PROJECT PERFORMANCE ASSESSMENT REPORT

SRI LANKA

NATIONAL IRRIGATION REHABILITATION PROJECT
(CREDIT NO. 2260-CE)

June 1, 2004

Sector and Thematic Evaluation Group
Operations Evaluation Department
Currency Equivalents (annual averages)
Currency Unit = Sri Lanka Rupees (Rs)

<table>
<thead>
<tr>
<th>Year</th>
<th>US$1.00</th>
<th>Rs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>1981 - 1990</td>
<td>28.2</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>41.4</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations and Acronyms

ICR: Implementation Completion Report
OED: Operations Evaluation Department
PPAR: Project Performance Assessment Report

Fiscal Year

Government: January 1 – December 31

Director-General, Operations Evaluation : Mr. Gregory K. Ingram
Director, Operations Evaluation Department : Mr. Ajay Chhibber
Manager, Sector and Thematic Evaluation : Mr. Alain Barbu
Task Manager : Mr. John R. Heath
About the OED Rating System

The time-tested evaluation methods used by OED are suited to the broad range of the World Bank's work. The methods offer both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. OED evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (more information is available on the OED website: http://worldbank.org/oed/eta-mainpage.html).

**Relevance of Objectives:** The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). Possible ratings: High, Substantial, Modest, Negligible.

**Efficacy:** The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. Possible ratings: High, Substantial, Modest, Negligible.

**Efficiency:** The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. Possible ratings: High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

**Sustainability:** The resilience to risk of net benefits flows over time. Possible ratings: Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

**Institutional Development Impact:** The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. Possible ratings: High, Substantial, Modest, Negligible.

**Outcome:** The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. Possible ratings: Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

**Bank Performance:** The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

**Borrower Performance:** The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.
Contents

Principal Ratings ................................................................. v

Key Staff Responsible .......................................................... v

Preface ................................................................................ vii

Summary ................................................................................. ix

Rationale and Approach ......................................................... 1

Background—The Low Return to Irrigation in Sri Lanka .......... 1

Project Objectives and Design .............................................. 4

Relevance ............................................................................... 4

Efficacy ................................................................................. 5

Efficiency ............................................................................... 9

Outcome ............................................................................... 12

Institutional Development Impact ..................................... 12

Sustainability ....................................................................... 12

Bank and Borrower Performance ..................................... 14

Findings and Lessons ......................................................... 15

Annex A. Tables .................................................................. 17

Annex B. Re-Estimate of the Economic Rate of Return ........ 26

Annex C. Farm Survey Questionnaire ................................. 41

Annex D. Basic Data Sheet .................................................. 47

This report was prepared by John Heath, who assessed the project in October 2003. The report was peer reviewed by Keith Pitman and edited by William Hurlbut. Rose Gachina provided administrative support.
### Principal Ratings

<table>
<thead>
<tr>
<th></th>
<th>ICR*</th>
<th>ICR Review*</th>
<th>PPAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>Unsatisfactory</td>
<td>Moderately Unsatisfactory</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Unlikely</td>
<td>Unlikely</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Institutional Development Impact</td>
<td>Modest</td>
<td>Modest**</td>
<td>Negligible</td>
</tr>
<tr>
<td>Bank Performance</td>
<td>Satisfactory</td>
<td>Unsatisfactory</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>Borrower Performance</td>
<td>Unsatisfactory</td>
<td>Unsatisfactory</td>
<td>Unsatisfactory</td>
</tr>
</tbody>
</table>

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate OED product that seeks to independently verify the findings of the ICR.

** Rated partial in the ICR. OED's ratings database converts this to modest (the current equivalent designation) in the interests of harmonization; but it should be noted that the ICR rates institutional development impact only as a part of the achievement of objectives, differing from current guidelines.

