

**United Nations Development
Programme
UNDP**



**Province of Sayaboury
Lao PDR**

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United Nations Capital Development Fund
UNCDF

LAO PDR

NAM TAN IRRIGATION REHABILITATION PROJECT

LAO/86/008

LAO/89/C02

REPORT OF THE FINAL EVALUATION

MISSION

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ACRONYMS

AFTA	Asian Free Trade Association
AFD	Agriculture and Forestry Division
ASEAN	Association of South East Asian Nations
CC	Consultative Committee
TPR	Tripartite Review
CTA	Chief Technical Advisor
DAT	Development Action Team
FIAT	Farmer Irrigated Agricultural Training Project
FIDIC	Fédération internationale des ingénieurs-conseils
GNP	Gross National Product
IIMI	International Irrigation Management Institute
IRRI	International Rice Research Institute
ISF	Irrigation Service Fee
JPO	Junior Programme Officer
LCC	Local Consultative Committee
LMC	Left Bank Main Canal
LPRP	Lao People's Revolutionary Party
LWU	Lao Women's Union
MAF	Ministry of Agriculture and Forestry
MOU	Memorandum of Understanding
NPD	National Project Director
NTRP	Nam Tan Rehabilitation Project
O&M	Operation and Maintenance
ODA	Official Development Assistance
PDR	People's Democratic Republic
PMU	Project Management Unit
PPER	Project Performance Evaluation Report
PRA	Participatory Rural Appraisal
RMC	Right Bank Main Canal
RRA	Rapid Rural Appraisal

TATechnical Assistance	
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNFPA	United Nations Fund for Population Activities
UNHCR	United Nations High Commissioner for Refugees
UNOPS	United Nations Office for Projects Services
UNV	United Nations Volunteer
USAID	United States Agency for International Development
VRF	Village Revolving Fund
WID	Women in Development
WUA	Water User's Association
WUG	Water User's Group

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GLOSSARY OF EVALUATION TERMS

IMPACT Is an expression of the changes produced in a situation as the result of an activity that has been undertaken

RELEVANCE Concerns the degree to which the rationale, objectives and expected impact of an activity are, or remain, pertinent, valid and significant, with regard to long-range objectives or other identified priority needs and concerns.

EFFECTIVENESS Is a measure of the extent to which an activity achieves its objectives.

EFFICIENCY Is the productivity of the implementation process of an activity - how well inputs were converted into outputs. An efficiency analysis usually compares a variety of ways of conducting an activity to find the one which requires minimum inputs to achieve some fixed goal or produces maximum outputs from a fixed quantity of inputs.

OBJECTIVES Are the purposes and aims of an activity, representing the desired states which the activity is expected to achieve.

OUTPUTS Are the specific products which an activity is expected to produce from its inputs, in order to achieve its objectives (e.g., number of people trained, number of vaccinations administered).

INPUTS Are the goods, services, personnel and other resources provided for an activity, with the expectation of producing outputs and achieving the objectives of the activity.

STAKEHOLDERS Individuals and/or groups who have an interest in and influence an organization's activities, programmes and objectives.

Source: UNCDF Programme Operations Manual

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EXECUTIVE SUMMARY

PROJECT DURATION AND FINANCING

The Nam Tan Irrigation Rehabilitation Project was implement in Sayaboury Province from February 1992 through June 1998. Concerning the rehabilitation of a gravity irrigation scheme and the agricultural development of its nearly 2,000-ha command area, the project was financed as follows:

UNCDF	\$4,015,	(LAO/89/
UNDP/Gov. of The Netherlands	\$1,715,	(LAO/89/008)
Government	\$150,180	
Farmers	\$110,000	
Total	\$5,992,	
	075	

At project closure about \$4.7 million of the committed external funds of \$5.7 million had been used, the \$1.0 million saving being essentially due to the non-expended contingencies of the UNCDF budget and the lesser than estimated cost of the rehabilitation works.

PROJECT ORIGIN AND RATIONALE

The impetus for the project was provided by the presence in the District of Phiang (pop. 40,000) of the Nam Tan irrigation scheme, farmed by over 1,900 families, which had fallen into serious disrepair during and following the Second Indochina War from 1965 to 1975. Built in the late 1960s with USAID assistance, it was completed in the early 1970s and regarded as a success as far as the provision of irrigation was concerned. Subsequent failures to strengthen the farmers' organisation, especially in effective water management and the marketing of produce, mitigated against the then project ever achieving its full potential.

The rehabilitation of this scheme, using a resolutely participatory approach, offered the

possibility to increase the province's capacity to produce rice under favourable conditions and to develop a model of irrigation management that could be replicated elsewhere in the Lao PDR.

PROJECT OBJECTIVES

The project's development objective was to contribute to ensuring food self-sufficiency in Sayaboury Province and limiting environmental degradation caused by hillside shifting cultivation.

Its immediate objectives were to:

- increase the beneficiary group's organisational, management and production capacity;
- modernise the irrigation infrastructure of the Nam Tan Scheme, increase the irrigated area and improve irrigation performance;
- strengthen the institutional capacity of the provincial and district services providing assistance to the rural users groups.

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PROJECT COMPONENTS AND IMPLEMENTATION MODALITIES

The activities planned to achieve these objectives were grouped into seven components:

1. Establishment of instruments to manage the irrigation
2. Rehabilitation of irrigation infrastructure
3. Support to agricultural production
4. Training
5. Management of irrigation scheme
6. Improvement of access to safe drinking water
7. Technical assistance

The project was to be executed by the Province of Sayaboury, under the supervision of a Consultative Committee (CC) chaired by the Vice-Minister of Agriculture and Forestry. The other members of the Committee were representatives of the Ministry of External Economic Relations, the Ministry of the Economy, Planning and Finance, UNDP and UNCDF. The committee was to meet annually, if possible on the occasion of the tripartite review.

A Project Management Unit (PMU), headed jointly by a National Project Director (NPD) and a Chief Technical Advisor (CTA), was to be responsible for the project's overall management and its implementation on behalf of the Province. A Local Coordination Committee (LCC) composed of representatives of the Sayaboury Province, Phiang District, the beneficiaries, the NPD and the CTA was to be formed. The PMU was to be composed of staff seconded from national, provincial and district technical services. They would be assisted by long- and short-term international experts.

The NPD assisted by the CTA would sign the contracts for the local supply of goods or services, issue work orders and approve payments for such services, and accept

completed works realised under both international and local contracts.

UNOPS, as Cooperating Agency, was to be responsible for the disbursements on all UNCDF budget lines except those directly concerning UNCDF. The CTA was to be the representative of UNOPS in the field. He would, in particular, provide the day-to-day management of the international contracts.

UNDP Agreement LAO/86/008 differs from the UNCDF Agreement in that it declares the project as nationally executed, while assigning disbursement responsibility of all budget lines except that for Training to UNOPS.

The project's execution required a high degree of involvement of provincial and district personnel and the active participation of the farmers in getting organised into irrigation blocks and constructing with their own labour the water distribution system below the tertiary canal. The rehabilitation of the irrigation scheme's civil works (main and secondary canals, service and village roads) was to be undertaken by an international contractor. An experimental station within the command area (known as 30-ha Centre) was expected to play a key role in providing both agricultural extension services and technical input to the management of the irrigation scheme. The scheme's effective use and sustainability would be ensured by the farmers creating a water-users organisation, putting in place a system of collecting water fees and managing the funds collected.

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PROJECT HISTORY

Project Agreements LAO/86/008 and LAO/89/C02 were signed in January and October 1992 respectively. The NPD was assigned to the project in February 1992, along with national staff comprising an agronomist, an irrigation engineer and two irrigation technicians. The project's progress, notably the mobilisation of Technical Assistance (TA) personnel, was initially hampered by the inadequate allocation of UNDP funds. A request for co-financing of TA and related costs to the Netherlands government led to the fielding of a Dutch formulation mission in August 1992 and a co-financing commitment equivalent to US\$1.7 million, exceeding UNDP's original commitment by about US\$600,000.

The year 1992 also saw a significant shift in execution responsibility. While UNOPS clearly was intended to play a strong role of cooperating agency, the project was in its initial months transformed into the Lao PDR's first nationally executed UN project. This shift was confirmed in September 1992 by an Aide Memoire limiting UNOPS's involvement.

In light of these rather confusing start-up conditions, it is not surprising that by the end of 1993 the project had achieved very little, its tangible output limited to a rehabilitated base camp, the results of a socio-economic baseline study and the cadastral and topographic mapping of the irrigation command area. This work had been accomplished by local contractors and two separate local consulting firms (MEKCONSULT, Lao Institute of Irrigation) with the assistance of short-term local and international experts.

The project's first CTA started work in April 1993 and completed the project's Inception Report five months later. This report, ostensibly in part in response to the recommendations of the Dutch formulation mission, proposed shifting the emphasis from irrigated agriculture to the household farming system and its improvement in the broader context of resource management. It proposed to modify the Project Development Objective as follows:

The project objective is to improve the livelihood of the households and their

members in the Nam Tan area by improving the farming system production conditions in a sustainable way within an integrated indicative resource management plan and;
use the project implementation to diffuse the project methodology, methods and techniques to national staff and other national support to be used in development of other areas.

The report by and large conserved the original project components and most of their activities. It put increased emphasis on crop selection, cultural practices, agricultural inputs and marketing and introduced an activity of on-going monitoring of development and related parameters.

A second CTA took up his post in January 1994. He became redundant eight months later, in September of the same year, when the parties cooperating in the project's implementation signed a Memorandum of Understanding (MOU) confirming the revision of the PMU structure, including the abolition of the CTA position. The new structure featured two departments reporting to the NPD, one for irrigation and one for community development. Each department was headed by a Deputy NPD assisted by an international expert, the irrigation expert representing UNOPS in the field. The international irrigation expert arrived in March 1995 and the community development expert four months later.

Community organisation of farmers into blocks began in February 1994 with four experimental blocks covering 100 ha of the command area. A community participation model was developed and used to formulate subsequent blocks of farmers who would cooperate on operating and maintaining the tertiary structures and farm ditches and outlets. Block-development work began

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in the 1994-95 dry season and was completed in October of 1997 with 92 blocks of farmers within the command area.

In December 1995 an international contractor began work to restore and improve the scheme's water conveyance and distribution network, rehabilitate service and village roads, and improve drainage conditions in the lower parts of the command area. The contractor's unsatisfactory performance led to the reduction of its contract volume and the engagement, in late 1996, of three local construction companies to complete the work. By the end of May 1997 the bulk of the main rehabilitation work was considered substantially completed.

The Water User's Association first election was in May 1995 and seven office bearers who became full time members of the irrigation scheme Management Committee were elected. These included a president, two vice-presidents, one for each main canal, and four other vice-presidents including one women to act as treasurer and another as the agricultural procurement official. The electoral college comprised the 92 block leaders, the 10 zone leaders and 14 village chiefs. By 1997 it was decided to include the entire farmer membership in the election of the management committee as the gap between officers and members was considered too wide.

In 1995 the project in concert with the Lao Women's Union (LWU) and the District set up the Village Revolving Fund (VRF), with money taken from the budget for

village micro-projects. Unlike the fund the money was taken from, the VRF was exclusively for women to get involved in small businesses and other productive activities. The Phiang District RF Committee had to approve the loans submitted by VRF Committees. 378 women and their families were the first recipients of the loans which had to be repaid with 12 per cent interest.

EFFICIENCY OF PROJECT IMPLEMENTATION

Input Supply

The inadequacy of programmed UNDP funds hampered the project's initial progress. This was resolved by a cost-sharing agreement signed with the Netherlands one year after the project had started with the NPD and some national staff assuming their posts on the project.

UNCDF contributed funding as required by the Project Agreement.

The Lao Government assigned the required national personnel and made the facilities of the 30ha Centre and the base camp available for rehabilitation as per the Project Agreement.

