistosomiasis Control was formed, where the MOHP was represented. Coordination between the members of this committee needs to be strengthened regarding activities that are not related to MOHP.

#### *7.6 Implementing Agency.*

The performance of the implementing agency is **satisfactory**. Performance was satisfactory related to achievement of the project objectives, but remained unsatisfactory for project management issues related to monitoring and evaluation.

*Project management:* Although the EDCD was staffed with an adequate number of professionals and administrative staff, project activities were mainly run by the EDCD Director himself. Procurement of modern office equipment including computers, faxes, internet and email accounts for managers of EDCD were deficient. A limited number of computer training and English courses were given to administrative staff. The EDCD was reluctant to use the credit for technical assistance activities especially recruiting consultants and

capacity building activities for managers.

*Disbursement:* Initially, project disbursement was slow because of factors outside the control of the implementing agency, such as delayed effectiveness and opening of the special account; and the utilization of funds from other resources such as MOHP and AFDB during the same implementation period of this project extending from 1992 to 1998. The project disbursed less than US\$100,000 until the end of FY 1996. The project was able to compensate for these delays during the course of implementation of the project. As of November 30, 2002, the project disbursed SDR 16 million, or 82 percent of the total IDA Credit amount of SDR 19.6 million. The undisbursed amount of SDR 3.6 million were due mainly due to the cost savings that resulted from the dramatic decrease in the prices of Praziquantel and Niclosamide.

*Procurement:* The quality of procurement including the process of procurement planning, processing, and monitoring was unsatisfactory but has improved along the course of the project. The PIU did not adhere to the procurement schedule. Procurement was handled by the Central Procurement Department (CPD) in MOHP which was the main reason for delays. In addition, all purchases needed to be cleared by the Minister.

*Financial Management:* The Bank received an unacceptable audit report for 1997 and later requested a re-audit by a qualified and independent auditor. The project received a qualified audit report for the year ending June 30, 1999, six months after its due date. The report emphasized the lack of a reliable accounting and filing system in the project. The Project worked on resolving the issues identified in the audit report. The Project received a clean audit report for the year ending June 30, 2001. A final Statements of Expenditures (SOE) review conducted in 2002 did not identify serious accountability issues (i.e., no ineligible, questioned, or unsupported transactions).

*Monitoring & Evaluation:* The ED CD mainly uses consolidated RHU data as a basis for monitoring and evaluation, with consolidated totals at the district, governorate and national level. Although this data does not represent prevalence rates, it is sufficient for the purpose of morbidity control, practical in the operational setting of a PHC based control program, and deeply entrenched as an institutional routine. However, the MOHP did not validate the prevalence data from NSCP surveys by an independent evaluation, although it was constantly requested. There are deficiencies related to the internal and external quality systems. Training on epidemiological survey design, data analysis methods, and reporting is needed.

#### *7.7 Overall Borrower performance:*

**Overall, the performance of the borrower is satisfactory**, primarily because the borrower was able to meet its commitments by extending the NSCP effectively to the Delta in addition to newly reclaimed land areas, and consolidating the NSCP over the entire territory. All project components of NSCP were successfully integrated under one National Program, coordinated by the ED CD, and implemented through the regular health care system. Project management improved over the implementation period of the project for disbursement, procurement and financial management. Issues related to monitoring and evaluation remained unsatisfactory until the close of the project.

## **8. Lessons Learned**

The lessons learned from this project are:

**Adoption of international control strategies and their adaptation to the country situation:** The Schistosomiasis project in Egypt has been characterized by its compliance to implement the recommended international sound and widely recognized control strategies. In addition, Egypt has adapted the control strategies to the country situation taking into consideration the epidemiological and demographic pattern. These were used to select and target priority intervention areas.

**Select a well-recognized problem both by the Government and the Bank:** The Schistosomiasis project enjoyed high visibility and strong support from all important political players, community leaders and individuals in the country. **There was strong ownership on the part of the client.** Advocacy/awareness

campaigns created an adequate understanding of the consequences of the disease among the public and ensured the demand for monitoring the timely availability of these inputs. The GOE and the Bank recognized that the benefits of addressing this problem could decrease the burden of disease in the country. In addition, this project was viewed as a successful entry point that could lead to further Bank participation in a new sector, the health sector, where the Bank has little experience in Egypt.

**Ensure agreement on the project objectives:** The need to expand the coverage of the NSCP to Delta has long been recognized in Egypt. The efforts to address the need were delayed due to inadequate resources to implement a new cost-effective strategy. Middle and Upper Egypt governorates needed to be modernized in order to absorb this strategy. Accordingly, these two objectives were achieved.

**Keep the project design simple:** The GOE and the Bank designed the project to be simple by financing a small number of clearly defined goods and services. The control strategies that determined these goods were carefully designed, subject to adequate policy discussions and endorsement, and benefited from technical advice from the Bank.