### Key Staff Responsible

<table>
<thead>
<tr>
<th>Project</th>
<th>Task Manager/Leader</th>
<th>Division Chief/ Sector Director</th>
<th>Country Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisal</td>
<td>H. Van Voorthuizen</td>
<td>Chaim Helman</td>
<td>S. Asanuma</td>
</tr>
<tr>
<td>Completion</td>
<td>Nihal Fernando</td>
<td>Ridwan Ali</td>
<td>Mariana Todorova</td>
</tr>
</tbody>
</table>
Preface

This is a Project Performance Assessment Report (PPAR) for the Sri Lanka National Irrigation Rehabilitation Project, for which Credit No. 2260-CE in the amount of US$29.6 million equivalent was approved on June 6, 1991. The credit closed on December 31, 1998, six months later than expected. Final disbursement took place on May 11, 1999 and a balance of US$5.0 million equivalent was canceled.

The PPAR presents the findings of a mission by the Operations Evaluation Department that visited Sri Lanka in October 2003. The mission was conducted by Mr. John R. Heath, assisted by Dr. Sarath Bandara Mananwatte and Dr. Ranjith Dissanayake Wanigaratne (consultants). The findings draw on interviews with beneficiaries, project staff, officials of the Government of Sri Lanka and Bank staff. Also, as a follow-up to the mission, Dr. Dissanayake conducted a survey of farm households in January-February 2004. The collaboration of these persons is gratefully acknowledged, as is the generous financial support received from a Norwegian Trust Fund, without which the survey work would not have been possible.

Following standard OED procedures, the draft PPAR was sent to the borrower for comments before it was finalized. No comments were received.
Summary

This is the Project Performance Assessment Report prepared by the Operations Evaluation Department (OED) on the National Irrigation Rehabilitation Project for which a credit of US$29.6 million equivalent was approved in June 1991 and closed in December 1998, six months behind schedule.

The objective of the project was to stabilize and increase agricultural production and incomes and to raise standards of living through rehabilitation and improved operations and maintenance of existing irrigation schemes. This entailed upgrading the skills of farmers and the staff of implementing agencies and creating viable Farmer Organizations for managing the rehabilitation schemes. The project aimed to rehabilitate about 1,000 minor schemes covering some 25,000 ha and about 60 medium/major schemes (12,500 ha)—comprising about 7 percent of all irrigated land.

The project built on a government program, launched in 1988, to share responsibility for operations and maintenance with farmer organizations. The program was intended to reduce the budget burden of recurrent funding for irrigation, to improve maintenance and to boost productivity of irrigated water and land. The program was an attempt to redress the limited efficiency and low returns to the heavy investment that Sri Lanka made in irrigation in the 1970s and 1980s.

The findings of this report are based on a comprehensive re-evaluation of the economic rate of return to the project and a survey of 120 households from six representative irrigation schemes.

OED rates outcome as unsatisfactory, based on the modest relevance of the project’s development objectives, modest progress in achieving those objectives and modest efficiency. Relevance was limited by the failure to address farmer incentives to use water efficiently and the lack of explicit attention to poverty reduction. Progress toward objectives was limited by the lower than expected growth in farm yields, cropping intensity and net farm income. Although the project’s re-estimated rate of return, at 10 percent, is about equal to the opportunity cost of capital there were serious deficiencies in the rehabilitation works, reducing cost efficiency.

The project’s institutional development impact is rated negligible based on the pre-eminent attention given to the physical aspects of rehabilitation rather than to the strengthening of irrigation agencies, Farmer Organizations, or the incentive framework. Sustainability is rated unlikely owing to design deficiencies in the rehabilitation and the Farmer Organizations’ limited success in mobilizing user funding to pay for operations and maintenance.

Bank performance is rated unsatisfactory, in particular, because it failed to ensure that farmers and staff were properly organized and trained before the rehabilitation work began, giving insufficient emphasis to the institutional challenges. Partly for the same reasons but also because of the delay in project start-up, the failure to strengthen provincial irrigation agencies and poor management of cash flow, Borrower performance is also rated unsatisfactory.
These findings suggest two lessons that might be taken into account when the Bank prepares future irrigation projects in Sri Lanka and elsewhere. First, after the economic rationale for rehabilitation has been demonstrated, consideration needs to be given to the supporting policy and institutional changes that must be made to boost and sustain the benefit flow. Measures are needed to provide farmers with incentives to behave as commercial operators and to use water sparingly, in line with its marginal cost.

