REVIEW OF PROGRESS

MAHAWELI BASIN DEVELOPMENT - PHASE II

PROJECT NO.383-0073

Conducted By

Frank D. Correl

Hasan A. Hasan

Donald G. McClelland

Thayer Scudder

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I. Purpose of Review and Procedure

This review has been undertaken consistent with a proviso in the AID authorization of the $85 million loan project (# 383-0073) for Mahaweli Basin Development - Phase II, divided into Phases I(a) and I(b) of activities on the Left Bank in System B of the Mahaweli Basin area. This proviso requires the approval of AA/ASIA prior to obligation of funds for Phase I(b). Such approval is to be based on a review of progress in Phase I(a), particularly the contributions of Sri Lanka and that country's ability to provide (or cause to be provided) adequate funding to support Phase I(b). $68 million, the amount required for completion of Phase I(a) has been obligated since FY 81. An initial obligation of $10.6 million for Phase I(b) is planned before end-FY 83, subject to the present review, with a further $31.4 million planned in FYs 1984 and 1985, subject to approval by AID/W of an increase in the authorization level of this project from $85 million to $110 million.

In essence, our review has sought to determine whether the Left Bank of System B is receiving its due share among competing demands for GSL budget resources and that the Mahaweli Authority of Sri Lanka (MASL) is making satisfactory implementation progress on the project. In addition, we have reviewed progress made by the U.S. construction contractor toward completion of the main and branch canals financed by the loan project.

In carrying out this review, we

(1) made an on-site inspection of completed and on-going activities in the Left Bank area (including planning and physical activities related to construction of canals, tertiary irrigation and drainage systems, land-clearing and other on-farm development activities, construction of roads, schools, agricultural production facilities and services, etc.; and resettlement of farm families);

(2) reviewed the MASL implementation plan for System B and measured progress achieved toward carrying out this plan;

(3) examined data with respect to actual and projected budget expenditures by GSL/MASL for System B and other Mahaweli development activities within the context of overall GSL budget availabilities including actual and prospective foreign aid availabilities;

(4) consulted extensively with responsible officials of GSL and local authorities, AID, other donors, and contracting firms in Colombo and in the project areas. Settlers and other inhabitants of the project areas were also interviewed;

(5) reviewed--for purposes of reference and comparison--strategy, plans and physical progress on earlier phases of Mahaweli development (System H) and the USAID-supported Water Management Project in the Gal Oya area in East Sri Lanka.

The team had its final review with USAID on June 30 and concluded its work on July 1, 1983.

We wish to acknowledge the extensive cooperation and assistance received throughout our Mission and the thoughtful and candid responses from all individuals interviewed by us.

II. Summary of Conclusions and Recommendations

(1) The GSL is likely to be able to finance downstream development costs associated with both Phases I(a) and I(b) even within IMF guidelines re the GSL budget. The projected size of the deficit, and methods for financing it, indicate prudent fiscal management on the part of the GSL.

(2) Mahaweli development continues to enjoy highest priority in the GSL capital budget, with appropriate priority accorded System B within the overall implementation plan. Prospects are good that adequate budgetary resources will continue to be allocated and available to finance downstream costs.

(3) Financial monitoring of System B needs improvement to ensure consistent data among various GSL entities and between Colombo and the field; and to ensure timely availability of data.

(4) Construction of U.S. financed canals in Phase I(a) is slightly behind schedule but prospects are good that work will be completed in time to assure water at critically needed periods in October-December 1983 and 1984, respectively.

(5) With respect to planning and construction of physical facilities, GSL is making significant progress to provide complementary downstream infrastructure in the project area as provided by the Project Agreement. In fact, it is keeping up with and exceeding the rate of progress made by the U.S. contractor.

(6) Planning of the settlement phase in System B is impressive. Creative policies have been adopted, performance on meeting targets for moving settlers into the area is excellent, and careful attention is being paid to orchestration of availability of land and settler services to farm families in the initial Blocks of Phase I(a) of System B. Increased attention is required to bring work for the remaining areas of Phase I(a) to the point where extensive settlement will run smoothly and also avoid a significant potential health hazard.

(7) Issues of agricultural production policies are being addressed with increasing awareness of the need for diversification. Initial efforts for water policy planning are bearing fruit but long range plans i.e. maintenance, economic use of water by farmers and water charge policy require expedited attention.

(8) A significant effort is required to provide adequate manpower planning to address off-farm employment issues.

On the basis of the above, we conclude that satisfactory implementation progress is being made with respect to Phase I(a) of the Project, both by the MASL and by the U.S. contractor, and that the Left Bank of System B is receiving its due share of GSL budget resources. We further conclude that reasonable prospects exist that GSL will provide adequate funding to support Phase I(b). Accordingly, we recommend that AA/ASIA approve the obligation of funds under project # 383-0073 for financing the contract for construction of Phase I(b).

III. Brief Overview of Mahaweli Development Activities and Scope of U.S. Project

Achievement of the aims of this project, with its concomitant loan for design and construction supervision, is one of several U.S.-assisted activities in support of the GSL's Accelerated Mahaweli Program (AMP), an integrated basin development effort financed with assistance from eight major donors. These additional activities consist primarily of the $50 million Mahaweli Sector Support loan to help finance GSL downstream activities and a program for environmental protection of the Mahaweli area. However, according to USAID/Colombo personnel, almost all other parts of the Mission program have some involvement in the U.S. effort in the Mahaweli area. Thus there are self-reinforcing aspects of the total U.S. effort that could encourage expedited performance by GSL in carrying out its program and obligations under the AID-financed project.

The AMP is administered by a special Ministry of Mahaweli Development. The Mahaweli Authority of Sri Lanka (MASL) and its subordinate entities oversee its planning and implementation for the Ministry. The goal of the program is to put large areas under irrigated cultivation and to have these areas settled with landless or land-poor farmers from all over the country.