The farmers in the Nam Tan command area provided their labour to construct tertiary canals and the block-level water distribution system.

The supply of inputs to the rehabilitation of the scheme's civil works was less than satisfactory. The international joint-venture of construction companies contracted to undertake the work did not perform as expected. Three local companies were hired to take on part of the work, which was completed only a few months behind schedule and for 20 per cent less than the jointventure's contract amount. The achievement of this relatively satisfactory result required a high concentration of the project personnel's efforts, which may well have been the principal cause for the neglect of other project components.

Project Management

The management of the project's execution by the development partners was initially inefficient, a situation that began to improve with the Aide Memoire of September 1992 but was fully resolved only by the MOU of September 1994.

Starting in June 1994, the Tripartite Review (TPR) meetings were held regularly and had a wide range of representation to them. Their minutes, however, provide relatively limited evidence of meaningful guidance and leadership being supplied to the project's execution. In particular, when it was clear that the agricultural inputs were producing extremely limited impacts on the farmers, the TPRs indicate that year after year, there was some recognition and in some cases alarm about this but no concrete action taken to rectify this serious problem. In essence no decisive action was taken by the donors and the Lao PDR representatives to correct the contradiction that while the irrigation system was going from strength to strength in terms of water provision the agricultural system was not keeping pace.

As far as internal management of the project was concerned, the reporting and

monitoring requirements were carried out scrupulously (a notable exception being the project final report, which is not yet available) but the various reports were of limited value in providing direction to the project and as such were inefficient for the purpose of good project implementation. They were frequently not objective, merely recording that such and such an activity was satisfactory without giving any analytical detail as to why. This is the case of most of the PPERs, which also failed to follow the format prescribed by UNDP and therefore did not provide a particularly coherent picture of the progress being made by the various project components. One serious omission in monitoring and reporting was the failure to carry out a mid-term evaluation.

At the outset of the project much management time was lost and energy expended needlessly as a result of the confusion over responsibilities. The NPD was confused by the absence of a clear definition of what national execution entailed. This inefficiency was the result of one of the Project Agreements indicating national execution (LAO/86/008) but essentially contradicting this by the role mapped out for UNOPS. When these ambiguities were cleared up by the MOU of September 1994, the day to day management of the project became much more efficient. New regulations governing the management responsibilities were effected and the roles of both local and expatriate personnel were defined to suit the new management situation.

Project

Implementation

n Scheme

Rehabilitation

Despite the serious difficulties caused by the weak performance of the civil works contractor, the project succeeded in producing appropriate results within an acceptable time frame and on the whole at a reasonable cost. The work was carried out virtually without disrupting agricultural production in the command area. It resulted in structures of generally good quality and clearly not only restored the irrigation scheme's original conveyance and distribution capacity but improved significantly its functioning at the tertiary-canal level and below. The overall cost of rehabilitating the irrigation infrastructure was \$1.9 million, corresponding to a very reasonable US\$1,020 per hectare of command area.

Early on, the project also carried out the emergency rehabilitation of three culverts under the main canals and of a washed-out drop structure, at the comparatively high cost of US\$99,000. Small weirs blocking the flow in natural drains were built for US\$ 61,000, which corresponds to a

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very attractive unit cost of US\$207 per hectare they allow to irrigate. The cost of both these actions are included in the overall cost of scheme rehabilitation reported on above.

The efficiency of block development by the farmers suffered in the initial construction season (1994-95) under the late delivery and poor quality of construction materials (primarily concrete pipe). The rectification of this situation for the subsequent seasons contributed to the work's successful completion in October 1997. The unit cost of

block development (not counting the value of the farmers' own labour) was an acceptable 106 US\$/ha. This cost is also included in the overall cost of scheme rehabilitation.

Village roads were built at a total cost of US\$121,000, or US\$14,200 for each of the 8.5 km realised, which is reasonable for the type of gravel road provided.

Agricultural Development

The implementation of the agricultural component of the project has been markedly inefficient. The Province, which has control over the 30-ha Centre, appears to have a conflict of interest over what it requires from the Centre and what comprises the needs of the farmers in the Nam Tan command area. The agricultural extension services to be provided by the Centre have made little impact over the period of the project life, which leads to the conclusion that it is not performing its function. Given the financial, technical and human resources, including a large number of local consultancies, that have gone into the Centre, the outputs both in the failure to persuade farmers to use higher yielding varieties and to diversify agricultural production in the dry season to any significant degree indicate a very inefficient use of a resource which was vital to the success of the project in its formulation.

Community Development

The implementation of this component of the project was very efficient if measured in terms of the success of organising the water users in their various groups and the women in making a success of the credit made available via the VRF.

If measured in terms of providing a meaningful interface between farmers as water users and the WUA as trustees of the money generated by the ISF for operation and maintenance then the project was less than efficient. The fact that the ISF collection since project inception has only ever reached around 70 per cent of the total indicates inefficiency in making all the farmers understand the vital need for this fund. This is further substantiated by the fact that many farmers do not understand what the fee is for.

Technical Assistance

The provision of Technical Assistance (TA) was hampered by the confusing project start-up conditions created by the inadequate allocation of UNDP funds and the unplanned shift from UNOPS-led implementation towards national execution. This led not only to significant delays in the arrival and gaps in the presence of long-term experts but to serious conflict between national and international project personnel, culminating in the abolishment of the CTA position. The project's start-up difficulties clearly resulted in a considerable waste of TA resources and, with the notable exception of the TA dealing with construction matters, a rather disappointing impact of the TA delivered.

PRINCIPAL FINDINGS

Immediate Objectives

They have been achieved to varying degrees.

- The *organisational capacity* of the beneficiary groups was increased by block and zone formation of the farmers and the organisation of village women into managers and recipients of revolving funds. *Management* objectives were achieved with the formation of the Water Users Association (WUA) and election of a Management Committee but its capability to manage the irrigation scheme needs much improvement, especially in the collection of ISF, financial administration and the organisation of the operation and maintenance of the main infrastructure. *Production capacity* has increased as a result of the reliable availability of irrigation water but farmers remain largely committed to lower yielding local rice varieties and have not taken up agricultural diversification to any significant degree.
- The irrigation scheme has been successfully *rehabilitated*. The reliably *irrigable area* in both the wet and the dry season has been substantially increased, largely as the result of the rehabilitated irrigation scheme providing the physical means for the better management of water distribution. At the level of the blocks, *irrigation performance* has improved substantially but at the level of the main and secondary canals the potential for good operation, especially in the dry season, has yet to be realised.
- While the 30-ha Centre has been rehabilitated and training has been provided for many provincial and district technical staff, little achievement is observable in the provision of support services to the farmers in the command area, resulting in the conclusion that the Immediate Objective of *strengthening the institutional capacity* of these support services has not been achieved.

Development Objectives

Significant tangible but unfortunately unsustainable results have been achieved. While the increase in rice yields has resulted in farmers obtaining a surplus, part of which reaches *provincial markets*, the potential clearly exists for the Nam Tan irrigation scheme to produce a considerably greater marketable surplus than is presently attained. The number of farmers resorting to *shifting cultivation* has significantly decreased.

Project Implementation Management

While overall the project was executed satisfactorily, there were negative aspects to implementation management that were predominantly the result of an unplanned shift in execution responsibilities, from a heavy reliance on UNOPS to national execution, in the initial stages of the project. This shift, the rationale for which is not documented, was not well dealt with and the resulting confusion led to serious conflict between national and expatriate project personnel and a considerable waste of TA resources.

Many decisions affecting the project appear to have been taken on an ad hoc basis between UNDP/UNCDF and the Project Management Unit (PMU). Changes to the project design are often either poorly documented or not documented at all. Thus much of what might have been useful information, not only to reconstitute the project history but to design future projects, has been lost.

Scheme Rehabilitation

Rehabilitation of the main water conveyance and distribution system was successfully achieved. The project adequately overcame the difficulties caused by an under-performing international contractor by engaging local contractors. The farmers created with their own labour an effective system of water distribution at the tertiary-canal and field level.

Twenty-six metal culverts under the main and secondary canals remain to be replaced with concrete structures. Installed in the early 1970s, they have reached the end of their useful life and can be expected to fail any day, disrupting irrigation and their replacement straining the WUA's financial resources.

Scheme Management

The organisation of the WUA is very complex and involves an unnecessarily large number of people. Collection of the Irrigation Service Fee (ISF) remains a serious problem with only between 60 and 70 per cent of the water users ever paying their fee to the block they are part of. This has serious consequences for the operation and maintenance of the scheme and, compounded by the provincial government refusing to allow the WUA Management Committee to impose a realistic ISF, offers a dim prognosis for the irrigation scheme ever being self sustaining.

The main canals are still damaged by buffaloes using them for drinking water and bathing, although there are WUA regulations banning this practice. The canals are also used by village families in enormous numbers for bathing and washing clothes and in some cases for drinking water. The health risk in this utilisation of the canal water is self-evident.

The 30-ha Centre is not providing the expected technical support necessary for the effective management of the irrigation scheme. The only entity with the potential to provide this support is the provincial irrigation division, which is well aware of its obligation and responsibility to ensure the continued well-being of the Nam Tan irrigation scheme but seems to need encouragement to assume this on a regular working basis.

The participatory methodology designed and utilised for the block formation was well formulated and appropriate to the needs of the farmers. Its implementation over a period of three years resulted in blocks within which irrigation water is equitably distributed and whose canals and structures are well maintained by the farmers.

The weir on the river Nam Tan is cleared of silt once a year and the main canals are weeded twice yearly by labour brigades raised by the village chiefs. These tasks, while effective in themselves, are inadequate to prevent the development of major erosion damage to the canal slopes. The only means to avoid such damage is a rigorously applied programme of routine maintenance. It seems inequitable that families who have no land in the irrigation command area but live in villages in this location are required to join the labour brigades clearing the weir and weeding canal embankments.

Agricultural Development

The agricultural extension services provided by the 30-ha Centre leave much to be desired. While training was conducted inside the Centre and other agricultural tasks were carried out to benefit the project, e.g. seed multiplication, the staff of the Centre seldom ventured outside its gates and

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into the fields of farmers in the irrigation command area. This appears to be borne out by the small number of farmers who implement lessons they received in the Centre on their farms. Centre staff appear to think that if the farmers understand the lesson in the classroom that is sufficient to ensure its eventual implementation. Farmers appear to have a subsistence mentality as far as agricultural production is concerned. It is possible they have off farm economic opportunities but as cultivators who are beneficiaries of a large irrigation scheme there is little evidence to date that higher rice yields to market surpluses and diversification into other cash crops are a serious priority.

Community Development

The participatory methodology developed and utilised with farmers to ensure effective block formation was very successful.

The Village Revolving Fund (VRF), although not part of the original project concept, is an excellent credit scheme, bringing women firmly into the economic life of their communities and families. The benefits to them and their families are tangible and the practical educational benefits to women in calculating profit and loss, making economic decisions on a day to day basis and planning income generating activities is plainly evident. Excellent repayment rates suggest a high degree of commitment to the fund not only as recipients of credit but also as responsible members of the community. There is still a need for training in good bookkeeping and revolving the credit on a more flexible basis but in essence the system can only improve.

While the VRF brings women into business activities and as a result strengthens their position in their communities, there is not a single woman leader in the 92 irrigation blocks or eight zones (there is no physical reason why women cannot fulfil these jobs) although 158 women headed households are within the command area of the project. There are two positions on the Management Committee of the WUA reserved for women; this suggests that the position of women in the project is such that imposition of the statutory requirement was the only way women would achieve some degree of representation.

RECOMMENDATIONS

The evaluation mission recommends:

Concerning the management of project implementation

- That when there is more than one agency involved in assisting a project, e.g. UNDP/UNCDF/Netherlands Government and the Lao PDR Government in the case

of Nam Tan, execution modalities be unambiguously defined in the Project Agreements and that great attention be paid to the careful delineation of responsibilities of the personnel implementing the project and care be taken before the project begins to ascertain fully that all staff very clearly understand these responsibilities.