Second, if farmers are to assume responsibility for operations and maintenance following rehabilitation, they must be fully consulted on the design of the proposed works. The creation of farmer organizations needs to precede rehabilitation, and building the capacity of these organizations—always a slow process—needs to be given no less emphasis than the engineering aspects.

Gregory Ingram
Director-General
Operations Evaluation
Rationale and Approach

1. The implementation completion report (ICR) for the National Irrigation Rehabilitation Project argued that it should be the subject of a “post-project impact evaluation”; a recommendation that was endorsed in OED’s June 1999 desk review of the report. The ICR noted that despite the project’s unsatisfactory outcome it offered a rich source of learning about the handover of irrigation schemes to farmer organizations. The current evaluation examines whether in the five years since the loan closed the irrigation systems are performing better, and whether farmers are likely to have become better off.

2. Both the project appraisal report and the ICR conducted an economic analysis based on six irrigation schemes (four minor and two medium/major) which are described as representative of all the schemes included in the project (1,034 minor schemes and 34 medium/major schemes had been covered at loan closing). OED re-examined the same six schemes, the main features of which are summarized in Annex A, Table A3. First, the economic rate of return was re-estimated (Annex B). Second, in January-February 2004, following the main mission, a farm and household survey was administered to 120 project beneficiaries drawn from the six schemes (see Annex C for questionnaire). The OED survey was not a formal impact evaluation because the project had neither a baseline survey nor a control group of non-beneficiaries. However, by revisiting the same sample of schemes that were studied at appraisal and completion, this evaluation aimed to establish if circumstances had improved over the last five years. While it was impossible to assess to what extent observed changes are attributable to the project, the evaluation was able to determine if these changes were consistent with the development objectives of the project.

Background—The Low Return to Irrigation in Sri Lanka

3. In 1988, following a decade of field experiments, Sri Lanka became one of the first South Asian countries to endorse the sharing of responsibility for operations and maintenance with farmer organizations. In medium and major schemes (80 ha or larger), the Farmer Organization was made responsible for operations and maintenance below the distributary head, while the public water agency retained control of the headworks and main canals. For minor schemes (under 80 ha), full responsibility for all aspects of operations and maintenance was transferred to the Farmer Organization. The Participatory Irrigation System Management program had the following objectives:

- Relieve the government of the financial burden of funding recurrent expenditures for irrigation;
- Improve the maintenance of irrigation facilities and the irrigation service;
- Enhance the productivity of irrigated land and water; and
- Promote a spirit of self-reliance among farmers in irrigation schemes.

4. About 85 percent of 200 schemes targeted by the government are under participatory management (representing about 15 percent of all irrigation schemes in the country). This program provided the design context for the project that is the subject of this assessment. The following paragraphs summarize key aspects of the broader framework of irrigated agriculture in Sri Lanka.

5. Sri Lanka had a total irrigated area of 659,000 ha in 2000, or about 35 percent of farmland. More than 75 percent of irrigated land is in the dry zone and is mainly used for highly water-intensive paddy cultivation. Unlike surface water, ground water is a limited resource whose availability has not yet been fully assessed (although it is likely that most of the major aquifers have already been tapped). The bulk of water demand is met from surface supplies, using an infrastructure that comprises 60 large multi-purpose dams, 260 major irrigation tanks, and about 12,000 minor reservoirs (village tanks). About 85 percent of the water supply is used for irrigated agriculture.

Sri Lanka has invested heavily in irrigation—

6. Successive administrations sought to make the nation self-sufficient in rice and to promote movement of population out of the crowded wet zone of the island to newly-established, irrigated farming communities in the dry zone. From 1980 to 1997, the government spent about SLR 215 billion (at 1996 prices) on developing irrigation infrastructure. But budgets are now more constrained and priorities have shifted. Irrigation outlays declined from 80 percent of agriculture sector spending in the early 1980s to about 40 percent in 2000. The share of new construction in irrigation investments declined from the 80 percent plus that prevailed from 1950 to 1985 to less than one-third by the late 1990s. In 1997 the total investment in irrigation was divided as follows: new works, 28 percent; rehabilitation, 41 percent; operations and maintenance, 11 percent; and private investment 19 percent (Table A1, Annex A).