The AMP area covers the basins of two rivers: the Mahaweli Ganga and the Maduru Oya. The program includes the construction of four large dams and a vast canal system, as well as other irrigation facilities and transportation and social infrastructure in support of settlement schemes in newly-irrigated lands. In developing the Master Plan, the program area was divided into irrigation systems. Tertiary and downstream work thus far have taken place in Systems B, C, G and H.

Each system in turn is divided into Zones (designated 1, 2, etc.) and each Zone into Blocks (101, 102, 501, etc.). Different donors have chosen to get involved in different Zones and different aspects of the program. This review is concerned with activities and plans related to USAID financed activities in System B.

Development of System B

This consists of three discrete elements:

(1) Maduru Oya dam and reservoir (the "headworks") to supply the system with water. The dam and associated works were financed and constructed with Canadian assistance at a cost of over $100 million. The dam is nearly complete and due for inauguration on July 2, 1983.

(2) Main and branch canals. These are concrete-lined canals that form the backbone of the irrigation work in System B. Main canals are to extend from the reservoir into the middle of the area to be irrigated with branch canals taking water into areas to the left and right of the main canals. There are two such canal groups, criss-crossing the left and right banks respectively, of the Maduru Oya downstream from the dam. The Left Bank main and branch canals are financed with U.S. loan funds.

(3) Third and fourth level canals (distributary (D) sub-distributary (SD) and field (F)); as well as drains, roads, land clearing, land levelling, settlement schemes, and the introduction of social infrastructure into the irrigated areas. All components of this third element, lumped together, are referred to as downstream activities. The MASL is undertaking the development of all downstream activities either with its own forces or through local contractors, including settlers. The settlers are also doing some of the work within or adjacent to their farms on a voluntary basis.

Background and Scope of U.S. Project

U.S. assistance in System B has consisted of financing (a) design of the main and branch canals on both banks of the Maduru Oya; (b) construction of the main and branch canals on the Left Bank; (c) engineering supervision of the construction of the Left Bank main and branch canals; and (d) assisting in financing of some downstream activities on the Left Bank under the Mahaweli Sector Support Loan (such financing for work in System B has been very limited so far but expected to increase substantially).

The design work of all main and branch canals is complete. Under this project construction was divided into two phases: Phase I(a) covering Zones 5 and 1 and Phase I(b) covering Zones 2, 3 and 4A.

IV. Budgetary and Related Considerations

The AID-financed main and branch canals were estimated to cost $85 million in 1981; they are now estimated to cost $110 million, a 29% increase which can be attributed largely to cost overruns higher than estimated in the PP. The GSL-financed downstream development activities were estimated to cost $118.6 million (including the ABD-financed roads); these costs are now estimated at $144.9 million, a 22% increase.

For Phase I(a), total costs are now estimated at $113.5 million, of which the AID-financed component is $68 million and the GSL-financed component is $45.5 million. Downstream development in Zone 5 will require about $15 million and in Zone 1, about $30.5 million.

As of December 1982, the GSL had contributed approximately $16.7 million to System B. Approximately $8.6 million was incurred in 1978-80 and cannot be attributed directly to the development of any particular Zone or Block; about one-half of it represents a transfer of funds from one GSL entity to another to carry out surveys and investigations. The rest of the $16.7 million contribution has financed much of the downstream development of Blocks 501 and 502 of Zone 5 and the design of most of the rest of Phase I(a) in Zone 1.

The resources budgeted for the period have been substantially greater than actual expenditures. Underexpenditures were about 23% for the five year period, and about 28% during the 1981-82 period. Although there have presumably been substantial GSL expenditures so far in 1983, available financial information is not sufficient to estimate these.

The GSL is likely to be able to finance downstream development costs associated with both Phase I(a) and Phase I(b) - even in the face of high budget deficits. In 1980, the GSL's budget deficit reached about 23% of GDP, causing concern on the part of the IMF and the donors (indeed, it was part of the impetus for undertaking the present review). In 1981, it was about 17% of GDP; in 1982, about 20%; and in 1983, it may be about 19% (assuming real GDP growth of 5% and inflation of 15%). The IMF has recommended that the deficit be held to around or below 20% of GDP. This IMF guideline is being adhered to.

Perhaps even more important, the deficit in 1983--contrasted to those in 1981 and 1982--will be financed largely by foreign aid and non-bank borrowing-and not by bank borrowing. This will reduce the likelihood of introducing unmanageable inflationary pressure into the economy, which would jeopardize the economic growth and stability that has been encouraged by the liberalization program introduced in 1977.

The capital budget for 1983 (excluding capital repayments) is about $876 million. Almost one-half (48%) has been directed toward the agriculture sector, and the Accelerated Mahaweli Program has been allocated $294 million, 34% of the capital budget (and 70% of the agriculture-budget). The bulk of the $294 million (70%) will support construction of three major dams primarily for irrigation and hydroelectric power. System B is the third largest recipient (out of 10) of budgeted resources, absorbing $33 million (or about 11%) of the AMP budget.

When an allowance of Rupees (Rs.) 2 billion is made for estimated under-expenditure of the capital budget, then the overall GSL budget (capital and recurrent) is Rs.49.4 billion ($2.15 billion at the current exchange rate of Rs.23 = US$1). However, estimated revenues will cover only 53% of that budget. The budget deficit of Rs.23.4 billion (slightly over $1 billion) is expected to be financed through: (a) foreign aid (Rs.14 billion, or $609 million); (b) non-bank borrowing, such as the Employee's Provident Fund and other trust funds (Rs.8 billion, or $348 million: and (c) borrowing from the domestic banking system (Rs.1.4 billion, or $61 million). Foreign aid clearly plays an important role. External resource commitments available for the remaining downstream costs of System B total $44.5 million (including $31.5 million from the U.S., and about $13 million from Australia). Resources likely to be committed total $50 million (including $25 million from the EEC and $25 million from Saudi Arabia). The balance of Left Bank downstream costs will have to be financed from the GSL's own domestic resources.