**Develop a sound and "living" Project Implementation Plan owned by the borrower for each component:** This project lacked a detailed and clear implementation plan which led to misunderstandings of the specific activities that were to be implemented and financed. Accordingly, the PIU resorted to funds from its own resources and other donors, such as AfDB, to finance activities that should have been financed under the project.

**Build the capacity of counterpart staff who will be concerned with project execution on Bank policies, procedures and guidelines:** The Bank should invest adequate resources to build the capacity of clients who have little or no experience in working with the Bank. A well-planned project launch, more supervision missions and higher supervision budgets would have better guided and assisted the client. Capacity building activities would have ensured an earlier start of the project and would have avoided delays in implementation. The project launching-workshops at the beginning of the project implementation were not adequate to ensure smooth implementation.

**Develop a sound system for Monitoring and Evaluation:** A list of indicators was developed at the project preparation stage without a baseline or clear arrangements for data collection, analysis and reporting. This led to unsatisfactory monitoring and evaluation of the project.

## 9. Partner Comments

### *(a) Borrower/implementing agency:*

The Borrower's comments were incorporated in this report. The technical comments are detailed in the Borrower's EDCD Technical Report.

### *(b) Cofinanciers:*

### *(c) Other partners (NGOs/private sector):*

## 10. Additional Information

During the ICR, IDA conducted a beneficiary survey, a cost-effectiveness analysis, an environmental analysis, an ex-post review, and field visits to Alexandria, Beheira, Qena and Aswan.

## Annex 1. Key Performance Indicators/Log Frame Matrix

### Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR	Actual/Latest Estimate
<p>The outcome indicators identified during appraisal were difficult to measure. In addition, there was no M&amp;E system in place to undertake data collection and analysis for these indicators. The ICR tries to identify measurable indicators that can assess the change in situation.</p> <p>Outcome Indicators</p> <p>1.0 Total positive rate for S. Mansonii in Lower Egypt</p> <p>2.0 Total positive rate for S. haematobium in Upper and Middle Egypt</p>		<p>1.6% in 2001 compared with 11.9% in 1996.</p> <p>1.3% in 2001 compared with 5.3% in 1996.</p>

### Output Indicators:

Indicator/Matrix	Projected in last PSR	Actual/Latest Estimate
<p>1.1 Number of school children (aged 6-18) treated during mass chemotherapy campaigns in the entire Delta area, and Fayoum governorate</p> <p>1.2 Number of water courses treated in Delta region</p> <p>2.1 Number of school children (aged 6-18) treated during mass chemotherapy campaigns in Middle and Upper Egypt</p> <p>2.2 Number of water courses treated in Middle and Upper Egypt</p>		<p>16 million children were treated during the period 1997-2001.</p> <p>Decreased from 30,000 to 14,000 during the period 1997 to 1999.</p> <p>4 million children were treated during the period 1997-2001.</p> <p>Decreased from 19,000 to 9,000 during the period 1997 to 1999.</p>

<sup>1</sup> End of project

## Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
1. Expanding the coverage of National Schistosomiasis Control Programme into the Nile Delta	23.73	15.90	67
2. Modernizing and Rehabilitating the National Schistosomiasis Control Program	15.56	8.29	53.3
3. Strengthening the management capacity of the Department of Endemic Disease Control	0.75	0.75	9.3
<b>Total Baseline Cost</b>	<b>40.04</b>	<b>24.94</b>	
<b>Price Contingencies</b>	<b>3.21</b>		
<b>Total Project Costs</b>	<b>43.25</b>	<b>24.94</b>	
<b>Total Financing Required</b>	<b>43.25</b>	<b>24.94</b>	

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method				Total Cost
	ICB	NCB	Other	N.B.F.	
1. Works	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2. Goods	40.91 (25.75)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	40.91 (25.75)
3. Services	0.00 (0.00)	0.00 (0.00)	1.09 (1.09)	0.00 (0.00)	1.09 (1.09)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	1.25 (0.00)	0.00 (0.00)	1.25 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	<b>40.91 (25.75)</b>	<b>0.00 (0.00)</b>	<b>2.34 (1.09)</b>	<b>0.00 (0.00)</b>	<b>43.25 (26.84)</b>

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method				Total Cost
	ICB	NCB	Other	N.B.F.	
1. Works	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2. Goods	21.56 (21.22)	0.00 (0.00)	0.38 (0.32)	2.25 (0.00)	24.19 (21.54)
3. Services	0.00	0.00	0.21	0.00	0.21

	(0.00)	(0.00)	(0.21)	(0.00)	(0.21)
<b>4. Miscellaneous</b>	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>5. Miscellaneous</b>	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>6. Miscellaneous</b>	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b>Total</b>	21.56	0.00	0.59	2.25	24.40
	(21.22)	(0.00)	(0.53)	(0.00)	(21.75)

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the IDA Credit. All costs include contingencies.