—but the impact on output and productivity has been disappointing.

7. The combined effect of trade, marketing, technology, land and water policies has been to tie most farm households to low productivity activities—about 90 percent of irrigated land is used to grow paddy. Poor reliability of water delivery and limited access to water by tail-enders, combined with the inadequate supply of agricultural extension and improved technologies, contribute to low crop yields. In many areas in the dry zone, diversification into higher value crops is impeded by water delivery schedules that are designed for paddy cultivation—schedules over which farmers exercise little control. Low productivity depresses farmer incomes—and also raises resistance to the introduction of water charges needed to fund maintenance of the irrigation system.


Falling returns from farming have driven the rural population out of agriculture...

8. The percentage share of labor employed in agriculture decreased from 47 percent of total employment in 1990 to 36 percent in 1999; but throughout this decade agricultural productivity per worker stagnated at around SLR 53,000 per year (in constant 1996 prices). In 2000, about 80 percent of the population lived in rural areas but only 23 percent of the mean earnings of rural households came from agriculture. About 45 percent of rural households are dependent on farming (including casual agricultural wage employment). Half of these households are located in the poorest 40 percent of the income distribution. Agriculture in Sri Lanka is becoming increasingly polarized between a small, dynamic sector (fruits, vegetables and spices) and a large, relatively stagnant sector comprising paddy production and tree crops. The dynamic sector accounts for a rising share of GDP and is fueled by domestic (particularly tourist) and export demand. The stagnant sector is associated with stable to declining GDP shares; easing of import restrictions on cereals has reduced the stimulus that these crops receive from domestic demand while their relatively high costs reduce export potential. Much of the irrigated farm area is tied up in paddy; and this sector’s share of agricultural GDP declined from 28 percent in 1982-85 to 22 percent in 1996-2000.4

Has the experiment in participatory irrigation management helped to address these constraints?

9. The early evidence—based on independent evaluation by the International Water Management Institute—is not encouraging. First, IWMI reports that in schemes where management responsibilities are handed over to Farmer Organizations government spending on operations and maintenance tends to increase in the five-year period after transfer. Second, farmers in schemes that have been handed over do not make increased payments (in cash or kind) after the handover—although they may contribute more labor for canal maintenance. Third, the quality of irrigation service does not improve with handover: farmers report no improvement in the adequacy, timeliness and fairness of water distribution, and no reduction in the incidence of irrigation-related conflicts. Fourth, farmers are frequently dissatisfied with the quality of the government-financed rehabilitation works that are typically a precondition for handover; and not convinced that the functional condition of canal infrastructure improves with handover.

Most importantly, it was found that:


5. The data are drawn from an intensive study of two irrigation schemes (Nachchaduwa and Hakwatuna Oya) and from an extensive survey of 50 randomly selected schemes from four districts (Anuradhapura, Kurunegala, Moneragala and Hambantota) where major and medium irrigation schemes are concentrated. (None of these schemes were included in the National Irrigation Rehabilitation Project but the findings are probably still broadly relevant). (M. Samad and D. Vermillion, Assessment of Participatory Management of Irrigation Schemes in Sri Lanka, Research Report No. 34, International Water Management Institute, Colombo, 1999).
“Management transfer alone did not result in significant improvements in agricultural production levels or the gross value of agricultural production per unit of land or per unit of water diverted. Neither did rehabilitation alone create significant effects. However, in schemes where both management transfer and rehabilitation have occurred, significant effects on agricultural productivity levels and economic returns were observed”.

10. This assessment considers whether the project in question bears out these earlier findings about the impact of rehabilitation and management transfer.

**Project Objectives and Design**

11. A detailed description of project features is given in Table A2 (Annex A).

12. The main objective of the National Irrigation Rehabilitation Project was to stabilize and increase agricultural production and incomes and to raise the standards of living through rehabilitation and improved operations and maintenance of existing irrigation schemes. Subsidiary objectives included (a) upgrading the skills of farmers and the staff of the implementing agencies, and (b) creating viable Farmer Organizations for managing the rehabilitation schemes.