The investment plan for 1983-1987 estimates that the AMP will absorb 27% of the capital budget (and 60% of the agriculture budget) over the next five years. As construction work is progressively completed, investment will decline from about 34% of capital investment in 1983 to about 22% in 1987. The foreign aid component of the Mahaweli program is estimated at $695 million, about 53% of total requirements. Except for Kotmale Dam, the Left Bank of System B has highest priority in terms of planned allocation of investment resources: Rs.4.6 billion (or 15% of the total). At the current exchange rate, this amounts to $200 million, of which $117.4 million (59%) is expected to be financed from foreign aid. This compares to a 53% foreign aid contribution expected for the entire Mahaweli effort over the 5 year period.

While the availability of financial resources is not likely to be a serious problem, the timely utilization of the resources may. In 1982, the Mahaweli Authority underspent its budgeted resources by 19%. Expenditures for System B were 32% less than budget authority in that year. In 1981, underexpenditures were about 27% for System B. Thus, the absorptive capacity of the Mahaweli Authority may be severely strained. On the other hand, the Mahaweli Authority is the only GSL entity that is not required to turn back to the Treasury budgeted funds that were not spent by the end of the year. This may reduce the incentive to utilize resources in a timely fashion. On the positive side, it constitutes yet one more indication of the strong commitment of the GSL to Mahaweli.

To the extent 1981 and 1982 were not anomalies, and instead become the norm, the GSL may need to intensify its efforts to recruit highly qualified middle level management to fill key positions within the Authority.

One item that became apparent to us in our review was that the financial monitoring of System B needs improvement. Many of the conclusions above cite cost data which are not always consistent among various ministries, or between Colombo and the field. A streamlined financial monitoring system should improve management, and it may also help to reduce the likelihood of underexpenditure noted above. If MASL receives computer facilities, this should be a relatively simple task. As the financial management system is improved, the Mission would benefit from receiving periodic status reports.

V. Implementation Progress: Construction

A. Construction of Main and Branch Canals in Phase I(a)

Downstream development of any kind in System B is dependent on the availability of water to be conveyed through main and branch canals. To provide a reference point for the timely development of downstream infrastructure, the team reviewed the status of the construction of the main and branch canals.

Zachry-Dillingham, the U.S. contractor, was awarded the construction of Phase I(a) of the main and branch canals on May 10, 1982. Work commenced on June 24, 1982. The completion date for Phase I(a) is July 24, 1984. However, the contractor must complete the first 2.2 kilometer portion of the main canal and the first right-side branch canal (LB-R1) by September 9, 1983. The contractor stands to have deducted from monies due him about $16,000 per day as liquidated damages if he fails to meet the first deadline and about $10,000 per day if he fails to meet the second.

As of June 1, 1983, the contractor was clearly behind schedule. The work schedule prepared by the contractor in January 1983 (which substantially revised his original work schedule submitted in August 1982) indicates that about 16% of the work, valued at $8.4 million should have been completed by May 31, 1983. Actual completion for the same period was estimated by the contractor and supervising engineer at 14%,valued at $7.3 million.

The contractor attributes his 2% delay (using the revised schedule as a basis) to several factors. First, there has been a disagreement between Zachry-Dillingham on the one side, and the supervising engineers (Berger-IECO) and the MASL on the other side, regarding blasting in the cut and cover rock section in the first 800 meters of the main canal. Moreover, the

contractor has encountered relatively long sections of very poor sandy soil while excavating for the LB-R1 canal, requiring replacement with good soil obtained from elsewhere. Finally, the contractor mentioned unseasonally high rainfall during the month of May (2.7 inches vs. about 0.5 inches on the average) which has led to shutting down earthwork operations, particularly work at the Kuda Oya syphon which stood under seven feet of water after the rains. The contractor indicated that he would use these and similar examples as justification for time extensions if it appears that he will fail to meet either or both deadlines imposed by the contract.

Based on the short visit to the site and conversations with the contractor and the engineers, it is felt that work will accelerate dramatically over the remaining months of the life of the Phase I(a) contract. This judgement is based partly on the high value the MASL places on the completion of the LB-R1 segment before the heavy rains of the Maha season begin in November 1983, in view of the imperative need to have irrigation water available for the settlers in the area, and the remaining requirement in 1984. The nature of the work is such that delay could be easily made up by adding more resources. We believe prospects are good that the contractor could meet his deadlines on time. He has every incentive to do so. Aside from the liquidated damages that he would have to pay, mobilized personnel and equipment at the job site represent a tremendous investment for the joint venture and the contractor will surely use these mobilized forces to earn as much return on this investment as possible, as early as possible.

All parties interviewed were optimistic that the problem will be successfully resolved with the contractor getting an extension of time of 30 days (i.e. until October 9, 1983) to complete LB-R1. Both the contractor and supervising engineer expressed confidence that this prospective delay of short duration to complete LB-R1 would not adversely affect the contractor's capability to complete the entire Phase I(a) by the deadline of July 24, 1984. We believe this to be a reasonable assessment of the situation. What is critically important to the settled areas and what is clearly understood by all parties is that the work be completed before the heavy Maha rains in November-December 1984. Thus, some limited grace period does exist.

B. Progress by GSL on Downstream Work Program

Institutional Arrangements and Planning of Downstream Activities

There are two MASL subordinate entities involved in the planning, design, construction and maintenance of downstream activities: The Mahaweli Development Board (MDB)[1/] and the Mahaweli Economic Agency (MEA). Each of these entities has a discrete role to play and is charged with carrying out certain aspects of the work. Their areas of responsibility supplement each other and their personnel work closely together at the headquarters and field levels. The MDB is an engineering-oriented organization and focuses on the area-wide and major brick-and-mortar aspects of downstream activities, such as overall planning of land development and the construction of distributary canals, roads, buildings, etc.

1/ Soon to be redesignated as the Mahaweli Engineering and Construction Agency (MECA).

The MEA, on the other hand, works directly with the settlers. Thus it focuses on farm-level problems such as farmland preparation, wells, housing and field canals.

The MDB and MEA collaborate in planning all downstream activities and social and administrative infrastructure. The physical planning process is thorough and includes several steps. The first of these is study of large-scale maps of project areas to locate temporary access roads and water tanks. Heavy construction equipment then moves into the area and building commences.