- That changes to the project design be properly recorded for the benefit of both the parties concerned with the project's implementation and those planning similar projects in the future.

Concerning the rehabilitation of the irrigation scheme

- That a programme of systematic replacement of the remaining old metal culverts under main and secondary canals with reinforced concrete pipe be planned and implemented.

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- That the operation of main and secondary canal structures be thoroughly assessed, appropriate operating rules be developed and, if and where found necessary, these canals be equipped with fixed-height weirs to simplify the operation of the off take gates.

Concerning the management of the irrigation scheme

- That the constitution of the WUA be amended to the effect that the Management Committee become a Board of Directors and that professionally trained staff (either hired by the WUA or supplied by the Province) be appointed to draw up seasonal operation, maintenance and financial plans and to operate and maintain the irrigation scheme down to the tertiary level.
- That the Board of Directors be responsible to the membership of the WUA for the smooth running and sustainability of the irrigation scheme under the new management of fully professional staff
- That the provincial irrigation service be assisted in acquiring the capacity to supply the technical services necessary for the optimal planning of cropping and water delivery schedules and the efficient functioning of the scheme's water conveyance and distribution facilities.
- That landless families, both new (refugees and people resettled from the mountains) and indigenous to the villages be offered to be trained for performing effective routine maintenance of the irrigation scheme and be paid by the WUA from the ISF for this employment. This will not only provide very poor families with some form of regular income but will further prevent them from resorting to shifting cultivation and potentially destroying the watershed on which the irrigation scheme depends.
- That the WAU be authorised to set the ISF as required to cover the entire cost of both operating the scheme and ensuring its sustainability through an appropriate maintenance and replacement programme.
- That the method of billing every farmer individually for the ISF be discontinued and the ISF be levied on the block which would receive a bill for all the hectares in the area it commands and that the block leaders have the responsibility for collection of the ISF apportioned to farmers on a pro rata basis. This is less difficult administratively for the WUA Management Committee and will almost certainly have the effect of greater peer pressure being applied to farmers in the

block who refuse to pay.

Concerning agricultural development

- That agricultural extension services based on on-farm methodologies be implemented and monitored with the full participation of farmers.
- That full use be made of those extension services being offered by provincial and district agricultural institutions and that financial and technical support be offered to these institutions in order that they be enabled to intensify on-farm extension activities in the Nam Tan command area.
- That as a matter of urgency an expert proficient in the marketing of cash crops and post harvest technologies (including storage, handling, transportation) assist the Nam Tan command area's farmers in improving the poor record to diversify into cash crops that are suitable for the area.

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Concerning community development

- That the VRF be strengthened and expanded and that this is assisted by the appointment of a credit specialist who provides training in all aspects of running a revolving fund and helps the village committees and women members, especially from poorer families who are afraid of borrowing, to understand and implement the necessary changes, including greater flexibility in credit provision.
- That VRFs at this time not become part of the operation of the UNDP Microfinance Project as this may undermine the solidarity and success built up by the women during the past three years.
- That community organisation efforts be seriously made to convince farmers and women that women from families farming in the irrigated command area are capable of serving in the capacity of representatives at all levels of the WUA and not only in the two positions reserved for them on the Management Committee of the WUA.

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PROJECT DATA SHEET

Country	Lao PDR
Project Number	LAO/89/C02 LAO/86/008

Project Title	Rehabilitation of Nam Tan Perimeter	
Sector	Natural Resources	
Subsector	Irrigation	
Gov. Executing Agency	Province of Sayaboury	
UN Cooperating Agency	UNOPS	
Project Cost and Financing	UNCDF	\$4,015,
	UNDP/Gov. of The Netherlands	\$1,735
	Government	\$150,540
	Farmers	\$110,000
Actual UNCDF Disbursements at Evaluation		\$3,633,213

Approval Date Starting Date Completion Date Evaluation Date

15 October 1992 February 1992 30 June 1998 December 1998

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INTRODUCTION

In December 1998 UNCDF fielded a mission ("the Mission") to undertake the final evaluation of Project LAO/89/C02, the Nam Tan Perimeter Rehabilitation Project in Sayaboury Province of the Lao PDR, including the technical assistance financed by UNDP with cost sharing by the Government of the Netherlands under Project LAO/86/008.

The Mission was composed of Messrs Paul Egli, Irrigation Specialist and acting as Team Leader, and Jim Monan, Social and Institution Specialist. It visited the Lao PDR from 28 November through 22 December. After having been briefed in Vientiane by UNCDF field representatives on 2 December, the Mission spent the period of 3 through 18 December in the project area, where its work consisted in:

- reviewing the project documentation available at the project office;
- undertaking field visits to inspect the irrigation infrastructure rehabilitated by the project, observe the agricultural practices in the irrigation command area and assess conditions in the watershed producing the water used by the irrigation scheme;
- interviewing the National Project Director and Deputy Director (Community Development);
- interviewing a Lao engineering consultant who had participated in the project's implementation;
- interviewing the Management Committee of the Water User's Association and

- technicians charged with operating the irrigation scheme's water-control structures;
- interviewing personnel of the 30-ha Centre;
- interviewing officers of the provincial and district irrigation and agricultural extension services;
- interviewing farmers and resettled refugees as well as women managing, or benefiting from, the Village Revolving Fund.

On 17 December, the Mission presented its preliminary findings in Sayaboury in a meeting chaired by the Sayaboury Permanent Secretary and attended by the Phiang District Deputy Mayor, the Sayaboury Section President of the Lao Women's Union, the Director of the Sayaboury Agriculture and Forestry Division and other provincial officials.

Upon its return to Vientiane, the Mission presented its findings on 21 December in a meeting held at UNDP offices and attended by the Deputy Permanent Secretary and the Senior Programs Coordinator of the Ministry of Agriculture and Forestry, the Nam Tan National Project Director, the UNCDF Assistant Resident Representative, two UNCDF Programme Officers, the UNCDF Programme Assistant, the UNDP Assistant Resident Representative (Rural Community Development), the FAO Representative, and the WFP Emergency Coordinator.

The Mission's work was greatly facilitated by the ready availability of provincial and district officials, of officers of the Water User Association and of farmers and women groups to discuss in a frank manner the project's execution and results. Special thanks are due to Ms Laurie Gross, outgoing UNCDF Programme Officer, for her efficient organisation of the Mission and to Mr Bounmy Rattanatray, National Project Director, for his abundant cooperation and hospitality.

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1 THE PROJECT AS ORIGINALLY DESIGNED

1.1 General Information about Lao PDR

The Lao PDR is a sparsely populated country of around five million people and is completely landlocked within the Indochina Peninsula. Its history in the 20th century has been one of conflict, first against the French who colonised the country in 1883 and more recently against the United States of America as an ally of its neighbour Vietnam in the Second Indochina War from 1965 to 1975. Much of the country was devastated by that war which left unexploded bombs, shells and mines littering much of the countryside. Both these conflicts left the economy in ruins and the Lao PDR, partially by political choice, isolated from much of the developed world.

In 1986 under the slogan "pean pang mai" (new economic thinking) a move

towards an economy based more on market principles emerged. This has resulted in many projects funded by both bilateral and multilateral agencies attempting to assist the Lao PDR in rebuilding its economy especially in the agricultural sector. Food security and poverty alleviation guide much of the thinking of the government.

Governance in the Lao PDR is through an elected National Assembly operating under a constitution which was approved as recently as 1991 and provides for separation of legislative, executive and judicial powers. Political power which constitutionally resides in the people is exercised through the legislature in Supreme People's Assembly. The head of state is a President and the executive is a Council of Ministers headed by a Prime Minister.

There is only one political party, called the Lao People's Revolutionary Party (LPRP), which is governed by a Central Committee which in turn is headed by an executive committee. LPRP organisation reaches down through provinces and districts to the villages in the same manner as government administration does. Apart from the Ministries of Defence and Foreign Affairs all others have similar offices at provincial and district level.

The Lao PDR covers 236,800 km² of rugged terrain with only four per cent of the land considered genuinely arable, which explains its low population density of 20 persons per km². The remainder of the national territory is made up of mountains and plateaux (71%) and valleys and water (25%). The country has two pronounced seasons - wet from May to October and dry for the remainder of the year. Rainfall can be as much as 3,000 mm in the mountains and anything between 1,200 and 1,800 mm on the western plains.

In 1995 the per capita GNP was approximately US\$350 with 22 per cent of the population living below the UN poverty line and 46 per cent below a national poverty line [Doc. 11]. Demographic details reveal a population growth rate of 2.8 per cent with life expectancy for males 51 and females 54 years. Infant mortality is 90 per 1,000 live births. Dependent population is 43 per cent under 15 years and 2.9 per cent over 65 years. Adult literacy is 69 per cent for males and 44 per cent for women while male children can expect eight years of schooling and females six [Doc. 12].

Habitation is overwhelmingly rural with only 350,000 people in the capital Vientiane and around 50,000 to 60,000 each in Luang Prabang, Savannakhet and Pakse. The Lao Loum who live on the

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plains make up around 64 per cent of the total population while, the Lao Theung of the mountain slopes and the Lao Sung from the high mountains over 1,000 metres comprise respectively 15 and 21 per cent.

Only 41 per cent of the population have access to a safe and adequate water supply while 30 per cent have some form of sanitary latrine. Common diseases are malaria, dysentery, tuberculosis and hepatitis and there is only one doctor per

4,446 people. Immunisation programmes have only reached 20 per cent of rural children. In 1996 only 20 of 117 district hospitals were fully operational [Doc.13]

The Lao PDR became a full member of the Association of Southeast Asian Nations in 1997 and has also recently become a member of the Asian Free Trade Association (AFTA). Its main trading partners, however, continue to be its neighbours Thailand and Vietnam as well as China and the European Union. Its main exports are wood products, garments, coffee and hydroelectric power while it imports rice, petroleum, machinery and raw materials. Around 80 per cent of the population is engaged in agriculture with only six per cent in industry; the remainder are in services including government employment. Agriculture accounts for more than 50 per cent of the nation's GDP and 40 per cent of export earnings.

The country had a trade deficit of US\$192 million in 1995 but between 1995 and 1996 inflation fell from 20 to 12 per cent. Recent collapses in neighbouring Asian economies have put pressure on the Lao kip which has lost around 70 per cent of its value in 1998.

1.2 The Project Area

The Nam Tan Irrigation Rehabilitation Project (hereinafter referred to as the Project) is situated in Sayaboury Province in the Northwest of the Lao PDR. Sayaboury comprises no less than 65 per cent mountainous area with many rivers including the Nam Tan which serves the Project irrigation scheme [Doc.8]. In 1997, the province's population stood at 309,000 people [Doc.32].

As in Laos as a whole, agriculture in Sayaboury Province is centred on rice production. Seventythree per cent of the province's annually cropped area of 43,830 ha is planted to rice [Doc.32]. The rice-cropped area of 31,800 ha is composed of 17,790 ha (56%) and 13,060 ha (41%) planted during the wet season on lowlands and on uplands respectively and 950 ha (3%) of lowlands irrigated in the dry season. According to provincial officials most lowland rice grown in the wetseason benefits from some sort of irrigation; they estimate at about 25,000 ha the area that could potentially be irrigated in that season.

The district encompassing the Project is called Phiang and has a population of approximately 40,000 people. The population of the project area, approximately 2,000 ha, is about 12,000 people, the vast majority of whom are rice farmers and live in 14 villages within the command area of the irrigation scheme. As cultivators of irrigated rice the farmers in the Project play an important role as food producers for the province and the neighbouring one of Luang Prabang. Phiang District produces more rice than any of the other nine districts in the province reaching a total 18,444 tons in 1995 with this figure comprising approximately 20 per cent of the entire provincial production. It also had in that year a relatively high production figure of over 2,000 tons of upland rice from

shifting cultivation which destroys forests and endangers watersheds. In

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Sayaboury Province opium production has also been on the increase, growing from 5.3 tons in 1992 to 6.9 in 1996 [Doc.8].