13. The project aimed to rehabilitate about 1,000 minor schemes covering some 25,000 ha and about 60 medium/major schemes (12,500 ha), covering 7 percent of the total irrigated area as of 1990. Before any scheme could be rehabilitated the relevant Farmer Organization had to agree that:

- With respect to minor schemes, the full cost of operations and maintenance would be borne by the Organization once rehabilitation was complete;

- With respect to the medium/major schemes, the full cost of operations and maintenance for distributary and field canals would be met by the Organization immediately after rehabilitation, with costs for operating and maintaining headworks and main canals beginning to be recovered from the Organization two years after rehabilitation.

**Relevance**

14. The project’s objectives were consistent with the strategy of Bank and Borrower when the project was appraised. A major Bank economic report of 1988 argued that the emphasis given to irrigation in the country’s development plans should be reconsidered. Faced with the evidence of low rates of return on investments in new irrigation schemes, the report recommended that the share of irrigation/resettlement in future public investment programs be reduced substantially and that future investment concentrate on high return projects in rehabilitation and upgrading of existing irrigation schemes.

---

15. This recommendation was embodied in the design of the National Irrigation Rehabilitation Project—building on the earlier Village Irrigation Rehabilitation Project. The summary of government strategy in the appraisal report focused on the need to preserve and make optimal use of existing irrigation infrastructure in the short and medium term. The Bank’s project rationale ignored the sunk costs argument; it justified fresh investment on the grounds that the returns to past investment were worth protecting—without rigorously examining alternatives that might have offered higher returns.

16. OED measures relevance in terms of current strategy, not the strategy when the project was appraised. The key issue is whether, by the standards of today, the project’s development objectives, as formulated during implementation, responded to a problem that was meaningful at that time, and whether the nature of that response was appropriate.

17. The current strategy of Bank and Borrower emphasizes (a) efficient management of water (which includes applying prices that reflect the scarcity of the resource) and (b) reduction of poverty. These were also key issues when the project was designed and implemented. The project responded to these objectives in a way that was only partly relevant. Transferring management to Farmer Organizations was, in principle, a way of increasing efficiency. But it was only half the answer; the other half had to do with correcting the trade and taxation regime to provide farmers with an incentive to get the highest possible return to their use of irrigation water. The project did not address the rice bias, failing to question the logic of government price support and input subsidies.

18. Second, there are equity considerations that the Bank’s strategy did not address. Government support to the domestic price of paddy—the wedge between domestic and world market price exceeding 20 percent, equivalent to 2 percent of GDP—benefited larger producers, discriminating against poorer farmers and rural workers, many of whom were net buyers of rice. Indeed, around the time the project was designed, it was estimated that 84 percent of rural households purchased more rice than they sold.7 Most families would be obliged to sell rice at harvest time (because of immediate cash needs or the lack of on-farm storage) and then buy back later in the year at much higher prices. An irrigation rehabilitation project would need to be linked to an appropriately-designed sector adjustment operation if these distributional issues were to be effectively tackled. This did not happen.

Based on these considerations relevance is rated modest.

Efficacy

19. According to the ICR, the expected outputs were substantially delivered, and at 90 percent of the anticipated cost. The command area rehabilitated was in line with the target set at appraisal; but fewer medium or major schemes were covered than expected (Table 1). The number of Farmer Organizations created was also broadly consistent with

expectations, although coverage of the larger schemes is not very clear. About 70 percent of the expected training was delivered.

### Table 1. Outputs by Component

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>COSTS (US$ million)</th>
<th>OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appraisal Estimate</td>
<td>Actual</td>
</tr>
<tr>
<td>Rehabilitation and improvement works, vehicles &amp; equipment</td>
<td>34.9</td>
<td>1,048 minor schemes, 105% of appraisal target</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34 medium/major schemes, 57% of target</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38,390 ha (command area), 102% of target</td>
</tr>
<tr>
<td>Farmer Organizations</td>
<td>2.7</td>
<td>1,255 Organizations, 105% of target (minor schemes)/1</td>
</tr>
<tr>
<td>Training and technical assistance</td>
<td>7.4</td>
<td>172 persons trained overseas, 71% of target; 92,471 person/days of in-country training, 67% of target; 2,367 person/days of technical assistance, 110% of target</td>
</tr>
<tr>
<td>Other/2</td>
<td>4.8</td>
<td>Not Available</td>
</tr>
<tr>
<td>TOTAL</td>
<td>49.8</td>
<td>44.7</td>
</tr>
</tbody>
</table>

Source: Implementation Completion Report.