Having gained access into a Block area, data collection follows. Topographical information is updated. Layouts of the D, SD and F canals are then prepared based on the location of the main and branch canals. D-canal turnouts are set to irrigate a maximum area of 125 acres. D-canal and SD-canal alignments are plotted and strip surveys of these alignments are prepared.

Detailed soil surveys are then made and soil types are introduced on the maps. Based on all this information, a detailed land use plan of the Block is prepared showing lowland and upland irrigated areas, settlement areas such as hamlets, village centers and townships, and market roads.

A design phase follows where alignments of market roads and D and SD canals are firmed up and detailed plans are prepared for their construction. Standard designs are used for all buildings, adapted to fit particular sites.

Construction of the different facilities follows. Contracts are let to local small contractors to construct D and SD canals, and larger local contractors are awarded road and building construction contracts. The MDB provides engineering support and supervision to all contractors. The first buildings constructed serve temporarily as field staff offices and housing facilities.

Settler camps are also constructed during this early stage. These are permanent buildings that will serve as dormitories while settlers work on their housing. Once settler housing units are completed and settlers bring their families, these buildings assume their intended primary function such as cooperative shops, storage areas, etc.

The land use plan is further refined to include plotting individual homesteads, farm areas, and field canal alignments. Clearing and land levelling activities follow before homesteads and farms are identified on the ground. Construction of field canals and drains is then completed and on-farm development activities follow and continue.

This systematic approach is improved and refined in developing each new Block based on lessons learned and experience gained in enveloping the previous Block. The attached map for Block 501 (Fig.1) is a typical example showing graphically plans for the development of each Block. The intensity of detail in these maps illustrates the extent of care that characterizes the planning process.

FIGURE 3

DOWNSTREAM INFRASTRUCTURE DEVELOPMENT-SYSTEM B - PHASE 1(a) CONSTRUCTION AREA

JUNE 1983

Block or Village Center	Hamlet Centers	Access Roads	Small Water Tanks	Plan.3/ Engr. Design	Land Clear. Level.	Market Roads	D&SD Canals	Field Canals	Field Drain	Schools	Cen.4/ Off.& Facil.	Homestead & Farm Development	Settler5/ Housing
each	each	Km	each		Acres	Kms.	Kms.	Kms.	Kms.	each	each	each	each
501 Dhamminna	Kandegama Dhamminna Nidhanwala	15 1/ 100%	5 100%	100%	3425 100%	7 100%	14 35%	25 10%	13 0%	3 Primary 1 Senior 95%	1 Block 3 Hamlet 71%	518 66%	581 42%
502 Diuldamana	Ihalawela Arunapura Maligatenna Diuldamana	25 100%	2 100%	100%	1,750 100%	12 83%	19 59%	44 10%	18 0%	3 Primary 1 Junior 95%	1 Village 4 Hamlet 30%	838 85%	838 68%
503 2/													
101 Ellewewa	Bandangala Ihala Ellewewa Mahadamana	18 100%	5 100%	90%	3,438 10%	9.0 30%	26 50%	36 0%	36 0%	3 Primary 0%	1 Block 3 Hamlet 0%	1,112 0%	1,112 0%
102 Ellewewa	Kalukelle Etapolonokada	12 100%	3 100%	90%	2,988 65%	7.5 10%	19.0 15%	24 0%	24 0%	1 Primary 1 Senior 0%	1 Village 2 Hamlet 5%	925 0%	925 0%
103 Pelatiyawa	Maguldamana Pahala Ellewela Pelatiyawa	18 100%	5 100%	90%	4,033 0%	5.5 0%	28 0%	36 0%	36 0%	2 Primary 1 Junior 0%	1 Village 3 Hamlet 8%	1,394 0%	1,394 0%
104 Village Center to be designated	6 Hamlet Centers to be developed	32 50%	6 100%	70%	3,750 0%	10.2 0%	44 0%	46 0%	46 0%	6 Primary 1 Junior 0%	1 Village 6 Hamlet 0%	1,290 0%	1,290 0%
Totals	21 71%	120 87%	26 100%	90%	18,384 35%	51.2 40%	150 14%	211 3%	173 0%	23 33%	27 18%	6,140 17%	6,140 13%

Zone 5 - 70% complete, Zone 1 - 24% complete, overall Phase 1(a) Project area - 38% complete.

1/ Upper figure signifies quantity planned. Lower figure signifies percentage completed of that quantity as of June 1983.
2/ Block 503 is in a flood area. Work on it has been deferred until 1985.
3/ Master planning, engineering and design include the development of a land use plan showing all canals, upland and paddy irrigated areas, water tanks, access roads and market roads.
4/ Typically includes administrative offices, staff housing, stores, medical facilities (midwife quarters, clinic, dispensary etc.), service centers, post office facilities, and cooperative stores.
5/ Includes quarters, well, latrine, and fencing.

VI. Settlement Planning and Implementation

Introduction

The successful colonization of new lands involves a dynamic process which can be divided into two distinct but overlapping phases. The first phase deals with the recruitment and physical transferrence of settler households and with the adjustment of those households to their new habitat. It is referred to as the Settlement Phase in this report. The second phase -- labeled the Development Phase -- commences when settler households increase production beyond their subsistence needs, market their surpluses, and generate non-farm employment through the purchase of an expanding range of consumption and production goods and services. The emphasis in this section is on the planning and implementation of the settlement phase by the Government of Sri Lanka in Phase I (a) of System B; some comments on development are included elsewhere in this report.

In reviewing the current situation in System B, it is important to realize that government-sponsored irrigated settlement schemes have been the main development strategy for the dry zone since the 1930s. Not only does the GSL have a lengthy experience with irrigated settlement, but it also has an impressive capacity to learn from that experience. In terms of policy the MASL has shown flexibility along with an ability to experiment. Policies currently being implemented in System B are largely a result of experiments carried out in System H and especially in Zone H-5.