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

**Project Financing by Component (in US\$ million equivalent)**

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	IDA	Govt.	CoF.	IDA	Govt.	CoF.	IDA	Govt.	CoF.
<b>1. Expanding the coverage of National Schistosomiasis Control Programme into the Nile Delta</b>	16.26	3.07	10.42	13.21		0.00	81.2	0.0	0.0
<b>2. Modernizing and Rehabilitating the National Schistosomiasis Control Program</b>	10.47	2.27		8.33		0.00	79.6	0.0	
<b>3. Strengthening the management capacity of the Department of Endemic Disease Control</b>	0.11	0.65		0.07		0.00	63.6	0.0	

### Annex 3. Economic Costs and Benefits

The project aimed to reduce the number of persons infected with Schistosomes by about two-thirds. Because infection causes disease only if it is intense or of long duration, disease would be expected to become extremely rare. The project's benefits would take many forms and would derive primarily from the increase in life expectancy and reduced risk of death that the project would produce. Increased life expectancy would not only enable persons to earn more and to exploit more fully the potential returns from prior investments in human capital, but also would increase individual and community welfare directly by increasing aggregate job satisfaction, improving the lives of family members (including the direct beneficiary) and expanding opportunities for participation in the wider community. While the primary beneficiary is the person whose life is saved, other persons also, including family members, friends, business associates, and community members, often have an interest in saving a person's life.

The ICR conducted a beneficiary assessment which confirmed the social benefits of the project and perceived economic benefits on the direct and indirect beneficiaries in the form of marked reduction in mortality and absence of morbidity symptoms and signs.

In the SAR (1992), the economic rate of return (IRR) was estimated based on conservative assumptions.

- (a) that no cost savings are achieved through the operational research carried out under the project;
- (b) that vehicles must be replaced after seven years and that small laboratory equipment must be replaced after five years;
- (c) that Egyptians are willing to pay between 1.3 and 0.3 per capita share of annual GDP to obtain an additional year of life expectancy (representing US\$2.20 to US\$0.50 a day);
- (d) that the rural population will grow at a rate of 2 percent a year;
- (e) that because of the project at least 2,300 persons will not become disabled or die each year; the more plausible assumption that approximately 4,600 deaths will be averted each year has also been examined where the larger figure allows for underreporting of deaths due to incomplete coverage by the health care system, and for other pathologies caused by Schistosomiasis, including cancer and acute gastrointestinal infections;
- (f) that the life of the technology is 25 years where the control program may be replaced eventually if a practical vaccine is developed or significant improvements in sanitation accompany economic and social development.

All calculations have been based on constant 1992 prices. During the 1980s, about 2.5 percent of the population died from Schistosomiasis between the ages of 35 and 45 years. Thus, during the mid-1990s, the project was expected to reduce the number of premature deaths attributable to Schistosomiasis by about 4,600 a year; where the overwhelming majority of persons likely to die from the disease were expected to be males. The IRR was estimated to be 40 percent based on a first scenario that assumed that society would be willing to pay \$600 in order to increase the length of the average victim's life by a year, that the average age at death due to Schistosomiasis is 40 years, and that the project would yield returns for 25 years. The \$600 represented about one-third of the average income of a fully employed Egyptian worker at that time. If the willingness to pay to increase life expectancy by a year were only two-thirds the base estimate, the rate of return would instead be 18 percent. The IRR was estimated to be 17 percent based on a second scenario that assumed that the reduction in the number of deaths were only half the estimated number, 2,300. These calculations suggest that the returns to the project significantly exceed the opportunity cost of capital.

The ICR used the actual cases compared to the projected costs that were used during the SAR to replicate the analysis. In addition, the ICR estimates took into consideration that the project will start to yield returns after 6 years from the start of activities. The numbers of deaths prevented due to Schistosomiasis used (2,300 or 4,600) were based on the assumption of 50 percent effectiveness out of 2.5 percent mortality of the population aged 35-45 years (i.e., 50 percent of deaths due to Schistosomiasis will be prevented). For the first scenario (4,600 lives saved per year), the ICR estimated that the IRR ranged from 35-41 percent (compared to a projected 28-40 percent in 1992); while for the second scenario (2,300 lives saved per year), the ICR

estimated that the IRR ranged from 25-29 percent (compared to a projected 28-40 percent in 1992). By comparing the IRR estimated in the SAR and that re-estimated in the ICR, it can be concluded that the differences are minimal indicating achievement of actual economic benefits over the lifespan of the program. These IRRs are highly respectable and reflect the net economic benefits of the NSCP in the last 10 years, assuming a reduction of mortality due to Schistosomiasis and increasing life expectancy are considered long term goals of the national program. Although placing a monetary value on health and human life is difficult, it reflects the economic gains of the investment which is in the form of additional output made available as a result of the augmentation of the productive labor force due to prevention of mortality and subsequently increasing life expectancy.