Nam Tan base camp which houses project staff is one hour's drive from the provincial capital in Sayaboury and some 20 km from the border of Thailand across the mountains to the west. The river Mekong flows along the province's eastern boundary and is a valuable waterway for transporting both produce and people to Vientiane and other parts of Sayaboury Province.

1.3 The Project Origin

The Project has its origins in a UNDP/UNCDF concept developed in the mid 1980s to rehabilitate the existing irrigation scheme at Nam Tan that had fallen into serious disrepair. Originally built by the Lao government in the late 1960s with USAID money and technical assistance [Doc.9] it was completed in the early 1970s. It was regarded as a success as far as the provision of irrigation was concerned [Doc. 10] but subsequent failures to strengthen the farmers' organisations, especially in effective water management and the marketing of produce, mitigated against the then project ever achieving its full potential. With the isolation of the Lao PDR after the Second Indochina War there was no money to rehabilitate the irrigation scheme and it fell into a further state of morbidity.

In the late 1980s the Lao Institute of Irrigation prepared "as-built" drawings of the existing scheme's main and secondary canals and service roads. FAO and UNCDF undertook the project formulation in 1991 [Doc.31], which formed the basis for the UNDP and UNCDF Project Agreements with the Lao PDR.

1.4 Pre-Project Conditions

From a situation in 1972 when the original USD funded project was first completed and saw land allocated at 3.0 ha per family, the position in the 14 villages supplied by the irrigation scheme had deteriorated considerably by 1992. Not only had landholding decreased to 1.8 ha per family but increases in population and diminishing irrigation had impoverished many households [Doc. 5]. Indeed in 20 per cent of cases landholding had been reduced to less than 1.0 ha. With an average family size in 1992 of 6.32 members these conditions spelled economic hardship for many households [Doc. 14].

The irrigation scheme had failed to the point where 10 per cent of the perimeter families claimed to have no irrigated water whatsoever. A further 63 per cent stated the water they received was insufficient and only 27 per cent

thought it satisfactory. Farmers in the area reported that illegal removal of irrigation water was as high as 51 per cent.

Shifting cultivation, which the project was partly designed to prevent, had increased as the irrigation system broke down. Farmers supplied by the Right Main Canal (RMC) claimed they had to resort to slash and burn in order to produce enough rice for family consumption. These households, usually in excess of 100, were deficient in rice for domestic consumption for between three and four months of the year. Those supplied by the Left Main Canal (LMC), where the water supply was better, claimed they could only provide enough rice for family consumption. The clear indication in 1992 was that the area supplied by water from the original project was a subsistence economy which was frequently in difficulty.

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The difficulties experienced by the families are indicated by the low yields of paddy. During the wet season of 1992 when all families planted rice the average yield was 2.18 tons of paddy per hectare. In those villages worst served by the failing irrigation system the yield was as low as 1.67 tons/ha, as in Nong Bua. National per capita estimates of 350 kg of paddy for basic needs clearly indicate how impoverished the village of Phon Xieng had become with only 112 kg per capita.

Dry season yields in 1991-92 were also extremely poor on the 465 ha, out of a total of over 1,600, that the irrigation system managed to supply. Only three villages supplied by the RMC were able to cultivate any rice and the yield averaged 1.46 tons/ha. In this situation nearly 800 farmers reverted to shifting cultivation in the same wet season to supplement the low yield attained in the project area.

The problem facing the farmers was not the result of a poorly constructed irrigation system, indeed the contrary, as most of the original structural components of the system are still in use today. Instead it was poor operation and maintenance and organisational weaknesses that resulted in the failure of the system to supply the water it should have been capable of to farmers' fields. A major part of the problem was that the then Water User's Groups (WUG) were poorly organised and little understood the complexity of the system and the need for preventive maintenance on canals and structures. In a survey carried out in 1992 [Doc. 14] over 50 per cent of a farmers group thought the WUG should be based on villages when in fact the location of the village frequently had little relevance to where the member's paddy field was situated. In the same meeting over 60 per cent of those farmers present thought the Irrigation Service Fee (ISF) should be used for public welfare rather than operation and maintenance of the irrigation scheme. Few wanted to serve as office bearers on the WUG.

The method of determining the ISF seems to have had little relationship to the

needs of the irrigation system. The Province set fees of 50 kg/ha of paddy in the wet season and 15 in the dry. A bill would then be sent to individual farmers based on area of irrigated field. The farmer would then transport his paddy to a district collection point after harvest. In one group meeting, over 30 per cent of the farmers claimed they had no idea how the irrigation fee was utilised [Doc. 14].

In 1992 livestock sales were more important to farming households than the sale of rice [Doc.5]. Indeed garden produce was more important financially than dry season irrigated rice sales. The average household income was US\$156 per annum, which worked out at US\$25 per member. The villagers expressed a desire for such basic needs as clean drinking water, better health facilities and improved food security. When expressing priorities farmers seldom mentioned rehabilitation of the irrigation project although they did want a better water supply to their fields, stronger water user's organisations and regulations regarding irrigation water usage [Doc. 5].

1.5 Project Rationale

The Project was found to be justified on a number of grounds. Rehabilitating the irrigation scheme would [Doc.1]:

- increase the area planted to rice in both wet and dry seasons;
- improve the food security of the province by increasing the average paddy yield in the Nam Tan command area by as much as 0.7 tons/ha;

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- negate the need for farmers to practice shifting cultivation whereby they destroy forests and by extension the watershed on which they rely;
- utilise some dry season irrigation to encourage diversification of agriculture into vegetables and crops which would improve the nitrogen content of the soil;
- provide a complementary economic marketing activity which would utilise the main Luang Prabang - Sayaboury - Paklay road being built with UNDP/UNCDF assistance.

1.6 Objectives and Expected Outputs

The Project Agreements (often called Project Documents) for LAO/86/008 (UNDP) and LAO/89/C02 (UNCDF) differ somewhat in the definition of the Project's development and immediate objectives but without contradicting one another. The major difference lies in UNDP's agreement closely following the 'new' structure for project formulation, which details expected outputs at the activity level, while UNCDF's project definition corresponds to the Fund's

traditional approach, which specifies a limited number of results required to achieve the Immediate Objectives. What follows is based on the French-language text of Project Agreement LAO/89/C02.

Development Objective

The Project aimed at ensuring food self-sufficiency in Sayaboury Province in the long term and limiting environmental degradation caused in Laos by hillside shifting cultivation.

Immediate Objectives

The Project's immediate objectives were to:

- increase the beneficiary group's organisational, management and production capacity;
- modernise the irrigation infrastructure of the Nam Tan Scheme, increase the irrigated area and improve irrigation performance;
- strengthen the institutional capacity of the provincial and district services providing assistance to the rural users groups.

Expected Outputs

The immediate objectives were to be met by the Project producing the following results.

a) The physical rehabilitation of the irrigation scheme to restore its original capacity.

This

would include:

- the rehabilitation of the water conveyance and distribution network to allow irrigating some 2,100 ha in the rainy season and 500 ha in the dry season;
- the resectioning of canals and repair of water-control structures allowing an increase of the irrigated area by 300 to 400 ha in the rainy season (15-20%) and by 150 ha in the dry season (40%);
- the rehabilitation of roads along canals (40 km) or connecting villages (11 km);
- the increase of the availability of irrigation water by developing water resources on the right bank and the improvement of drainage conditions in the south of the scheme;

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- the increase of total paddy production by about 3,000 tons;
- the protection of the scheme against damage by passing elephants and stray buffaloes through the installation of fences and 20 bridges.

b) The strengthening of the capacity to manage and utilise the scheme by:

- the revitalisation of a technical support centre comprising a small experimental station and a modernised fish hatchery;
- the organisation of the scheme's management and maintenance by its users;
- the establishment of permanent means to maintain the scheme through the creation of a maintenance fund provided and managed by the users forming 35 groups;
- the training of four engineers and some 20 technicians in rural engineering, water management, organisation and training of water users, extension work, and agricultural credit.

1.7 Project Components

Project Agreement LAO/89/C02 grouped the activities required to achieve the project objectives into seven components. The need for the sequential execution of the components was

emphasised and the following principal activities were identified

for each. ***Component 1: Establishment of instruments to manage the irrigation scheme***

- Cadastral Survey
- Study of the current organisation of farmers and proposals for reorganisation
- Development of participatory mechanisms for farmers

Component 2: Rehabilitation of irrigation infrastructure

- Finalisation of engineering design and tender documents
- Engineering surveys and studies
- Civil works construction

Component 3: Support to agricultural production

- Creation of a technical support centre
- Buildings and equipment for the centre
- Personnel for the centre
- Functions of the centre
- Strengthening of the district agricultural service
- Strengthening of credit facilities

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Component 4: Training

Component 5: Management of irrigation scheme

- Identification of farmers and introduction of rotational water allocation practice
- Establishment of a water users organisation
- Collection and management of irrigation service fees
- Maintenance organisation

Component 6: Improvement of access to safe

drinking water Component 7: Technical assistance

Project Agreement LAO/86/008 reflects all the above components but Component 6 (Improvement of access to safe drinking water), despite the statement in the summary description on its front page that says "the improvement of access to drinking water is also planned."

1.8 Implementation Modalities *Institutional Framework*

Figure 1.1 shows a simplified version of the project management structure depicted in the LAO/89/C02 Project Agreement.

The Project was to be executed by the Province of Sayaboury, under the supervision of a Consultative Committee (CC) chaired by the Vice-Minister of Agriculture and Forestry. The other members of the Committee were representatives of the Ministry of External Economic Relations, the Ministry of the Economy, Planning and Finance, UNDP and UNCDF. The committee was to meet annually, if possible on the occasion of the tripartite review.

A Project Management Unit (PMU), headed jointly by a National Project Director (NPD) and a Chief Technical Advisor (CTA), was to be responsible for the Project's overall management and its implementation on behalf of the Province. A Local Coordination Committee (LCC) composed of representatives of the Sayaboury Province, Phiang District, the beneficiaries, the NPD and the CTA was to be formed.