System B Planning

By international standards, the planning for the settlement phase in System B is exceptionally good. Creative policies which deserve special mention include the following:

(1) preference in recruitment given to those families already resident within the settlement areas, including spontaneous settler families that arrived before September 1977;

(2) settling together families from the same area of origin and of similar ethnic and religious backgrounds (hence speeding up the process of adjustment, and of the formation of communities and settler organizations);

(3) aggregating several hundred families together in hamlets so as to provide better production-support and social services, with urban functions to be provided by a small number of larger townships (with emphasis in System B on the upgrading of existing townships rather than on the more difficult and expensive construction of new towns as was tried earlier in Systems H and C);

(4) the worker settler program whereby household heads arrive without their families and are organized into six person groups while they construct their houses, and the program whereby settlers do contract work on D-Channels and work together doing on-farm development;

(5) emphasizing water user associations as the main settler participatory action organization, with the field channel system corresponding to turnout

groups of 8 to 14 members;

(6) the unit manager system which is designed to provide a face to face unified extension service to the members of settler organizations, and to facilitate community development.

A point to note in passing concerns a special feature of the host population in Zones 2 - 4 which constitute the area covered by Phase I (b). A majority of inhabitants in these Zones belong to various minority groups. These people are among the poorest in Sri Lanka. Landlessness is a major constraint with over 50% of the households in some villages controlling no land. Though the people of the area have adapted by combining livestock production with crop agriculture, in most villages the majority of livestock are owned by a minority of households. Since these stockless people also tend to be landless, they are very poor by any standards.

Since the policy of the MASL is to give priority to the host population in each area developed, the extension of the System B canal system into the Phase I (b) Zones would incorporate, for the first time, a significant number of minority group people into the AMP. Not only would these people benefit greatly, since all households would receive allotments according to MASL Policy, but their incorporation would show that the AMP is for all Sri Lankans, fostering the socio-economic and political integration of the country's diverse population.

System B Implementation

To date the implementation schedule relates primarily to Zone 5 (Blocks 501 and 502) and to Zone 1 (Blocks 101-103).

Blocks 501 and 502: Implementation here is exceptionally good to date provided irrigation water arrives on schedule in October, 1983 for the Maha 1983/84 season. Experience elsewhere in Sri Lanka indicates that where worker settlers are brought into a pioneer area prior to the provision of irrigation water, such water should be made available by the second Maha season. In the case of Zone 5, this is the forthcoming 1983/84 season. In terms of settler morale, this is a crucial commitment made by the MASL -- the most important for settlers next to the actual receipt of land.

In terms of the transfer of settlers, 1050 worker settlers or slightly over 90% of target, have been settled on schedule. Of the 1050 settlers, approximately half were previously resident within System B, the rest being specially recruited outsiders. Most arrived during the second half of 1982. As an experiment, the Resident Project Manager (RPM) provided each settler with roof tiles as an incentive to build permanent housing. The response has been overwhelming with tiled roofed housing (a traditional indicator of long-term commitment to stay) going up throughout Blocks 501 and 502. Though construction of wells is running behind schedule, we saw no evidence that there was a serious shortage of potable water.

The policy of the MASL is to settle households in nucleated communities in which production and social services can be more easily provided. Three such hamlets have been built in Block 501 and four in 502. Their population at full settlement will vary from 120 to 224 settler households, of which

approximately 90% are already resident. In the future, non-farm families totalling 20% of the number of farm families are to be added; none have been recruited to date. Implementation of educational and medical services appears adequate. Five primary schools will serve these seven hamlets of which three are complete and two are under construction. Staff for four of the schools are expected within a month, the MASL providing housing as an incentive. In addition, there is a nearly complete senior secondary school. Medical services are currently being organized. Private dispensaries and a government health center are located in the township of Aralaganwila (which is within five miles of most of the hamlets) while clinics will be built, each to serve two to three hamlets. Malaria spray teams have already begun their work and anti-malaria pills are being dispensed to settlers. Voluntary health workers are in the process of being recruited from settler families. After a series of short on-site training sessions, they are given supplies to treat malaria, cuts and wounds, diarrhoeas, etc., operating out of their own houses. In H-5, where this system was pioneered, the goal is one voluntary health worker for every 25 settler families with a voluntary health center for every 125 families. This program will be replicated in System B. It is illustrative of the process whereby the MASL is promoting rural development strategies which have national implications.

Provision of MEA staff except for agricultural staff appears adequate. Crucial staffing relates to Unit Managers, all seven of whom have been recruited and are operational. Though no field assistants have been recruited to assist them, the RPM has trained in their stead seven orderlies (one per Unit Manager). These are facilitators who are recruited from the youth of host settler families. All with a secondary school education, they live with the worker settlers from the day of their arrival. In time they will be replaced by field assistants or their training will be upgraded to that level. As for staff at the Block level, the agricultural and land development officers have yet to be recruited. Full time agricultural and land development officers need also be recruited as deputy RPMs at the B System (Left Bank) level.

In sum, we conclude that the GSL is doing a commendable job in implementing the settlement phase in Blocks 501 and 502. The best indicator that this is so is provided by the worker settlers who have come from more distant areas, at least 80% of whom are said to have brought their families.

Blocks 101 - 103: Resettlement in these Blocks was scheduled to begin during 1983, with 2000 settlers to be brought in during June-September. Implementation is running nearly a month behind because of delays in demarcating household lots (the policy being to show worker settlers their lot on arrival). Though no settlers had arrived as of June 20, the first 180 are due to arrive on June 25th, with the RPM confident that all will be present by September. This does not seem to be an unrealistic expectation, since half of the 2000 settlers are host families, the remainder being evacuees from the Victoria and Kotmale reservoir basins.

Construction is proceeding on the dormitories for worker settlers, with fifteen completed and the final five under construction. Construction also is proceeding on schools for the eight hamlets in which the 2000 families will be settled, with three schools operational while the remaining five

are scheduled to open in January 1984 at the beginning of the new school year.