By doing sensitivity analysis as that performed in the SAR, the following was concluded:

No. of deaths averted/ year				
	4600		2300	
	Estimates in SAR	Estimates in the final report	Estimates in SAR	Estimates in the final report
800\$	40%	41%	17%	29%
600\$	28%	35%	12%	25%

The ICR concluded that the Schistosomiasis control activities reached the final beneficiary and that improvement has been achieved in the health of the population in Egypt. However, the net economic gains of the future Schistosomiasis control activities need to consider a reduction in morbidities due to Schistosomiasis infection and transfer it into economic gains and monetary values. Finally, the analysis used in the original SAR used saving lives due to Schistosomiasis control activities as an effectiveness measure, although mortality due to Schistosomiasis is not considerable, possibly due to lack of morbidity data due to Schistosomiasis.

#### Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle Month/Year	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
	Count	Specialty	Implementation Progress	Development Objective
<b>Identification/Preparation</b>				
12/87	1	Pr. HR Ec.		
01/88	2	Pr. HR Ec.; Cons. Schisto		
05/91	3	Pr HR Ec.; Cons. Schisto ; Mgt Cons.)		
12/91	3	Pr. HR Ec.; Cons. Schisto ; Mgt. Cons		
<b>Appraisal/Negotiation</b>				
02/92	3	Pr. HR Ec.; Cons Schisto ; Mgt. Cons.)		
<b>Supervision</b>				
12/93	3	Op. Officer; Op. Assist.; Cons.	S	S
03/94	2	Hlth Spec.; HR Spec.	U	S
01/95	3	PH Spec.; Schisto Cons.; HR Spec.	U	S
06/95	1	Hlth Spec.;	S	S
10/95	1	Hlth Spec.;	U	S
02/96	2	Hlth Spec.; Schisto cons.	U	S
06/96	2	Prog. Officer; Op. Officer	U	S
04/97 (MTR)	5	PH; Impl. Spec.; Op. Officer; Prog. Officer; Cons. Schisto	S	S
11/97	2	Op. Officer; Impl. Spec.	S	S
05/98	2	HR Spec.; Op. Officer	S	S
10/98	2	Schisto Cons.; Op Analyst	S	S
10/99	4	Hlth Ec.; Hlth Spc.; Impl. Spec.;	S	S
		FMS		
02/00	5	Hlth Ec.; Hlth Spc.; MIS Impl. Spec.; PH Spc , Prog. Assist.	S	S
06/00	7	Hlth Ec.; Hlth Spec.; Op. Officer; Prog. Assist.; MIS cons.; FMS; Cons. Schisto	S	S
12/00	3	Hlth Spec.; FMS; Op. Officer	S	S
/03/01	4	Hlth Ec.; Hlth Spec.; FMS, Op. Officer	S	S
01/02	2	Hlth Spec.; Op. Officer	S	S
04/02	2	Hlth Spec.; Impl. Spec.	S	S
<b>ICR</b>				
	7	Hlth Spec.; Op. Officer; PH cons.; IT cons , Impl. cons ;FMS; Env. Cons	S	S

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation		169,113
Appraisal/Negotiation		
Supervision		456,782 (342,767 BB; 114,015 TF)
ICR		20,000
Total		645,895

## Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<i>Rating</i>
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<i>Social</i>	
<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |   |                                 |                                |                                |                                 |
|---|---------------------------------|--------------------------------|--------------------------------|---------------------------------|
| <input type="checkbox"/> <i>Lending</i>     | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |
| <input type="checkbox"/> <i>Supervision</i> | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |
| <input type="checkbox"/> <i>Overall</i>     | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |

### 6.2 Borrower performance

#### Rating

- |   |                                 |                                |                                |                                 |
|---|---------------------------------|--------------------------------|--------------------------------|---------------------------------|
| <input type="checkbox"/> <i>Preparation</i>                           | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |
| <input type="checkbox"/> <i>Government implementation performance</i> | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |
| <input type="checkbox"/> <i>Implementation agency performance</i>     | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |
| <input type="checkbox"/> <i>Overall</i>                               | <input type="radio"/> <i>HS</i> | <input type="radio"/> <i>S</i> | <input type="radio"/> <i>U</i> | <input type="radio"/> <i>HU</i> |

## **Annex 7. List of Supporting Documents**

1. Aide-Memoire and Back-To-Office Report for ICR Mission, December 2002
2. Borrower's contribution to ICR
3. Field visit reports to Alexandria, Beheria, Qena and Aswan
4. Beneficiary Survey Report
5. Environmental Analysis Report.
6. The EDCD Technical Report.