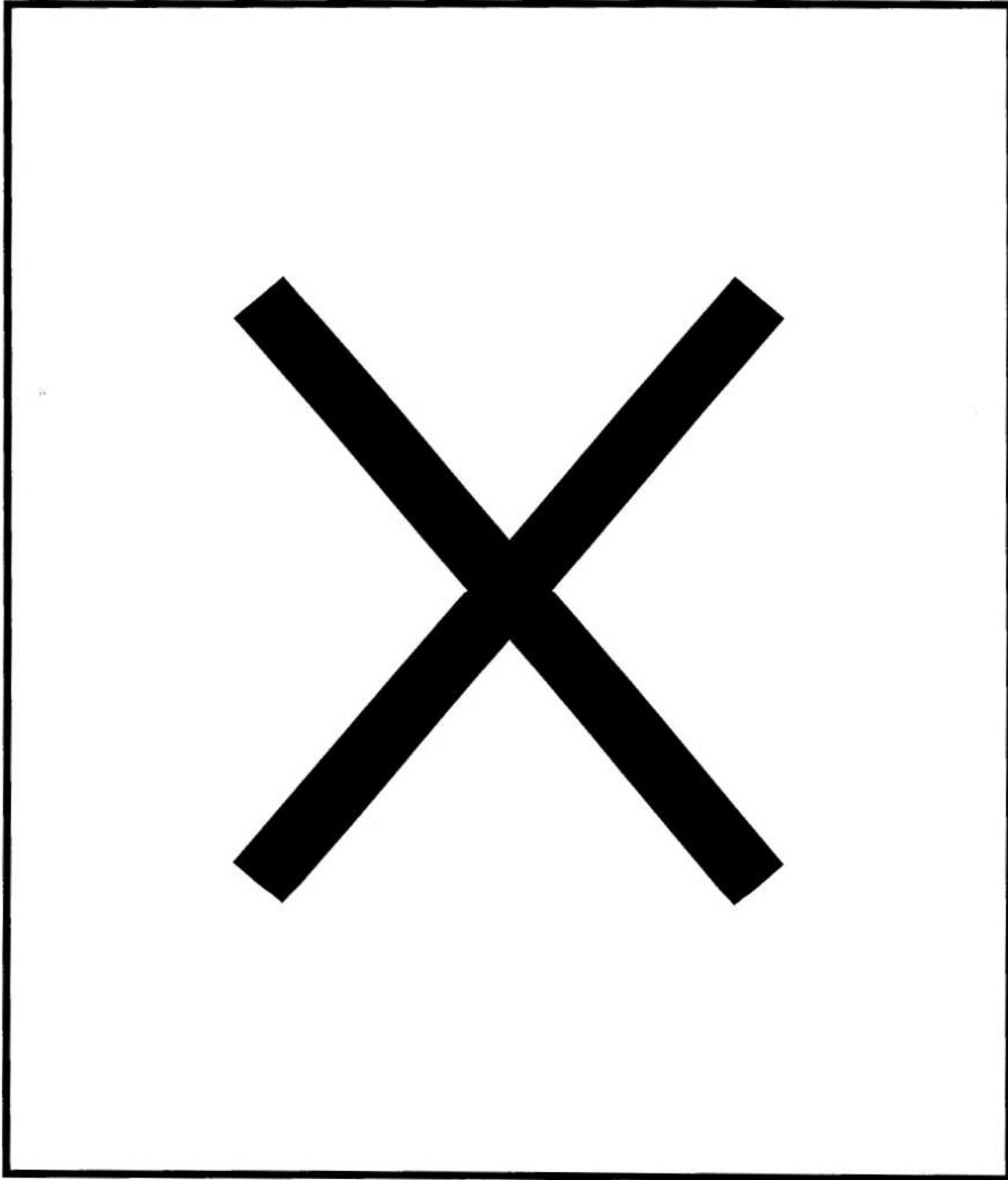
The PMU was to be composed of staff seconded from national, provincial and district technical services. They would be assisted by long- and short-term international experts.

The NPD assisted by the CTA would sign the contracts for the local supply of goods or services, issue work orders and approve payments for such services, and accept completed works realised under both international and local contracts.

UNOPS, as Cooperating Agency, was to be responsible for the disbursements on all UNCDF budget lines except those directly concerning UNCDF (Annex J). The CTA was to be the representative of UNOPS in the field. He would, in particular, provide the day-to-day management of the international contracts.

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UNDP Agreement LAO/86/008 differs from the UNCDF Agreement in that it declares the Project as nationally executed, while assigning disbursement responsibility of all budget lines except that for Training to UNOPS.



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Implementation of Project Components

Based on the French-language text of UNCDF Agreement LAO/89/C02 the expected implementation of the individual project components can be summarised as follows.

Component 1: Establishment of instruments to manage the irrigation scheme

The cadastral survey and mapping would be undertaken by a local consulting firm contracted by the Project.

The study of the current organisation of farmers and proposals for reorganisation would be carried out by the project national and international staff. This would serve to stimulate the beneficiaries' interest in the rehabilitation work and lead to the formation of users organisations based on identified systems of solidarity at the level of villages, farmer groups and irrigation blocks. Using participatory mechanisms the farmers would build the water distribution system at the block level, carry out canal maintenance tasks and apply a rotational water allocation method developed and promoted by project staff.

Component 2: Rehabilitation of irrigation infrastructure

The required civil works (rehabilitation of the diversion weir, primary, secondary, tertiary canals and their water control structures, service roads and village roads) were to be designed by an international engineering company. Great emphasis was placed on the need for the active involvement of the target farmers in the choice of location of the outlets from the tertiary canal and in deciding on the layout of the field ditches. The responsibilities of the engineering company would include hydrologic, topographic and drainage studies as well as the supervision of the civil works construction and assistance to the farmers in their work at the block level.

All civil works except the tertiary canals were planned to be executed by an international construction company contracted following competitive bidding based on international standards. Companies pre-selected in the sub-region would be invited to bid.

The tertiary canals and their structures would be executed under a force-account arrangement with the beneficiary farmers participation. The Project would provide technical supervision, construction materials, construction equipment (dump truck, compactor, loader, agricultural tractor, water tanker, concrete mixer, topographic instruments, hand tools) and locally hired operators of the construction machinery. Following project completion, the equipment would be used in the maintenance of the irrigation infrastructure.

Component 3: Support to agricultural production

The existing experimental station (known as 30-ha Centre) was to be rehabilitated and its controlled-environment activities revived on an area of at most five hectares.

The station was expected to: 1) collect and interpret agro-climatic, hydrologic and water-use data; 2) undertake field trials, develop crop rotation systems, estimate crop water requirements and supervise field demonstrations by district technicians; 3) produce and distribute fingerlings and provide advice on fish culture, select and reproduce appropriate fish species and undertake tests of raising fish in rice fields; 4) monitor and evaluate crop production in the command area, develop technico-economic crop production models, and assist district technicians in the evaluation with the farmers of the results of growing season; 5) assist district technicians in field training sessions, temporarily store vaccines and initiate the distribution of improved rice varieties.

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The Project would hire a local contractor to rehabilitate the Centre buildings and fish pond, reequip the weather station and provide office furniture and supplies, a refrigerator, teaching materials, and agricultural implements.

The Project would provide motorcycles for the Centre's four technicians (1 irrigation, 2 agriculture, 1 fish culture) and defray the operating expenses of motorcycle use related to conducting field trials and demonstrations.

In light of the Centre's eventual role as a regional agricultural and irrigation research centre, research protocols will be developed with the support of the International Rice Research Institute (IRRI) and the International Irrigation Management Institute (IIMI).

The strengthening of the district agriculture service, necessary to ensure the rehabilitated irrigation scheme's sustainability, would require Phiang District to assign six technicians, three for each of the two main canals (1 irrigation, 1 agriculture, 1 community development) under the authority of a district irrigation engineer.

To strengthen credit facilities the Project would make available a line of credit of US\$ 50,000 to be used for: 1) the short-term financing of production inputs and the storage of paddy; and 2) medium-term financing of agricultural implements and draught animals. The loans would be administered by the Phiang branch of the Sayaboury Lane Xang Bank. The Project would provide office equipment and a motorcycle for each of two officers of this agency.

Component 4: Training

The Project was to finance various training activities for the benefit of national project personnel, especially those of Phiang District, in order to allow them to assume gradually the responsibilities in areas of primary concern to the Project: rural engineering, agricultural experimentation, agricultural extension, agricultural credit and management.

Component 5: Management of irrigation scheme

To achieve the efficient operation and maintenance of the rehabilitated irrigation scheme the Project would assist the command area farmers in: 1) introducing the practice of rotational water allocation; 2) creating a simple organisation representing them in dealings with the district in irrigation matters; 3) putting in place a system of collecting water fees and managing the funds collected; 4) organising the maintenance of the water conveyance and distribution network.

Component 6: Improvement of access to safe drinking water

The Project would finance the improvement of ten village wells and the construction of ten latrines. It would assist the district health service in setting up a process of health monitoring focussing on: 1) the quality of water pumped from wells and in irrigation canals; 2) water borne diseases particularly as they affect children.

Under this component, the Project would also provide a community development

fund of up to US\$25,000 to finance social or cultural micro-projects having the effect of increasing communal solidarity.

Component 7: Technical assistance

To overcome the insufficiency of human resources of the institutions directly concerned with project implementation, the Project would finance technical assistance. It would primarily concern the rehabilitation of the irrigation infrastructure and the agricultural utilisation of the command area.

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1.9 Reporting Requirements, Monitoring and Evaluation

The LAO/89/C02 Project Agreement requires the following reports to be produced by the Project: 1) an inception report; 2) six-monthly progress reports; 3) an annual report for the Tripartite Review (TPR) meeting; 4) a final report.

UNCDF would finance the following monitoring and evaluation missions: 1) an annual technical mission on the occasion of the TPR; 2) an annual monitoring-evaluation and audit mission; 3) an evaluation mission in the Project's third year; 4) a final audit mission before the Project's financial closure.

1.10 Project Duration, Cost and Financing

The Project was planned for a duration of five years. Table 1.1 shows the Project budget broken down by component and source of financing, based on the amounts given in the Project Agreements for LAO/86/008 and LAO/89/C02.

TABLE 1.1 Estimated Cost and Financing of Project (US\$ '000)

Component	Total	UNCDF	UNDP	Lao PDR	Irrigators
1. Scheme Management	16	16			
2. Rehabilitation	2,353	2,267		64	22
3. Agricultural Production	453	453			
4. Training	70		70		
5. Scheme Management	158	9		60	89
6. Drinking Water	37	37			
7. Technical Assistance	1,570	482	1,056	32	
Base Cost	4,657	3,264	1,126	156	111
Physical Contingencies		326			
Financial Contingencies		163			
UNCDF Support Cost		163			
OPS Support Cost		98			
Total	5,408	4,015	1,126	156	111

1.11 Project Risks

Of the two Project Agreements only UNDP's (LAO/86/008) had a section on project risks. The principal risk identified was the possibility of a lack of effective farmer participation and motivation. It was felt, however, that at least part of the directly affected farmers (about 50 per cent), who possess less than one hectare of land per family, would be particularly motivated to attain household food self-sufficiency.

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The risks of schedule overruns was proposed to be minimised through close monitoring by UNOPS and tight planning of the civil-works construction by the contractor.

The Project Agreement also mentions four pending questions that must be resolved during project implementation: 1) the assignment of national staff to the Project; 2) the distribution of newly irrigable land to poor households; 3) the capacity of the authorities to assume the recurring costs; 5) the management of the maintenance fund by the farmers.

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2 PROJECT IMPLEMENTATION RESULTS

2.1 Implementation History

Project Agreements LAO/86/008 and LAO/89/C02 were signed in January and October 1992 respectively. The National Project Director (NPD) was assigned to the project in February 1992, along with national staff comprising an agronomist, an irrigation engineer and two irrigation technicians. The Project's progress, notably the mobilisation of Technical Assistance TA personnel, was initially hampered by the inadequate allocation of UNDP funds. A request for cofinancing of TA and related costs to the Netherlands government led to the fielding of a Dutch formulation mission in August 1992 and a co-financing commitment equivalent to US\$1.7 million, exceeding UNDP's original commitment by about US\$600,000. The corresponding agreement signed in March 1993 by UNDP and the Netherlands confirmed the Project's duration of five years but set its start date as 1 January 1993 [Doc.33], as opposed to the UNDP and UNCDF Project Agreements, according to which the project started on the date they were signed.

The year 1992 also saw a significant shift in execution responsibility. While UNOPS clearly was intended to play a strong role of cooperating agency, the Project was in its initial months transformed into the Lao PDR's first nationally executed UN project. This shift was confirmed in September 1992 by an Aide

Memoire (signed by the Government, UNDP and UNCDF) limiting UNOPS's involvement and is illustrated by the changes in disbursement responsibility for the lines of the UNDP and UNCDF budgets (Annexes I and J). The Mission found no documentation explaining what made these changes come about. In light of these rather confusing start-up conditions, it is not surprising that by the end of 1993 the Project had achieved very little, its tangible output limited to a rehabilitated base camp, the results of a socio-economic baseline study and the cadastral and topographic mapping of the irrigation command area. This work had been accomplished by local contractors and two separate local consulting firms (MEKCONSULT, Lao Institute of Irrigation) with the assistance of short-term local and international experts.