Medical facilities, on the other hand, are a cause for concern. The clinic at Block headquarters has yet to be built and the nearest facility is eight miles away in Aralaganwila. Though a mobile team of doctors has agreed to visit the settlers and anti-malaria pills will be made available, these services appear inadequate considering that the first outsiders will be relocatees from the Victoria and Kotmale basins. No matter how humanely undertaken, compulsory relocation is stressful for those involved, with morbidity and mortality rates elevated during the period immediately following removal. In the case of the Victoria and Kotmale evacuees they will be coming into a malarial zone just prior to the main rainy season, with many of the Victoria settlers required to bring their families because of the dam construction time table. Under these circumstances present medical arrangements do not appear to be adequate. GSL should be approached, with some urgency, on this matter.

Staff recruitment at the moment is also inadequate, with three of eight Unit Managers not yet on hand. Agricultural and land development staff are also absent. Granted the greater isolation of Zone 1, the greater distance from Aralaganwila township, and the fact that half of the settlers will be dam relocatees, staff recruitment should also become a matter of urgency.

VII. Agricultural Facilities, Services and Policies

In examining this aspect of implementing action with respect to System B, we reviewed the situation in System H, the oldest system within the AMP, and used our observations there as a convenient reference point. We were impressed with the open and frank review of System H experience and the GSL officials' willingness to incorporate lessons learned into System B. An example is the approach to land utilization mapping. The overall System B land utilization map is still being developed even though some villagers have been resettled. The lack of this planning map has frustrated a number of donor agencies who require detailed planning documents in order to execute funding commitments. However, during our review, it became apparent that the lack of the land utilization planning map has allowed the GSL a certain amount of design flexibility in order to compensate for a typical land utilization schemes or adjust the scheme for a more appropriate alternative. This is especially true when errors are discovered on soil, drainage or contour maps. Thus the GSL can quickly implement needed changes without requiring a large number of donor agency approvals and develop final block-wide maps as each Block is developed, profiting from the experience gained earlier.

The agricultural cropping system found in System B is similar to that found in System H except for changes in cropping pattern necessities by soil, water or climatic parameters. In general there will be a higher proportion of upland cropping areas than in System H, of which a large percentage will be irrigable.

Utilizing lessons learned from System H, a parallel channel to irrigate the upland areas will be constructed separately from the channel used to irrigate

the paddy land. Unlike System H, when water is unavailable to irrigate the upland areas this parallel channel will not carry water. Also, by design this upland irrigation system will not be able to carry enough water to irrigate a rice crop to ensure production of other crops since upland soils are not appropriate for rice production. The irrigation schedule currently used in System B allows for one complete watering per farmer field once a week. It was estimated by the MEA officials present that the average yield for paddy is about 85 bushels/acre in System B. This is well above the national average.

We were also informed that the MEA assists the farmer with securing proper amounts of inputs required for crop production (e.g., seed, fertilizer, chemicals, credit, etc.). They also, as in System H, assist the farmers with finding market for their produce, for example, through the Paddy Marketing Board, the Cooperative Department, and the Oils and Fats Corporation.

It was mentioned that the MEA is currently emphasizing development of local markets for most of these crops. In fact, in many areas the MEA project officers are actively encouraging private sector participation in buying produce from farmers. They are trying not to solely rely on the government agencies for marketing, but to use the presence of those entitites, and the national system of guaranteed floor prices for rice, to provide enough competition to avoid victimization of farmers by monopoly buyers. (Apparently, in System H the private sector has moved into the area and is active in buying paddy, chillies, cowpeas and a few other subsidiary crops). The MDB has constructed secure enclosed storage areas to hold seed, fertilizer and chemicals, and to serve as short-term storage depots during the harvest season. The research programs being undertaken at the area agricultural research station have been designed to take varieties considered promising to the soil types prevalent in System B and test them in yield experiments under these different soils and water regimes. This appears to be a very practical approach to regionalized research to the agro-ecological growing parameters to System B. Unfortunately, at a minimum, three years of research data will be necessary to make solid crop production recommendations. As some settlers are already in System B or expected shortly, and the Research Station has just started its function, it will be about another two years before any impact will be felt.

Relating to both crops and livestock, the MASL is more commited to agricultural diversification now than at any point in the past. According to Mahaweli Projects and Programme 1983, "Sri Lanka is now 90% self-sufficient in rice and greater emphasis should prevail from now onward on crop diversification". Agricultural diversification at household, hamlet and regional levels makes excellent sense for a variety of reasons. At the household level, it raises net income, makes better use of family labor throughout the annual cycle, raises the status of farm family women by making them producers on the family farm, and improves family nutrition. At the hamlet and regional levels it generates more employment for permanent as opposed to seasonal farm laborers, and provides food for non-farm families and produce for agro-industry.

System B is well-suited for agricultural diversification for several reasons. Certain zones have sizeable areas of well drained irrigable

upland which are more suitable for other crops than rice. Recent data for Zone 1, for example, indicates that one-third of the irrigable land is more suited to other crops. That figure may also be an underestimate since soil and land use surveys have not been completed. Moreover, according to Mahaweli Projects and Programme 1983, "System B contains the largest percentage of indigenous cattle and buffaloes in the area of Mahaweli activity". The local inhabitants, especially in the northernmost villages, in the Phase I (b) area already practice mixed (crop and livestock) farming and mixed cropping. Further, the dual canal system being implemented within System B will greatly facilitate diversifying production systems at the hamlet level. Of particular interest are the ideas of the agricultural advisor to the Ministry of Mahaweli Development to develop within System B smallholder production systems based on irrigated upland combining low density plantings of coconut with fodder crops for dairy production.

VIII. Water Management Aspects of System B

The organization for water management in the Mahaweli areas is based on a three tiered Project Manager system. The Resident Project Manager (RPM) is responsible for overall project management including the settlement process, provision of settler services, and various construction activities. The RPM is assisted by Block Managers responsible for 2500 farmers (approximately 5000 acres) and at the lowest level by Unit Managers responsible for varying number of farmers ranging from 125 - 300 families. Operations and Maintenance is handled at the Block level by an engineer and technical assistants attached to the Block Manager's staff. Unit Managers are currently receiving additional practical training in agriculture and water management as well as technical training such as surveying. In coordination with the construction schedule, training will be required for additional unit managers and other field staff.