The following documents and information pertaining to the Schistosomiasis Project are available

- Memorandum of the President
- Staff Appraisal Report
- Credit Agreement
- Back-to-Office-Reports
- Project Supervision Reports
- Various Project Progress Reports

## Additional Annex 8. Description of the Main NSCP Strategies

This annex describes this strategy among the description of the main NSCP strategies: chemotherapy (selective and mass), snail Control, health education, and intersectoral collaboration. It is worthy to note the effect of the decision taken by the Minister of Health and Population, in 1997, to introduce the strategy of Mass Population Chemotherapy (MPC). The decision to use of Praziquantel for MPC has not passed without hesitation and reflection because of the lack of international experience for the use of the drug at that scale. Until 1997, it was against the policy of MOHP to offer free chemotherapy without a positive diagnosis. The introduction of MPC was considered to be revolutionary at that time given the history of using the earlier drug “tarter emetic” which caused serious side effects and complications.

*Selective Population Chemotherapy (SPC):* The SPC is now systematically applied for the three traditional target groups: outpatients, population samples, and school children. Previously it was applied only to outpatients and to limited school-based interventions. In 1997, the NSCP for urinary Schistosomiasis, replaced the long-standing, cumbersome sedimentation microscopy techniques with the rapid, cheap and quick screening with haematuria dip-sticks, where positive results are followed by treatment. For intestinal Schistosomiasis, Kato-technique is used for diagnosis.

*Mass Population Chemotherapy (MPC):* The national campaigns for MPC were planned centrally according to guidelines that were determined at the central level. These MPC campaigns had caused the prevalence of Schistosomiasis to drop dramatically. In 1997, the prevalence threshold for use of MPC in “hot spot” villages of over 20 percent was the trigger point, but in 1999 it was lowered to villages with a detectable prevalence of just 10 percent. This threshold has been further lowered to reach 3.5 percent in 2002. MPC was applied for two rounds annually until the year 2000. The year 2000 was supposed to be a year of consolidation. However, the NSCP has maintained one round of MPC during the years 2001 and 2002. The NSCP is intending to stop MPC at the beginning of the year 2003. These thresholds are arbitrary but were based on the assumption that severe morbidity becomes negligible when the prevalence is lower than 20 percent, given that RHU-returns underestimate the real prevalence substantially. In the first round in March 1997, 4.14 million school children were treated in the Nile Delta in 11 governorates, and in June 1997, 2.7 million people were treated in 535 villages. In December 1997, schools in 5 governorates were retreated (Sharkeya, Kafr El Sheikh, Demyeta, Dakahlia, and Beheira). Also, 208 of the 535 villages were re-treated where the prevalence was still above 10 percent. In the second round in 1998, the schools in the same governorates were treated and 230 villages were selected for mass chemotherapy. In the third round in May 1998, MPC was applied in the 208 hot-spot villages in which 1998 outpatient surveys showed the prevalence exceeded 20 percent. In August 1998, a follow up survey was conducted in these 208 villages, and mass chemotherapy was repeated in 98 villages where prevalence was still over 10 percent. In October 1999, MPC was applied in 5 lower Egypt Governorates: Kafr El Sheikh, Beheira, Ismailia, Dakhalia, and Sharkia; and in Upper Egypt governorates: Fayoum, and Qena where most of the foci were present. With more reduction of the thresholds few spots were found in other governorates as well such as Giza, Beni Suef, Minia, Sohag, Luxor and Aswan. Each of the campaigns in principle was followed 3-4 months later by a control survey on a sample of the target population.

*Snail Control:* Mollusciciding has become a supportive rather than a primary strategy as it is now based on epidemiological (high human infection rates) rather than malacological results (presence of snails). Focalization became necessary for economic and ecological reasons. The focal strategy is possible after a few rounds of chemotherapy to allow the identification of “hot spots” on the basis of human re-infection rates. The district and local snail teams were trained on focal concepts and methods. An intermediate strategy was developed in which molluscicides are applied only in canals and water courses in a perimeter of 1 km around a high prevalence villages or schools, and in any canal where infected snails are found. Treatment takes place twice or three times a year, usually with knap-sack spraying where several target villages are lined along one canal. Drip-feed is used sometimes. The snail teams survey all canals and drains twice per year, and identify and examine the snails. During the period from 1997 to 2001, the number of water courses treated has decreased from 49 thousand to 1.8 thousand, the length of water courses treated has decreased from 44

thousand km to 2.9 thousand km, and the number of Niclosamide consumed decreased from 85 to 10.2 tons. The snail team still surveys all canals and drains them twice a year. All over Egypt, and particularly in the Delta, the potential for transmission is still widely present as between 5-30% of watercourses harbor an intermediate host of schistosomes.