The Project's first CTA started work in April 1993 and completed the project's Inception Report five months later [Doc.5]. This report, ostensibly in part in response to the recommendations of the Dutch formulation mission, proposed shifting the emphasis from irrigated agriculture to the household farming system and its improvement in the broader context of resource management. It proposed to modify the Project Development Objective as follows:

The project objective is to improve the livelihood of the households and their members in the Nam Tan area by improving the farming system production conditions in a sustainable way within an integrated indicative resource management plan and;
use the project implementation to diffuse the project methodology, methods and techniques to national staff and other national support to be used in development of other areas.

The report by and large conserved the original project components and most of their activities. It put increased emphasis on crop selection, cultural practices, agricultural inputs and marketing and introduced an activity of on-going monitoring of development and related parameters. The Mission failed in trying to locate any indication of whether this report ever was the subject of a review by the parties overseeing the Project's implementation and of whether the proposed reorientation and work plan were approved by them.

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A second CTA took up his post in January 1994. He became redundant eight months later, in September of the same year, when the parties cooperating in the Project's implementation signed a Memorandum of Understanding (MOU) confirming the revision of the PMU structure, including the abolition of the CTA position. The new structure featured two departments reporting to the NPD, one for irrigation and one for community development. Each department was headed by a Deputy NPD assisted by an international expert, the irrigation expert representing UNOPS in the field. The international irrigation expert arrived in March 1995 and the community development expert four months

later.

Community organisation of farmers into blocks began in February 1994 with four experimental blocks covering 100 ha of the command area. A community participation model was developed and used to formulate subsequent blocks of farmers who would cooperate on operating and maintaining the tertiary structures and farm ditches and outlets. Block-development work began in the 1994-95 dry season and was completed in October of 1997 with 92 blocks of farmers within the command area.

In December 1995 an international contractor began work to restore and improve the scheme's water conveyance and distribution network, rehabilitate service and village roads, and improve drainage conditions in the lower parts of the command area. The contractor's unsatisfactory performance led to the reduction of its contract volume and the engagement, in late 1996, of three local construction companies to complete the work. By the end of May 1997 the bulk of the main rehabilitation work was considered substantially completed.

The Water User's Association first election was in May 1995 and seven office bearers who became full time members of the irrigation scheme Management Committee were elected. These included a president, two vice-presidents, one for each main canal, and four other vice-presidents including one women to act as treasurer and another as the agricultural procurement official. The electoral college comprised the 92 block leaders, the 10 zone leaders and 14 village chiefs. By 1997 it was decided to include the entire farmer membership in the election of the management committee as the gap between officers and members was considered too wide [Doc. 19].

In 1995 the Project in concert with the Lao Women's Union (LWU) and the District set up the Village Revolving Fund (VRF), with money taken from the budget for village micro-projects. Unlike the fund the money was taken from, the VRF was exclusively for women to get involved in small businesses and other productive activities. The Phiang District RF Committee had to approve the loans submitted by VRF Committees [Doc.20]. 378 women and their families were the first recipients of the loans which had to be repaid with 12 per cent interest.

Annex F presents the chronology of key events of the project history. The following sections, in addition to summarising the inputs supplied and TA delivered, elaborate on the activities carried out and results achieved.

2.2 Input Supply

The Lao PDR assigned to the Project the national staff according the schedule shown in Annex F and made the existing Nam Tan base camp and buildings of the 30-ha Centre available for rehabilitation.

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The farmers in the Nam Tan command area provided their labour to construct tertiary canals and to build the block-level water distribution system.

Inadequate allocation of UNDP funds at project start-up led to a request for co-financing of Technical Assistance (TA) and related costs to the Netherlands government. After a formulation mission undertaken in August 1992 [Doc.9], the Netherlands agreed to provide an amount not exceeding Dfl. 3.1 million (US\$1.7 million) for this purpose [Doc.33]. In addition, it funded the long-term assignment of a JPO agronomist. In the end, a total of US\$1,716,180 had been contributed under the LAO/86/008 Agreement, all but some US\$60,000 contributed by the Netherlands. This amount essentially defrayed the cost of the TA personnel and UNVs, local consultants, official travel, study tours and training, support personnel, transport and office equipment, and the operation and maintenance of this equipment.

UNCDF contributed slightly over US\$3.0 million, covering mostly the cost of:

- engineering services required to design and supervise the rehabilitation of the Nam Tan scheme's civil works and to assist farmers in block development;
- contracts with an international and three local construction companies for the rehabilitation of the civil works (excluding tertiary canals);
- local contracts for the rehabilitation of the base camp and 30-ha Centre buildings and the execution of lesser civil works of the irrigation scheme;
- supplying the materials and tools used by farmers in block development;
- transport equipment and their operation and maintenance;
- local and international consultants;
- a village-level credit fund;
- UNOPS services and UNCDF missions.

Other than the UNDP contribution during the Project's early months, the inputs were generally provided in a timely manner.

2.3 Technical Assistance

Annex H shows the schedule of the presence of TA personnel financed by UNDP with the Netherlands co-financing under LAO/86/008. Table 2.1 breaks the TA experts' approximate duration of presence down by sector in which they were active and by type (short- or long-term) of assignment. The Netherlands also financed separately a JPO Agronomist who served the Project for 13 months.

TABLE 2.1 Presence of Technical Assistance (person-months)

Sector	Long-term	Short-term	Total
Preparatory		5	5
CTA	18		18
Office Management	23		23
Irrigation	25		25
Agriculture		2	2
Community Development	50	5	55
Total	116	12	128

2.4 Emergency Rehabilitation

Towards the end of 1994 (i.e., before the award of the contract for rehabilitation of the Nam Tan scheme's civil works) three metal culverts carrying the flow of natural drains crossing the main canals collapsed, jeopardising the effective operation of these canals in the 1995 rainy season. With the assistance of a local independent civil engineer, contracts to rebuild the failed culverts, along with a washed-out drop structure on a main canal, were negotiated with SVS (a private contractor from Vientiane) and the state-owned Sayaboury Irrigation Construction Company. The work, by which the metal culverts were replaced with concrete structures, was completed in May 1995 at a cost of US\$ 99,000.

2.5 Rehabilitation of Civil Works

Engineering Services

A call for proposals by UNOPS for the provision of engineering services by an international consulting company lead to the signature of a contract with a consortium consisting of TEAM Consultancy Engineers Co. Ltd. (Thailand) and two national firms, MEKCONSULT Co. Ltd. and Société Mixte d'Etude et de Développement (SMED) ("the TEAM Joint Venture"). The contract of a value of US\$250,700 concerned the following services [Doc.3a]:

- establishment of information system and water management data base;
- survey and design for main rehabilitation works;
- supervision of the construction contractor;
- assistance to project staff for Block irrigation development;
- assistance to project staff for strengthening of O&M system;
- training of project staff and farmers.

Design of civil works (main rehabilitation) and Bill of Quantities (BOQ) would be based on "asbuilt" drawings of the main and secondary canals, water control structures and service roads prepared by the Lao Institute of

Irrigation in the late 1980s and field verification of current conditions. The TEAM Joint Venture started field surveys and work on contract drawings in February 1994. Draft tender documents were ready by July 1994. In response to a UNCDF Technical Review Mission's pointing out the lack of accuracy of the bill of quantities due to the

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limited topographic detail available [Doc.24], the contract drawings were refined and information from the "as-built" drawings included in the tender set. The decision to use UNOPS "General Provisions for Construction Works" rather than the FIDIC format led to an additional review by an independent consultant and his drafting of the contract General Conditions.

In mid-December 1994 UNOPS invited four construction companies to submit bids to undertake the main rehabilitation works. The contract was awarded in May 1995 and the contractor started the detailed topographic survey of main and secondary canals two months later. The resulting drawings for the two main canals, submitted to the TEAM Joint Venture in October 1995, contained errors indicating the contractor's lack of experience. UNOPS recognised the need for increased supervision and amended the Joint Venture's contract to effect the assignment of additional personnel to the Project. This and subsequent amendments (some related to activities other than the rehabilitation of civil works) resulted in the eventual engineering-services contract value of US\$550,700.

Construction

The civil works contract essentially concerned the rehabilitation of the original water conveyance and distribution system. As described in the USAID Evaluation of 1974 [Doc.25], that system comprised:

- the left bank main canal, 5.9 km long with 40.3 km of laterals having 159 regulating structures;
- the right bank main canal, 12.8 km long with 22.6 km of laterals having 138 regulating structures;
- 50 small bridges crossing these canals and a significant number of culverts to allow natural drains to flow under the canals.

(The present report refers to the left and right bank main canal as "RMC" and "LMC" and calls the laterals "secondary canals.")

The LMC had a command area of 1,201 ha and the RMC of 1,000 ha, for a total of 2,201 ha. Irrigation would initially be limited to 1,800 ha, however, until it was firmly established that the water resource could adequately supply the design command area in the wet season [Doc.25].

The Project, in addition to restoring the USAT financed distribution network to its original capacity, would also

- improve drainage conditions in low-lying parts of the command area;
- rehabilitate 40 km of service roads along canals and 11 km of village roads.

The TEAM Joint Venture estimated the total cost of the required rehabilitation works at US\$1.7 million.

An invitation to bid extended by UNOPS to four pre-selected international contractors resulted in tendered contract amounts ranging from US\$900,000 to US\$ 4.0 million. The unit-price contract was awarded to a joint venture whose bid amounted to US\$1.4 million. It was headed by EAZIMA Co. Ltd. (Japan) and included LAO IBANETSU Co. Ltd. (Japan) and Sayaboury Irrigation Construction Company ("the EAZIMA Joint Venture"). The contract, signed in May 1995, required the work to be substantially completed by 31 December 1996 [Doc.26].

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EAZIMA Joint Venture began mobilising at the end of June 1995, started surveying the main canals in July, completed its base camp in October and brought its equipment on site in November and December 1995. Sayaboury Irrigation Construction Company never participated in the work and, contrary to expectations, EAZIMA relied entirely on its partner LAO IBANETSU to manage the work and supply both the equipment and labour. The equipment was insufficient, inadequate for the job and in poor condition. Moreover, the site manager had little financial autonomy and was limited in his ability to procure materials, spare parts and to pay the personnel. Despite management changes made in response to UNOPS's request and additional construction equipment brought to the site, work progress was sluggish and delays accumulated.

When at the end of 1996 it became evident the EAZIMA Joint Venture would be unable to meet the date for substantial completion, which in the meantime had been extended to 31 March 1997, UNOPS decided to reduce the Joint Venture contract and hire three local companies to undertake the remaining work and to repair defective work left behind by the Joint Venture at its expense. The three companies, all state-owned, were Entreprise de Route Luang Prabang-Sayaboury, Sayaboury Irrigation Construction Company and Sayaboury Road Maintenance Company. The Joint Venture's reduced work was substantially completed in May 1997 and final settlement with the company took place in June 1998. The result of the last work substantially completed by a local contractor will be up for final inspection and settlement (approx. US\$9000) in May 1999.

Table 2.2 compares the work quantities of the original EAZIMA Joint Venture contract with those actually realised by the Project [Doc.26]. The table shows that for the main canals and service roads the lengths achieved are essentially those originally planned. Fewer secondary canals were rehabilitated because some were found to be too small to lend themselves to be built using machinery; these were deleted from the contract and re-constructed by the farmers in the context

TABLE 2.2 Results of Main Rehabilitation Work

Description	Unit	Contract	Actual	Difference
Irrigation Canals				
Main Canals	km	18.3	18.2	-0.1
Secondary Canals	km	22.9	19.4	-3.5
Service Roads	km	35.1	34.7	-0.4
New Bridges / Crossings	no.	19	29	+10
Canal Concrete Culverts	no.	5	30	+25
New Structures (others)	no.	8	14	+6
Existing Structures Repaired	no.	67	64	-3
Gates Installed	no.	72	76	+4
Gates Repaired	no.		25	+25
Flashboards Installed	no.	71	50	-21
Drainage				
Culverts along Saya-Paklay Road	no.	5	2	-3 (1)
Village Roads				
Roads	km	6.8	8.5	+1.7
Culverts	no.	7	19	+12

(1) The three required culverts were built under UNCDF-financed Sayaboury-Paklay Road Project

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of block development. The length of rehabilitated village roads exceeded that planned and small structures were built in generally larger numbers than planned. Moreover, it turned out to be possible to preserve a significantly larger number than planned of such structures (including gates) of the original USAID scheme. The quality of the work is generally good, although damage by buffaloes and lack of regular maintenance have already started to have a marked negative effect on the slopes of the main and secondary canals.