In most Mahaweli areas farmers are organized at the field channel (i.e. turnout) level, consisting of from eight to twenty farmers, who select a farmer representative. In Block H-5 a system of Community Development Societies was introduced with direct contact with farmers, instead of their representatives, which covers the entire range of farmer concerns, not simply water-related matters. Emphasis will need to be placed on providing adequate training of unit managers and farmer representatives to ensure effective transfer of information. In addition, researchers will require several seasons of experience before making recommendations to farmers on specific crop varieties.

Water charges continue to be an issue in Sri Lanka. Presently water charges are levied at the rate of Rs.30 per acre per year in some areas administered by the Irrigation Department and in some Mahaweli areas. In other areas a revised rate of Rs.75 per acre has been instituted. Operations and Maintenance costs are substantially higher, with estimates ranging from 150 - 200 rupees per acre annually in various parts of Sri Lanka, including the USAID- supported Gal Oya Water Management Project area. Collection rates from farmers are low. In areas recently settled, including areas of System H settled since 1977, no irrigation charges have been levied to date. However, farmers in Block H-5 had not been advised that water charges would be charged at some future date.

Various proposals have been put forward to establish water rates which will meet operations and maintenance costs of systems. Recommendations have been made to set water charges in terms of bushels of paddy so that charges will increase with inflation. Recently Mahaweli officials have proposed a charge of Rs.200 per acre per season as an adequate charge to cover expected operations and maintenance costs. This figure may be high unless a farmer can count on two good crops per year. It has been proposed that funds generated by water charges remain at the Block level in the case of Mahaweli areas or at the district level in the case of Irrigation Department administered systems. A recent Cabinet Paper has proposed that water charges be set at one half the cost of operations and maintenance which is currently computed at Rs.200 per acre. This rate would be flexible in certain areas where irrigation supply may be inadequate or unreliable. This proposal calls for collection of charges by the Irrigation Department or Mahaweli authorities to be earmarked for operations and maintenance funds to be established at the Ministry of Lands and Land Development or within the Mahaweli organization.

Greater efforts appear needed to address the main problems in irrigation management, namely overconsumption of water and inadequate maintenance. A water charge based on quantity consumed may be impractical but some alternative method which encourages farmers better to manage available water could be developed. Also, none of these proposals encourages farmers to assume greater maintenance responsibility. Adequate attention to this aspect is imperative.

IX. Manpower Planning Problems

While on the whole we were impressed with physical progress and the state of planning and implementation of settlement, provision of services and farm income and employment considerations, we were concerned about the paucity of planning regarding non-farm employment in System B (and the AMP area in general).

During project appraisal, there is a tendency for planners to underestimate seriously the potential long-term benefits of projects planned and implemented as agricultural development projects, especially in regard to non-farm employment. This general criticism continues to be applicable to the AMP. Very little consideration has been paid to non-farm employment generation or to the requirements for both seasonal and permanent farm labor.

Recent studies show that over half of Sri Lanka's non-farm employment continues to be in rural, rather than urban areas. As planned and implemented government-sponsored settlement projects may well generate less non-farm employment than currently exists in old lands rural areas. Currently, planning for System B is based on the assumption that one non-farm family will be settled on homestead allotments for every five farm families. This figure has no scientific validity, being based primarily on the availability of highland allotments in System H (not B) for non-farm families rather than on the employment potential of System B farming systems. Studies at Minneriya (near Polonnaruwa) and in other countries (Sudan for example) show that the type of agricultural diversification currently being planned for the AMP(and specificially for System B)elsewhere have generated much more farm labor and non-farm employment and suggest that an initial figure

possibly as high as one farm laborer or non-farm family for every two farm families (as opposed to 1:5) would be a more appropriate target. What are needed are careful surveys of the employment generation potential of the more diversified farming systems currently being planned within the AMP at the household, hamlet and systems levels. Here, employment generation relates to the following categories: (1) seasonal and permanent agricultural labor; (2) AMP administrative and service personnel (including teachers, health workers, police, etc.); and (3) non-farm employees in hamlets, village centers and townships, such as shopowners, workers, artisans, clergy, etc. Special emphasis is needed on the larger regional towns which are largely ignored in current planning.

Such information is necessary to better plan for community services and for commercial enterprises which in turn make settlements and rural towns more attractive places for non-farm labor. Without such planning the employment potential of the AMP will not be realized hence affecting adversely attainment of a major goal of the program.

X. Conclusions and Recommendations

Our conclusions in the key areas of our review are as follows:

--We believe that GSL will be able to finance downstream development costs for Phases I(a) and I(b), even in the face of substantial budget deficit. IMF guidelines of limiting the budget deficit to 20% of GDP or below are being adhered to. The deficit will be financed largely through foreign aid and other means less likely to introduce sharp inflationary pressure into the economy;

--The ability of the GSL to finance these downstream costs in a non-inflationary manner assumes that relatively high levels of foreign aid will be available. It is likely that this, in fact, will be the case with the GSL's own domestic resources required to make up a deficit of approximately $30 million. This should not pose a problem. Mahaweli continues to have highest priority within the GSL's budget, and System B has appropriate priority (after the major headworks) within the Mahaweli Implementation Plan. It is reasonable to assume that budgetary resources will be allocated to help finance the downstream costs of the activity that commands highest GSL priority;

--Improvement of financial monitoring requires priority attention by GSL. Improved monitoring should improve quality and timeliness of available data and should reduce inconsistency of data from various sources. Improved monitoring would also provide a valuable opportunity for improving expenditure flows and avoiding shortfalls in annual budgeted expenditures;

--Construction of the main and branch canals in Phase I(a) area is 14% complete against 16% planned, or slightly behind schedule at present. However, the team concludes that these canals should be completed on time or with about one month's delay as the contractor accelerates his operation;