*Health Education:* Health education occurs mainly by TV spots which are shown regularly on national and local TV stations. Twelve messages were prepared in 1988 and were shown for almost 8 years. Since then new 12 TV spots have been prepared and are aired regularly. They receive funding from MOHP or other donors resources. There is a separate program for health education in the schools. To reach the community, limited outreach activities were conducted using mosques and agriculture workers.

*Intersectoral Collaboration:* The role of NSCP, being placed under MOHP, is rather limited and perceived as not being its mandate. It is usually blocked by administrative and political boundaries at the central and governorate level. Some progress can be noted as the national program for sanitation and sewer construction has agreed to give priority to the Schistosomiasis "hot spot" areas, the canal banks in new land reclaimed areas are lined with concrete to prevent the establishment of snail colonies, the new villages will have sufficient water supply and sanitation to keep the human risk factors for schistosome transmission at a minimum, and that all immigrants in newly reclaimed areas are systematically screened and treated for Schistosomiasis and that the local health services are trained and closely supervised by EDCD. In the Delta, over 90% of households have individual water supply, a latrine, electricity, television and (>70%) electrical washing machines.

## **Additional Annex 9. Recommendations for Follow-Up on Issues of Importance**

- The overall project objective of the NSCP will need to be revisited to reflect a change of concept from “control” to “elimination”. The existing objective of NSCP is “to reduce Schistosomiasis to a level where it is no longer a public health problem”. A proposed objective could be “to support the NSCP in its efforts to control and eliminate Schistosomiasis in Egypt” or “to eliminate Schistosomiasis from the entire territory”. This is an ambitious goal that can be achieved gradually and in a long term perspective. Elimination of urinary Schistosomiasis is more feasible. Schistosomiasis mansoni will be a tougher enemy, and will require continued efforts and commitment for decades. This is an area of future investments for the World Bank Group that will need technical and financial assistance that would enable the NSCP to bridge this change from control to elimination.
- Information, Education and Communication activities have been focusing mainly on mass communication through mass media and health education in schools. There were limited activities conducted at the community level depending on orientation sessions and raising awareness during Schistosomiasis Control campaigns. There is a need to shift the strategy from depending mainly on mass communication to a balanced mixture of mass and interpersonal communication channels and to establish partnerships with NGOs to establish partnerships at the community level. This shift will be relevant with the shift of control strategies from mass strategies to focal and micro focal control strategies.
- The HSRP, financed by IDA, would enhance the sustainability of NSCP, particularly through the strengthening of the Family Health care model. The activities conducted by NSCP provide a basis for further integration of NSCP into HSRP. The treatment, diagnosis and preventive activities of the major endemic diseases, including Schistosomiasis, have already been incorporated into the standards and guidelines for the integrated primary health care services to be covered under the HSRP, and would need to be followed through during the implementation phase. As the prevalence decreases and the occurrence of disease becomes more localized, it will become increasingly critical to identify, treat and control cases at the household level. The Family Health care model, under development through HSRP, would provide an ideal platform for improving surveillance, control and treatment at the household level. Moreover, this will necessitate the reinforcement of the district health offices to play a more active role in disease surveillance, planning and quality control of diagnosis and treatment program. These activities should link with the ongoing development of comprehensive Disease Surveillance System under HSRP. The NSCP, the Disease Surveillance Department and the Family Medicine Programs under HSRP have initiated a joint effort to pilot new models of focused interventions in “hot spot” villages where the prevalence is higher than 10%. This corresponds with the major strategic shift away from mass chemotherapy towards a more selective treatment and focal mollusciciding based on improved epidemiological intelligence. In that regard, the project supported the provision of family folders for family health units and computer equipment to support the comprehensive disease surveillance system.
- NSCP is extending its control activities into the newly reclaimed land areas west of Suez Canal, where large-scale irrigation and drainage activities have taken place, and there is a continuous influx of new immigrants. These immigrants are usually farmers and unskilled labor who are more likely to be infected with Schistosomiasis, and 10% were already found to be infected with *S. mansoni*. Confirmed reports on the spread of infected snails were also reported from these areas. There is a need to expand efforts to contain the spread of disease to the newly reclaimed land areas. NSCP is also encouraged to conduct the operational research and put in place a plan of action for preventive strategies east of the Suez Canal in Sinai and in the areas surrounding Nasser lake and in Toshke, where immigration is expected to begin soon. Close monitoring and surveillance system for these areas will be required in these areas as the consequences of new immigration, irrigation and drainage on the spread of Schistosomiasis are difficult to predict.
- It is important to monitor the potential emergence of drug resistance to Praziquantel and developing alternative strategies to contain its spread. Egypt has been using Praziquantel for the last decade as the mainstay of its mass chemotherapy strategy. While this strategy has been effective and contributed to the dramatic decrease in the prevalence of the disease, the use of Praziquantel is expected to be reduced significantly over time with the

introduction of more selective interventions. The global decrease in the price of Praziquantel is encouraging its continued use through mass chemotherapy intervention for longer than necessary, thereby increasing the risk of creating drug resistance. There is a need to move towards more selective and limited use of Praziquantel in order to minimize these problems.