1/ No target was specified for the number of organizations to be created in medium/major schemes; between the 34 schemes in this category, 207 Organizations were created, each covering part of the network of distributary and field canals.

2/ Institutional support and Studies, Environmental Protection (No output indicators specified).

20. With respect to outcomes, the picture is less promising: the project’s main development objectives were not fully achieved.

**Objective 1: Raising Farm Output and Incomes (Partially Achieved)**

21. According to the ICR, the increase in cropped area was slightly higher than expected but cropping intensity and yields grew by less than the expected amount. The net effect was that paddy output grew in line with appraisal expectations. On the other hand, there was no significant diversification into other (more profitable) field crops. Net annual farm incomes increased by substantially less than appraisal estimates (Table A4, Annex A).

22. OED’s 2004 farm survey revisited the same six schemes covered in the appraisal and ICRs and found that cropping intensity and paddy yield were respectively slightly higher and slightly lower than appraisal estimates (Table 2). But the growth of paddy output and the diversification into other field crops were both lower than expected. Net farm income grew by less than the appraisal had forecast. However, this aggregate picture conceals substantial differences between the schemes: three had net farm incomes that much exceeded appraisal estimates, and three did less well than expected (Table A3, Annex A). Both of the two medium/major schemes in the study (Kaltota and Mahagal Wewa) had lower than expected farm income growth.

---

8. This survey was carried out in January-February 2004, as a follow-up to the main mission which took place in October 2003.
Table 2. Determinants of Farm Income Growth

<table>
<thead>
<tr>
<th></th>
<th>Appraisal Estimate 1991 (A)</th>
<th>Survey Results 2004 (B)</th>
<th>Change (C)/(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Project</td>
<td>With Project</td>
<td></td>
</tr>
<tr>
<td>Cropping intensity (%)</td>
<td>99</td>
<td>146</td>
<td>47%</td>
</tr>
<tr>
<td>Paddy yield (mt/ha)</td>
<td>2.62</td>
<td>3.95</td>
<td>51%</td>
</tr>
<tr>
<td>Paddy output (mt)</td>
<td>4,070</td>
<td>8,087</td>
<td>99%</td>
</tr>
<tr>
<td>OFC Share (%)</td>
<td>-</td>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>Net farm income/d</td>
<td>7,857</td>
<td>22,807</td>
<td>190%</td>
</tr>
</tbody>
</table>


Note: See Annex A, Table A3 for details of each of the six schemes.

/a Mean value for six schemes.
/b Main season (maha).
/c Share of Other Field Crops in net farm income.
/d '000 Sri Lanka rupees, converted to SLR 1995 values using GDP deflator.

23. The ICR attributed the shortfall in farm output and incomes to a weak incentive framework. The lack of legal title to land and the absence of secure water rights reduces investment by farmers. Also, farms are too small to be economically viable. Household incomes are therefore derived mainly from subsistence-oriented rice production supplemented by off-farm wage earnings. There is little scope for the crop diversification that is necessary if irrigation potential is to be realized.

24. The 2004 survey results partly support this analysis. On the one hand, the mean area owned by farmers is, in each of the six schemes, somewhat larger than assumed at appraisal (Table 3, footnote /a); and none of the 120 farmers interviewed reported that the area owned at the time of the survey was less than that they had owned five years previously—in most cases farm size had remained constant. Also, two-thirds or more of farmers have title to their land; and, with the exception of Kaltota (where 47 percent were untitled five years before), titling appears to have occurred some time ago. Whether or not farmers have secure water rights, a majority report that they are satisfied with the supply of irrigation water that they receive. On the other hand, there is little crop diversification and a significant dependence on other income sources, mainly wage earnings (particularly at Dorakada, which is located on the edge of a town) (Annex A, Table A6). A national household survey in 2000 showed that more than two-thirds of households involved in crop production believe that diversification would boost their income; but these same respondents cite problematic access to credit, water, appropriate inputs, technical assistance and roads as the main obstacles to diversifying.