--The institutions overseeing the planning and implementation of downstream infrastructure, the Mahaweli Development Board (MDB) and the Mahaweli Economic Agency (MEA) are reasonably well-staffed, competent and equal to the task;

--The physical planning process of downstream infrastructure is systematic, thoroughly comprehensive and incorporates lessons learned and experience gained as it progresses, and appears adequate for the Left Bank of System B;

--The magnitude of facilities planned appear to meet the needs of the settler families in terms of irrigation needs, transportation facilities and social and administrative infrastructure;

--Progress in implementing planned infrastructure appears satisfactory for the one year period of its life. Overall progress in the Phase I (a) area is estimated at 38% against what is planned. Progress in Zone 5 is estimated at 70% and in Zone 1, 24% against what is planned respectively. Thus it appears at present that construction of downstream infrastructure is ahead of the construction of the main and branch canals. It is expected that all irrigation infrastructure (distributary and field canals and drains) will be completed on time and that satisfactory progress will continue on other aspects of the construction program to meet settler needs;

--The GSL has provided effective planning for settlement of the System B area. Creative policies have been adopted to minimize friction and dislocation, to organize settler life in a productive manner, and to provide needed production support and social services efficiently;

--Implementation of settlements in Zone 5 has progressed very well. Selection criteria have been adhered to, settler targets are close to being met, with many settlers from outside the area bringing their families. Adequate staff has been recruited and there is a general atmosphere of activity and progress in the area. Availability of irrigated water by the Maha crop season of 1983 will be the key to continued, sustained progress;

--Implementation in Zone 1 is running somewhat behind schedule. Settlers are scheduled to arrive shortly, including some being displaced from the area to be inundated by the Victoria and Kotmale Dams who will have no alternate livelihood or homes to return to. Key problem areas that require urgent attention are staff recruitment and the mobilization of adequate medical facilities and services, especially as initial settlement coincides with the beginning of the prime malaria season;

--Solid progress is being achieved in applying lessons learned from earlier experience in System H with respect to agricultural planning and provision of services. Provision of inputs, assistance with marketing, and adoption of policies to limit cultivation of rice are positive features of MEA activity, with attention being paid to blending of the roles of the private sector and public entities in marketing. A time lag with respect to research will delay optimum crop production recommendations, and attention to expedited, sustained research efforts appears necessary;

--We noted with interest the receptivity toward emphasis on greater agricultural diversification, both in crops and livestock. This policy, if extended, will further more economical use of irrigated lands, raise farmer income and avoid the problem of overproduction of rice, for which export markets are not assured.

--A good start has been made in organizing water management in the Mahaweli areas but more needs to be done in training of staff and farmers. Emphasis is required on a more comprehensive maintenance effort, for the entire canal system, extensively involving farmers, and on measures promoting water use economy. Adoption of a system of water charges to finance operations and maintenance on a largely self-sustaining basis is an important area of concern still being addressed.

--We are concerned about the apparent lack of manpower planning, especially as it relates to non-farm employment in System B, and the absence of such planning as a severe inhibiting effect on achieving optimum development impact. Provision for non-farm settlers has been made, not on the basis of a considered judgement of off-farm employment needs and possibilities and farm labor requirements beyond settlers' own families, but as a function of homestead lands remaining after allocation of settler needs.

It is evident that the GSL is making significant progress to provide complementary downstream infrastructure, services and other inputs in the project area as required by the project agreement.

It can be stated with confidence that distributary and field canals will be complete and ready to receive irrigation water conveyed by the AID-financed main and branch canals, once those are completed by Zachry-Dillingham. From an engineering and construction viewpoint, it is evident that the Phase 1 (b) option should be exercised by the GSL. Acceptance of the Zachry-Dillingham bid price for Phase 1(b) promises a savings of at least $12 million over likely results of rebidding. The contractor has mobilized effectively and is performing required work on Phase I (a) in a competent manner, endeavoring with all means at his disposal to meet deadlines and ensure availability of irrigation water to settlers beginning in the forthcoming Maha cropping season beginning in November 1983.

From our analysis of the GSL budgetary and other financial data, it is evident that the Left Bank of System B is receiving its due share of resources from the GSL. Moreover, we believe that reasonable prospects exist that the GSL will ensure the availability of adequate funding in support of Phase 1(b). U.S. association with Sri Lanka in development of Phase 1(b) will assist toward realization of the AMP's goal of greater agricultural diversification. Further, with Phase 1(b) covering the first area under the AMP inhabited by significant numbers of minority populations, the U.S. has the opportunity to help the GSL demonstrate throughout the world that the AMP is intended to benefit all Sri Lankans. Accordingly, we recommend that AA/ASIA approve the obligation of funds under project number 383-0073 for financing the contract for Phase 1(b).

GLOSSARY

GSL - Government of Sri Lanka

ADB - Asian Development Bank

EEC - European Economic Community

IMF - International Monetary Fund

Maha - the major crop of the year, cultivated from November to March

Yala - the second crop of the year; in the dry zone, it is dependent on irrigation, and in the wet zone, on residual moisture

AMP - Accelerated Mahaweli Program

MASL - Mahaweli Authority of Sri Lanka

MDB - Mahaweli Development Board

MECA - Mahaweli Engineering and Construction Agency (a new entity that will replace MDB)

MEA - Mahaweli Economic Agency

LB-R1 - Left Bank, first branch canal on the right

D Canal - distributory canal; third level canal

SD Canal - sub-distributory canal; intermediary level canal designed to carry water to additional areas not served by D canal

F Canal - field canal; fourth level canal

RPM - Resident Project Manager

paddy - unmilled rice

bushel - 45 pounds of paddy

GDP - Gross Domestic Project

Exchange Rates:

1978:	U.S.$1 = Rs.15.50
1979:	U.S.$1 = Rs.15.44
1980:	U.S.$1 = Rs.18.00
1981:	U.S.$1 = Rs.20.00
1982:	U.S.$1 = Rs.21.00
1983:	U.S.$1 = Rs.23.00