□ EDCD should follow up on enhancing the process of monitoring and evaluation of the NSCP as a whole. The existing quality control and surveillance systems are sufficient in principle, and appear to be largely functional. However, their work is not systematically reported or followed-up. In the next stage of the NSCP, this component should receive top priority attention of the EDCD staff. More effort will be needed to strengthen the governorate level health teams to monitor epidemiological data, and ensure that they are systematically collected, analyzed, and reported accurately and in a timely manner to national authorities as well as fed back to local and district level authorities. At the same time, surveillance, planning and quality control systems at district and local level should be developed in line with the comprehensive Disease Surveillance System being developed through the HSRP. An external evaluation of the NSCP for validation of the program results is essential, but should not be focused only on epidemiological validation. In addition to conducting a series of random checks of technical quality at different levels of NSCP, the evaluation should undertake analysis of the structure and processes of the program, particularly in reference to ongoing HSRP activities, and should include an assessment of the internal control and reporting mechanisms. The evaluation should be conducted by management and quality auditors in addition to Schistosomiasis specialists.

□ Over the past ten years, EDCD has heavily relied on the USAID-supported Schistosomiasis Research Project (SRP) for operational research. The research networks and capacities that have been established through this project appear not to be sustainable, while there is much more work needed to address the needs of NSCP. EDCD needs to build up its own in-house operational research capacity and identification of its needs, e.g., development of information system, training of the newly recruited staff, and integration of the SRP-supported facilities within the MOHP. Its offices and labs can then serve as a general reference and research center for NSCP and other parasitic and infectious disease control programs. Such a Research Center would also undertake monitoring and quality control of disease control programs at the national level, and provide the linkage with regional and international research centers.

□ Finally, the levels and phases of the project should be defined geographically and operationally at the governorate level rather than the regional level. This will lead to decentralization of planning at that level as well as commitment and motivation of the governorate level structures. Regional coordination will remain necessary and assured by EDCD. In later phases, the operational level may be further decentralized to the district and community level.

## **Additional Annex 10. Summary of the Results of the Beneficiary Survey**

The social impact of the national schistosomiasis control program in Egypt is remarkable in all five governorates. In general, people are aware of the activities of the program and are generally satisfied with its outcome.

The people recognized that:

- (a) schistosomiasis is still an existing serious and major public health problem dominating in all rural areas mainly because the farmers' behavior is still depending on the use of water for cultivating their land and their continuous exposure to schistosomiasis;
- (b) the NSCP is an important program that is still needed and that it is the government's responsibility to sustain its resources;
- (c) their willingness and commitment to support the program is confined to activities related to raising awareness and to those that can be performed at community level as part of the campaigns; however, there is no willingness to pay for part of the cost of the services;
- (d) their health improved with a positive impact on the health of farmers, and in particular the younger generation;
- (e) the public health services improved related to the performance of physicians in examining patients, the performance of lab technicians in diagnosis and screening, the availability of modern diagnostic techniques, the treatment of infected persons, the conduction of mass chemotherapy campaigns, the conduction of awareness campaigns, and the conduction of snail mollusciciding with specific appreciation to urine and stool screening and examination, treatment of infected persons, and implementation of the school-based program;
- (f) the complications due to schistosomiasis are reduced;
- (g) repeated infections are common, but treatment reduces the severity of the disease;
- (h) Praziquantel is available in tablet and suspension forms, and free of charge in rural health units;

However, the people criticized that:

- (a) the spraying of chemicals in canals resulted in killing of fish and were concerned about the quality of water and its effect on nature and plants;
- (b) clinical health services at the primary health care level were of less quality in some places due doctors' non-availability, lack of counseling and home visits, and in some cases lack of interest of lab technicians and inadequate specifications of some lab equipment;
- (c) community-based organized activities are lacking;

## **Additional Annex 11. Summary of Environmental Impact Analysis of Niclosamide**

The NSCP control strategies combines chemotherapy with mollusciciding. Chemotherapy alone does not reduce sufficiently the release of schistosome eggs into the environment to significantly effect snail infection and hence transmission. Snail control relied at first on mass application of Niclosamide and later changed to focal application that decreased the amount of niclosamide used and reduced pollution of the environment. Niclosamide is highly effective in killing the intermediate snail hosts of *Schistosoma mansoni*, *S.haematobium*, and *Fasciola gigantica*, snail eggs, and free larval stages of schistosomes.