Table 3. Salient Features of Farms in Six Representative Irrigation Schemes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmland owned (ha)</td>
<td>0.8</td>
<td>1.8</td>
<td>0.4</td>
<td>1.5</td>
<td>0.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Farmers “satisfied” or “fairly satisfied” with supply of irrigation water (%)</td>
<td>70.0</td>
<td>90.0</td>
<td>100.0</td>
<td>66.7</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Share of Other Field Crops in net farm income (%)</td>
<td>--</td>
<td>0.9</td>
<td>60.9</td>
<td>1.1</td>
<td>--</td>
<td>3.5</td>
</tr>
<tr>
<td>Share of farm income in net household income (%)</td>
<td>68.1</td>
<td>54.3</td>
<td>16.4</td>
<td>43.7</td>
<td>41.2</td>
<td>48.6</td>
</tr>
</tbody>
</table>


/a The appraisal models assumed the following farm sizes: Kaltota, 0.4 ha; Mahagal Wewa, 1.1 ha; Dorakada Liyadde, 0.2 ha; Kobeigane, 0.2 ha; Mahakiri Ibbewa, 0.4 ha; Nittewa, 0.6 ha (Staff Appraisal Report, Table 5.2, p. 29).

/b “Farm income” refers to income from holdings operated directly by the farmer, as distinct from “Off-Farm Income” (mainly wages received for working for other farmers) and “Non-Farm Income (all income from outside the agriculture sector; mainly wages).

Objective 2: Creating Sound Institutions for Operations and Maintenance (Partially Achieved)

25. Although the number of Farmer Organizations created matched expectations, the completion report presents evidence that they were unlikely to be viable. The Organizations were not created before the rehabilitation works were begun, giving farmers no say in the design. Not surprisingly, most farmers did not provide labor or materials, thus failing to make the envisaged contribution of 10 percent to the total cost of works. There were major flaws in the quality of the works and their environmental appropriateness, weakening sustainability and therefore reducing the prospects for longer-term farmer commitment. Farmer resistance was invoked to explain why the target for handover of operations and maintenance responsibilities to Organizations had only been partially met—64 percent for small schemes, 32 percent for larger schemes—when the project closed. OED was unable to verify what the current status of handover is but was advised that there are still schemes that await transfer.

26. What has changed since? In the 2004 survey, OED found that 14 out of 15 Farmer Organizations in the six schemes had, in principle, assumed responsibility for the cost of operating and maintaining the lower end of the canal network. Each has an irrigation committee which oversees water supply to individual fields—hiring a sluice-gate operator—and mobilizes members’ (unpaid) labor for maintaining distributary and field

10. Irrigation tanks in Sri Lanka are generally arrayed in linked cascades, occupying sub-watersheds. The planning, selection and design of the rehabilitation works failed to take into account the water flow between tanks.
canals. Members are summoned to a meeting at the beginning of each season to agree on the cultivation calendar and the attendant chores. Book keeping is rudimentary. It was not possible to obtain accurate information about the financing of works by these Organizations. It was found that farmers pay a token membership fee to the Organization but there is no significant upfront contribution to a fund for financing operations and maintenance. Organizations receive government money for identifying suitable private contractors to carry out rehabilitation works: this takes the form of a commission equal to 5 percent of the value of the rehabilitation contract. In other words, the financing of essential irrigation tasks remains government-driven.

Table A8 (Annex A) shows that a plurality of farmers are either satisfied or fairly satisfied with the Farmer Organization with respect to

- Organizing rehabilitation
- Organizing maintenance
- Supplying farm inputs
- Providing information about the use of funds
- Settling disputes between members.

27. Except at Kaltota, a majority farmers were satisfied or fairly satisfied with the Farmer Organization’s role in securing credit. The only area where the dissatisfied contingent dominated (four out of six schemes) was the assistance provided by Organizations with the marketing of paddy.