The definitive cost of the main rehabilitation work has been established at US\$ 1.1 million, US\$300,000 less than expected under the original contract with the EAZIMA Joint Venture [Doc.26]. The saving is primarily due to lesser volumes of earthwork on canals and roads and the fact that Entreprise de Route Luang Prabang-Sayabouri, having had its equipment originally provided by UNCDF, charged only the cost of labour, fuel and spare parts. Table 2.3 summarises the final cost broken down by principal work classes and types of contractors.

TABLE 2.3 Cost of Main Rehabilitation Work (US\$)

Class of Work	EAZIMA Joint-Venture	Local Contractors	Total
Earthwork: Canals, Service Roads	253,730	97,025	350,755

Water-Control Structures	285,978	82,273	368,251
Gates: Installation, Repairs	251,992		251,992
Village Roads	111,020	10,000	121,020
Total	902,720	189,298	1,092,018

2.6 Block Development

Block development work started in January 1995 and was completed in October 1997. It was carried out by the farmers with the assistance of community-development and technical personnel of the TEAM Joint Venture. The work consisted essentially in rehabilitating the tertiary canals (plus some small secondary canals) and putting in place the structures and field ditches for the effective and equitable distribution of irrigation water below the tertiary canals. As shown in Table 2.4, the work's result is the controlled supply of water to a total of 1,838 ha of land in 92 blocks.

To achieve this result, the Project supplied construction materials such as concrete aggregate, cement, reinforcing bars, prefabricated farm inlets and concrete pipes, as well as implements such as shovels, masonry tools and wheelbarrows. The Project also provided two vibrating plate compactors after the manual compaction of tertiary canals turned out to produce unsatisfactory results. The latest budget revision shows the cost of the supplied materials and equipment as US\$195,000 (Annex J).

To include the rehabilitation of tertiary canals in the work to be performed by the farmers was a departure from the original project design, which proposed the reconstruction of these canals under a force account arrangement and the procurement of heavy equipment (truck, front-end loader, vibrating roller) for this purpose.

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TABLE 2.4 Results of Block Development

Description	Unit	Right Bank	Left Bank	Total
Blocks	no.	42	50	92
Area	ha	810	1,028	1,838
Tertiary Canals Rehabilitated	m	35	1,888	1,923
Existing Structures Repaired	no.	20	12	32
New Structures Built	no.	122	144	266
New Farm Inlets Installed	no.	497	772	1,269
New Farm Ditches Built		33.1	29.7	62.8

2.7 Small Weir Construction

The 1995 TPR approved the project staff proposal to study the possibility of constructing weirs in natural drains of the command area in order to increase the availability of irrigation water, improving on the farmer's traditional practice of annually rebuilding earthen dams for this purpose.

A feasibility study undertaken by a locally hired consultant identified 16 weir sites allowing the irrigation of over 400 ha in total (Doc.29). The project irrigation engineering staff produced the drawings and specifications for the seven most attractive sites and supervised construction of the weirs by local contractors selected following competitive bidding. Two weirs were built in the 1995-96 dry season, one (across the Nam Phiang) in 1996-97 and four in 1997-98. The three sets of weirs irrigate respectively 57, 130 and 108 ha, for a total of 295 ha. They cost a total of US\$61,000 to construct.

2.8 Equipment Management and Maintenance

With the decision to rehabilitate the tertiary canals in the context of block development, the originally planned procurement of several pieces of large construction equipment became unnecessary. In the event, only two vibrating plate compactors were purchased. After having been extensively used in the reconstruction of tertiary canals they were handed over to the WUA. While reportedly still functional, they are both in need of an overhaul.

The transport equipment procured under the Project is reported to have been both appropriate and of sufficient quantity: 3 pick-up trucks, 1 Toyota Landcruiser, 1 Hyundai Accent, and 14 motorcycles. Other than three Honda Dream motorcycles and the Hyundai Accent car, which arrived in mid-1996, all pieces of transport equipment were delivered in mid-1993 and are approaching the end of their useful life. A pick-up truck and six motorcycles are presently used by the WUA and a pick-up truck, the Toyota Landcruiser and three motorcycles by the project transition staff. The Hyundai Accent car and a Honda Dream motorcycle have been exclusively used in Vientiane and, assuming they have been regularly serviced, should be in good condition. Two 110 kVA generators purchased by the Project in early 1993 are alternately used at Nam Tan base camp to generate electricity from 6:00 to 21:00 hours on work days. Although still reliable, their consumption of diesel fuel has increased from the original 8 l/hr to 11 l/hr.

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The Mission was informed that the decisions regarding the repair, disposal or hand-over of all equipment (including office equipment, computers and printers, surveying and flow measuring equipment) will be taken in the context of the planned Nam Tan Sustainable Watershed Management Project.

2.9 Infrastructure Management, Operation and

Maintenance Organisation

To facilitate the management of the irrigation infrastructure and utilise it to its optimum capacity, farmers organisations called "blocks" were formed. These comprise anything between 10 and 35 farmers whose land is geographically contiguous and irrigated by the same or neighbouring water outlets from the tertiary canals. A participatory methodology was utilised whereby farmers not only decided on block formation but took part in the decisions concerning alignment of field ditches within the block. Within the project area 92 blocks were eventually organised and each elected or selected a block leader (this number was later reduced to 40 leaders who had responsibility for two or three blocks) who was trained by the project technical staff on the obligations and responsibilities and benefits to be assumed by the farmers. The elected block leader had the further responsibility to coordinate preparation of block land and for the organisation of the operation and maintenance of the farm ditches and small structures within the block.

To link the villages to the block system and the Project, organisations based on each of the 14 villages were formed. These are known as Development Action Teams (DAT) and have one farmer from each village assisting the village chief and block leaders to understand and put into action messages and instructions from Project professional staff.

As a result of the deliberations of all the above organisations and with help from the project staff and provincial and district officials, a Water User's Association (WUA) was formed in 1995 and was composed of all farmers who wished to become members. The 92 blocks were further organised into 10 zones (these were later reduced to eight), a zone being a group of blocks served by the same secondary canal. The zone leaders were elected/selected by all the members of the blocks covered by the zone. These representatives of the farmers plus the 14 village chiefs elected a Management Committee of the WUA consisting of seven members, a president, three vicepresidents from the RMC and three from the LMC. For the 1997 election of the Management Committee the entire farmer membership formed the electorate as the Project felt the management was becoming too distant from the membership [Doc. 18].

In the Lao PDR the legality of the WUAs is contained in decrees promulgated by the Ministry of Agriculture and Forestry and states "The Irrigation Water Users Association shall be a juridical entity established by grouping all water user members together under control and supervision of Provincial Authorities" [Doc. 17].

At the time of the Mission the full time staff of the WUA (paid for from the collection of ISF) consists of the Management Committee i.e. the elected WUA

president, four vice-presidents with responsibility for various aspects of operation and maintenance and administration of the irrigation scheme, a woman vice-president treasurer and a woman vice-president officer for agricultural inputs procurement (these two positions are held in perpetuity for women members of the WUA). These elected members hold office until January 1999 when another election, held every two

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years, will be conducted with all members of the WUA participating. Candidates for election to the Management Committee have to be farmers in the irrigation scheme, be of good character, free of debt, be literate and be knowledgeable about the irrigation scheme.

The hired professional staff of the WUA consists of a secretary, one irrigation technician, one agricultural technician and an accountant. Sayaboury Province also supplies two irrigation technicians designated as Water Masters.

The 14 village chiefs, eight zone and forty block leaders also receive ex gratia payments from the WUA for raising village labour brigades and organising maintenance activities.

Operation and Maintenance

Training to rehabilitate and maintain the irrigation system was provided by the TEAM Joint Venture and project staff and by April 1997 the DAT personnel and local builders had been trained in reinforced concrete techniques and stone masonry for irrigation structures. The WUA *officers* had been trained to operate irrigation systems and in seasonal maintenance as well as administering and planning how to finance the operation and maintenance. At the same time block leaders were instructed in their blocks on rotational water distribution and block network maintenance [Doc.3c]. Assistance on the latter was provided by the Farmer Irrigated Agricultural Training Project (FIAT), a nation-wide UNDP financed training unit, that carried out training of project staff and provincial and district personnel to deal with requirements at the level of the block [Doc.34].

Project engineers and technicians and two students from irrigation college were also trained. Topics included flow measurement, calculation of river and canal discharge, data processing on water management, surveying and designing small water structures and concrete weirs.

As of late 1998 the WUA Management Committee, with assistance from the Province, District and Project, plans the seasonal cropping and water-allocation schedule and operates the main conveyance and distribution network (weir, main and secondary canals). The WUA prepares an annual technical and financial report and submits it to the village chiefs and the MAF district *office* (which transmits it to the provincial authorities).

Rice cultivation in the current (1998-99) dry season takes place in eight zones scattered across the command area. Thus the irrigation of the planted 565 ha requires the two main canals and many secondary canals to transport water and results in

inordinate transmission losses. The requirement that the 30-ha Centre is to receive water in every dry season is a major impediment to the application of a more rational plan involving the subdivision of the command area into say four zones of contiguous blocks and each zone receiving irrigation water every four years. The WUA technicians in charge of distributing the water in the main system operate the off takes from the primary canals by judging visually the flow into the secondary canal. They lack the rules that would allow them to set the gate opening so as to produce a given required flow with a certain degree of precision. Such rules are indeed not easy to develop and promote since the flow depends on both the gate opening and the water level in the main canal. In the case of the Nam Tan scheme the water level varies with the setting of the canal's check structures (flash boards and underflow gates), rather than being controlled by fixed weirs, as one frequently finds on farmeroperated irrigation schemes.

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The maintenance of the main conveyance and distribution systems consists of clearing the weir of sand and silt and weeding the banks of the main and secondary canals. Annual desilting of the weir and twice-annual weeding of the main canal is undertaken by village labour brigades raised by the village chiefs. Every household, including those that are landless, has to supply one labourer, regardless of the area of the fields it irrigates. Weeding of the secondary canals by the farmers of the blocks it serves is [organised. by](#) the block leaders. Maintenance of the main and secondary canals is limited to this periodic weeding. There is no routine maintenance with a view to prevent eventual major repairs caused by the deterioration of canal slopes and service roads. The maintenance of the tertiary canals has been handed over to the WUA and is effected by the farmers of the blocks it serves. Handing over of the weir, the primary and secondary canals and related structures has yet to be accomplished and the Project still guides the WUA in the operation and maintenance of these components of the irrigation scheme. At a meeting of with the WUA staff the Mission was informed that they do not feel confident enough as yet to take over the running of the entire irrigation scheme. They reported they still need technical assistance and funding from the Province or District when there is a major system failure.

2.10 Financing the Operation and Maintenance of the Irrigation Scheme

When the Project began, the Irrigation Service Fee (ISF) imposed by the Province stood at 50 kg of paddy per hectare for the wet season and 25 for the dry. Farmers delivered this to the district warehouse. For the first three years of the Project this rate and payment method continued until in 1996 it was decided that payment would be in cash, according to the current market price of paddy. Further financial analysis led the WUA to the decision that the ISF was not

sufficient to meet the operating and maintenance demands of the irrigation system. Compounding the problem of a general operating cash shortfall is an approximate annual 35 per cent ISF collection failure.