In flowing water, Niclosamide (the 70% Wettable Powder and the Emulsifiable Concentrate 25%) is effective at concentrations 1 ppm and 0.6 ppm of active ingredient, respectively. In stagnant water, the effective concentrations are even lower being 0.6 ppm and 0.4-0.6 ppm, for the above formulations, respectively. These mollusciciding concentrations should continue to persist for at least 8 hours to kill all snails. Niclosamide is not very specific against vector snails and it affects adversely other organisms and consequently may pose serious problems.

**Effect on Aquatic Biota and Terrestrial Plants:** Niclosamide is toxic to bacteria and algae at concentrations as low as 0.04 mg/L. It adversely affects the productivity of the phytoplankton, the start of the food chain, and leads to partial eradication of algae that could affect negatively the soil fertility. Niclosamide has less impact on aquatic vegetation and on terrestrial plants and animals. Water treated with Niclosamide has been used for irrigating crops in Egypt without considering phytotoxicity to terrestrial plants, such as cotton, sugar cane, wheat, maize, beans, rice, lentils, barley and other economic plants.

**Effect on Fish and Other Freshwater Animals:** Niclosamide has different effects on non target aquatic animals. It is toxic to leeches, clams and tadpoles at the molluscicidal concentrations, while anophiline mosquito larvae, shrimps and the cray fish are relatively resistant. Niclosamide is generally highly lethal to fish species (LD50 being 0.03-0.23 mg/L). However, some bioassay tests revealed that the most common freshwater fish in Egypt *Oreochromis niloticus* is relatively less susceptible to Niclosamide than most other fish. Niclosamide residues were detected in and extracted from muscles of fish after exposure to the molluscicide.

**Effect on Birds and mammals:** Niclosamide is generally of very low acute toxicity to birds (acute toxicity at LD50 60 mg/kg) and is almost non toxic to mammals (acute toxicity at LD50 being > 1,000 mg/kg). Niclosamide is slowly absorbed from the gastrointestinal tract, through the skin and mucous membranes, or by inhalation of fine dust or mist (acute dermal toxicity at LD50>2000 mg /kg. It has strong irritative effect upon the mucous membranes of the eye and is corrosive to the cornea. Skin reactions have occasionally been reported in field workers applying the 250 g/L emulsion concentrate.

**Effect on Human Health:** Niclosamide could be a potential genotoxic agent. It has the capability to induce mitotic crossing-over indicating a role in oncogene activation and anti-oncogene inactivation.

**Potential Effect on Schistosome Transmission:** Molluscicide application may lead in the long-term to suppressing populations of organisms which act as biological agents for schistosomiasis control in nature. Niclosamide is lethal to the leech *Helobdella punctata – lineata*, a predator of *Biomphalaria* snails, existing in the irrigation canals in Egypt. It is also lethal to an introduced snail to Egyptian aquatic habitats *Helisoma duryi*, which competes with schistosome vector snails reducing their infection with schistosomes. Niclosamide kills most other snails associated with *Biomphalaria* and *Bulinus*. Such snails act as traps of schistosome miracidia in the snails habitat, leading to reduction of the infection rate of susceptible snails.

Niclosamide affects negatively, by disturbing carbohydrate metabolism, the grass carp *Ctenopharyngodon idella* which is used in Egyptian waterways for biological control of aquatic weeds.

***Dissipation of Niclosamide:*** The major routes of dissipation of niclosamide in the environment are dilution, dispersion, sorption to sediments and suspended particulates, photodegradation and possibly microbial degeneration. It does not accumulate in the soil. Although niclosamide is likely to have an immediate effect on the majority of aquatic community, most organisms appear to recover and the treatment area returns usually to pretreatment conditions within weeks or months.

***Risk mitigation of using Niclosamide under Egyptian conditions:*** can be obtained by the following:

1. Optimizing the effect of chemotherapy by treating all patients in risky villages from January to mid-February to reduce the release of schistosome eggs before the appearance of the new generations of snails in March. This will decrease the schistosome transmission peak in May and will further reduce the need of mollusciciding.
2. Restricting the use of Niclosamide to treat defined transmission sites in water courses depending on epidemiological and operational studies.
3. Proper use of the correct concentration of Niclosamide by checking and adjusting the actual concentration in the treated water and for the correct time .
4. Reducing aerial application by utilizing dispensers to replace spraying which leads to more spread contamination .
5. Complying with the protective standards of handling and applying Niclosamide for laborers (clothing and respirators).
6. Performing medical monitoring programs for all handlers of Niclosamide .
7. Preventing the consumption of fish exposed to Niclosamide at molluscicide application by farmers, and restricting the human use of treated water for 2-3 days after application.







IMAGING

Report No.: 25552  
Type: ICR