28. In conclusion, Farmer Organizations can be deemed viable if they are judged solely by their members’ satisfaction with the services they provide—but this may simply reflect farmers’ very low expectations. The Organizations are not viable in terms of being financially self-sustaining. Probably they do not play a significant role in promoting the efficiency or profitability of farming. The 2004 survey showed that only 16 percent of farmers received an income from the sale of farm produce that exceeded income from all other sources; five years previously the proportion was 14 percent (Table A8, Annex A). This paints a picture of part-time subsistence production, rather than a booming commercial farm economy. Of the six sites, only Dorakada is periurban: much of the off-farm employment involves long-distance migration (including jobs in the army and, for young women—a key source of remittances—domestic service in Middle Eastern countries).

In the light of these findings, efficacy is rated modest.

**Efficiency**

29. The ICR assessed that the project’s overall economic rate of return was 14 percent (in the base case), compared to the 31 percent forecast at appraisal. The reduction in benefits is attributed to lower than expected cropping intensity and yields, and the lack of diversification into crops more profitable than rice. Costs were higher than anticipated owing to delayed implementation. But the 14 percent estimate is predicated on adequate maintenance of the works following rehabilitation. The ICR indicated that adequate maintenance was unlikely, given the limited viability of the Farmer Organizations. The
ICR adjusted the rate of return to reflect a 20 percent reduction in production phased over time owing to poor maintenance. This yields a rate of return (10 percent) that is barely equal to the opportunity cost of capital, suggesting that efficiency should be rated modest.

30. This evaluation refers to three new sets of data bearing on the efficiency of the Project. First, Kikuchi and colleagues re-estimated the rate of return as 12 percent, the third highest of the six rehabilitation projects reviewed by the International Water Management Institute. However, the authors caution that they have taken at face value the increase in cropping intensity reported in the completion report; this is “the most critical parameter in determining the benefit flow of this type of project” and they suggest that it was probably overestimated. The completion report says that cropping intensity increased by 6 percent in the minor schemes and 2 percent in the larger schemes.

31. The second data source derives from a re-estimate of the economic rate of return commissioned by OED in 2003. Using the same analytic framework used in the appraisal and ICR, OED derived a rate of return of 18 percent. Cropping intensity showed an increment of 9 percent for the minor schemes and 15 percent for the larger schemes. The higher rate of return is driven not only by increased cropping intensity (13 percent higher than the completion report estimate) but also by the increase in the irrigable area (6 percent higher) and yields (13 percent higher). The net effect is that paddy output is almost one-third higher than estimated at completion (Table 4). The cost side of the equation remained largely unchanged: the cost of works and operations and maintenance used the data in the completion report. There was some increase in labor and farm input costs but this cancels out when offset against a 12 percent increase in paddy price.

### Table 4. Economic Rate of Return—Drivers

<table>
<thead>
<tr>
<th></th>
<th>Minor Schemes</th>
<th>Medium/Major Schemes</th>
<th>Total or Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICR (1999)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigable area (ha)</td>
<td>21,250</td>
<td>11,382</td>
<td>32,632</td>
</tr>
<tr>
<td>Cropping Intensity (%)</td>
<td>134</td>
<td>168</td>
<td>151</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>3.96</td>
<td>3.95</td>
<td>3.96</td>
</tr>
<tr>
<td>Paddy output (t)</td>
<td>112,573</td>
<td>75,528</td>
<td>188,101</td>
</tr>
<tr>
<td><strong>OED (2003)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigable area (ha)</td>
<td>22,000</td>
<td>12,721</td>
<td>34,721</td>
</tr>
<tr>
<td>Cropping Intensity (%)</td>
<td>150</td>
<td>190</td>
<td>170</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>4.04</td>
<td>4.87</td>
<td>4.46</td>
</tr>
<tr>
<td>Paddy output (t)</td>
<td>129,281</td>
<td>117,703</td>
<td>246,984</td>
</tr>
</tbody>
</table>

Source: Implementation Completion Report; OED's 2003 re-estimate of the economic rate of return.

32. The third data source is OED's 2004 farm survey, which found a lower than expected increase in cropping intensity and yields (Table 5), consistent with a more modest rate of return than the 2003 re-estimate. Why is there a discrepancy? The 2003