The WUA assisted by the Project [Doc. 16] calculated that 52,500 kip/ha per crop was needed to meet all the needs of the irrigation system. Provincial authorities in Sayaboury rejected this figure and set the ISF until the year 2000 at 30,000 kip/ha per crop. At the present price of paddy the ISF still amounts to the same 50 kg/ha levied in 1992 (Earlier in 1998 the mission members, when evaluating a Vietnamese irrigation project with similar economic conditions to Nam Tan, found that the ISF ranged between 180 and 250 kg of paddy per cropped hectare). A budgetary analysis using the provincial ISF for 1997-98 revealed there would be a deficit of 14,806,000 kip in the operation and maintenance budget. This projected deficit did not include failure to collect the ISF from over 30 per cent of farmers.

Salary and ex gratia payment costs in the budget for personnel in 1997-98 amounted to 14,867,955 kip. This comprises salaries for the WUA elected and hired staff. It also includes, as noted earlier, payments to eight zone leaders, 40 block leaders and 14 village leaders. Adding these to the administrative costs to run the organisation reveals that only around 50 per cent of the WUA budget is left for operation and maintenance plus interest made from depositing the ISF in the bank [Doc.6].

Responsibility for collection of the ISF is with the 40 block leaders and 14 village chiefs who then pass the money to the treasurer of the WUA. At the meeting with the Mission the chairman of the WUA Management Committee said that in future the remuneration paid to village chiefs and block

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leaders would be withheld if they failed to collect the full ISF. Only in cases where there was genuine hardship, e.g. the full amount of water could not be supplied or there was a crop failure, would farmers be excused from paying the full amount of the ISF.

In meetings with farmers and block leaders in 10 blocks, the Mission realised that the concept of financial planning for systematic preventive maintenance and as a result efficient operation of the irrigation scheme was not understood by the farmers. When presented with the fact that the WUA required more than the 30,000 kip per cropped hectare to properly operate and maintain the system they came up with the following reasons for not increasing their ISF:

- we must ask the Province for money when a major repair is needed;
- the WUA must pay with money from the bank account;
- we will pay if the next seasonal crop brings us high prices;
- if necessary we will raise extra money if a major failure occurs;
- blocks will assess the cost of repairs and decide if an increase is

warranted.

The WUA Management Committee informed the Mission that in 1998 they had to hire a contractor to carry out major repairs costing 5.0 million kip. After the provincial authorities refused to defray the cost, the WUA took the money from the reserve fund it is building up for emergencies. They continue to press the Province to refund the money.

2.11 Agricultural Development

In order to utilise the irrigation system to its maximum potential a number of activities were set in motion by the Project [Docs.3a, 3b, 3c, 3d].

During the 1994 wet season trials were carried out on fertilisers, weeding trials on-farm, spacing and straight row planting, integrated cropping (on-farm), pest management (on-farm) and trials on alternative cash crops.

Trials were carried out with different cash crops during the 1994-95 dry season with the objective of building extension methodologies for farmers based on suitable crops other than rice. A UNDP short-term expatriate consultant assisted MEKCONSULT in conducting these experiments.

A 30-ha Centre demonstration farm within the irrigation perimeter was rehabilitated and the national agriculturists employed there given a mandate to draw up a farmers' needs assessment based on participatory methods and to develop extension techniques as a result. The Project funded the rehabilitation of an access road, office and training facilities, transport and a fishpond at the farm.

Agricultural extension *officers* and DAT personnel were trained in participatory methods for developing extension methodologies. Model farmers were selected and trained to pass on extension messages to their neighbours. Videos, leaflets and manuals were developed for use with farmers.

Extension tools were distributed e.g. leaflets, group meetings and training were held with farmers, demonstrations and farmer field days were carried out and some individual home visits to farmers were carried out by extension officers.

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A programme to improve livestock production was formulated with the objective of training farmers in better animal husbandry techniques.

A study was carried out on marketing crops and a monitoring and information system for the marketing of agro-products was established.

Farmer classroom training was conducted in water management, intensive rice cropping, cash crops, fishery production and use of agricultural inputs. To supplement the classroom training a field visit to a research station in Luang Prabang was organised and focused on the utilisation of model farmers as extension messengers.

National staff were trained in how to use a farm household participation planning and a farm household organisation of development methodology. The DAT were trained at the 30-ha Centre in conducting PRAs, participatory extension methodologies, use of extension tools and project planning and evaluation and monitoring.

Ongoing training of DAT, 30-ha Centre staff and project staff was to be carried out by a UNV Community Organiser.

As of April 1997 the reported impacts of the agricultural extension and training programmes were [Doc.3c]:

- an increase of 176 ha planted to rice over 1995 figures;
- increased average paddy yield (3.03 tons/ha) of around one ton/ha over pre-project conditions;
- 15 per cent of farmers using improved rice varieties;
- 43 per cent of farmers using fertilisers;
- 16 per cent of dry season area planted to water melons (yield 15 tons/ha);
- 6.5 ha planted to cucumbers (yield 11.5 tons/ha);
- 2.23 ha planted to onions, garlic, sweet corn and vegetables;
- 361 families involved in fish culture;
- rice-fish culture in 12 rice paddies with an area of 1.80 ha;
- experiments on potatoes and tomatoes.

As of May 1998 the reported impacts were [Doc.3d]:

- average wet season paddy yield increased to 3.13 tons/ha;
- average dry season paddy yield increased by 0.5 tons/ha over 1997;
- 29 ha planted to water melon and cucumber.

The great majority of farmers still prefer to plant the local variety of rice (this produces the sticky rice loved by Lao people) which has a lower yield and value than improved varieties. They reported to the Mission they seldom have a surplus to sell for cash and as they do not grow other cash crops in quantity the system is still one of subsistence agriculture or subsistence plus to a very small degree.

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The total expected area for irrigated rice production, in both wet and dry seasons, of 2,600 ha has not yet been attained, with the 1998 figure reaching 2,402 ha, which was a significant improvement over 1992 when only 1676 ha were reached.

Although there is no record on land use in the watershed, a trek by the Mission along 8 km of the Nam Tan revealed some cultivation in the valley floor but virtually no damage to the slopes of the watershed itself.

2.12 Community

Development

Farmer Block

Development

A major component of Community Development using participatory methods was initiated for the basic unit in the irrigation system i.e. the block. The Project in February 1994 met with farmers to ask them their needs related to water provision and how the farmers themselves would improve their situation. The farmers were in complete agreement that improved water provision was their priority. The concept of manageable block development was put to them and they were asked to come up with blocks of farms comprising between 15 and 30 ha that would benefit from the same canal and outlets. The farmers themselves had to identify the block boundaries and make a list of block members related to utilisation of the same part of a tertiary canal.

The process assumed the following format:

- use 15 to 30 ha size limitation as guideline only;
- discuss among themselves the formation of their group;
- use cadastral maps (farmers trained by project staff) to identify boundaries;
- review the size of the block.

The TA team suggested four blocks be utilised as a model for testing and further block formation. The farmers themselves selected two blocks on each main canal for this phase of the process.

Farmers in the four test blocks walked transects of their land and helped in the alignment of block ditches and water outlets. Where ditches crossed a particular farmer's land, negotiations were held among themselves to gain access to the land in question. All decisions regarding alignment were based on negotiation. Farmers who lost land were compensated.

In October 1994 the project staff carried out surveys and made designs in participation with farmers. Construction materials were provided and some farmers who had good skills were trained as carpenters and masons. Block construction was started in the four areas in January 1995 and completed in April of the same year. During the formation and construction of these four blocks, farmers from every part of the command area made visits to them to observe the process.

Once the participatory process was thought appropriate, block formation using the same methodology was carried out throughout the project. By the end of 1995, 30 per cent of the irrigation area had been formed into blocks, by the

close of 1996 a further 45 per cent was completed and by October 1997 the full 92 blocks had been developed. Each block elected/selected a leader who had to sign a contract with the Project delineating responsibilities. A major responsibility of the block leader with the assistance of the village chief was the collection of the ISF which he handed over to the WUA. A zone concept was instituted comprising a number of

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blocks using the same secondary canal to oversee operation and maintenance by farmers. Zone leaders were also elected/selected by block members of the zone. In 1995, as noted above, a Water User's Association was legally constituted and a Management Committee elected by block and group leaders and comprised a chairman and vice chairmen from left and right bank main canals. In the WUA constitution it was decided that elections would be held every two years.

Women in Development

Although not included in the original Project Document a Women in Development (WID) programme was started and in 1994 included a number of training components including toy making, small scale enterprises, credit management and family planning using a birth spacing method. At the same time, in order to give women confidence in making community decisions affecting their lives, representatives of the Lao Women's Union (LWU) were invited to attend all meetings and training conducted by the Project [Doc.15].

Village based revolving funds were started in 1995 with money taken from village micro-level project funding originally intended for a health programme, sanitation and clean drinking water. The new revolving fund was to be exclusively for village women, especially poor women who needed to supplement their livelihood, and would support the development of small businesses and other productive enterprises run by these women. The Project approached an NGO called Consortium which had experience in running such programmes. Meetings were held to explain the concept of the revolving fund and an account was eventually established for each of the 14 villages in the Somsavanh branch of the Lane Xang Bank.

The LWU would generally supervise the scheme but each village would have a Village Revolving Fund Committee (VRFC) which in turn would submit suitable loan applications to the District Revolving Fund Committee (DRFC) and if approved the Project would transfer the amount to the deposit account of the village concerned. Major criteria for applicants were that they had no access to other sources of credit, had suffered in the past from natural disasters and were members of the LWU [Doc. 27]. The recipients of the loan, usually a production group, would repay it plus interest to the VRFC which in turn would deposit it in the bank account for use by new applicants.

As of April 1997 the total funds released to the villages totalled 29.15 million kip with 55 production groups comprising 378 families availing themselves of loans.

The loans were for rice production, weaving, fish production, retailing and pig raising and the average loan per unit was 77,122 kip. Repayment with 12 per cent interest (this was raised to 24 per cent for succeeding years) was 100 per cent within the time allotted [Doc.3c]. In the following season 1997-98 over 49 million kip was loaned with repayment again 100 per cent, this time with 24 per cent interest [Doc. 3d]. By this season the number of loans had reached at total of 1,396 families.

Gains made by the women apart from profit and savings were:

- knowledge of simple accountancy;
- confidence to engage in business;
- dealing with banks for the first time;
- accumulation of savings as a result of having to repay the loan;
- experience in managing revolving funds;

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- more prominent roles in society;
- greater solidarity among them [Doc.20].

In meetings with the Mission in three villages, Somsavanh, Natan and Na Bouam, around 40 women explained the status of the VRF and their involvement with it. Somsavanh VRF had made loans to eight groups in 1996/97 for pig production, fish culture and weaving. The loans varied between 50,000 and 100,000 kip. The total number of families in the group comprised 84 and repayment was almost 100 per cent at 12 per cent interest. One family defaulted and had left the area.

In 1997/98 the loan portfolio had grown to 6.6 million kip but the number of families had been reduced to 34 as a result of the financial crisis in the region. One of the pig raisers explained the situation by stating that three piglets purchased in 1996 for 50,000 kip were costing 300,000 by 1998. This group switched to chickens and took a further 1.0 million kip loan to supplement the 500,000 kip profit they had made from the pigs. They project after six months of chicken raising that they will repay the loan and make a large profit from the chickens as they can sell them after four months. The Somsavanh VRF loan portfolio has grown in financial terms but reduced in beneficiaries with the low value of the kip.

Other groups in Somsavanh, engaged in fish culture and weaving also repaid their loans in full in 1997. Boua Vanh, who took a 100,000 kip loan to start a rice retailing business, told the Mission she is making a profit of 30,000 kip per month after buying paddy from farmers, paying to have it milled and then selling it to traders who come into the area. She also cultivates a half hectare farm in the command area and raises three children. Her husband works as a nurse.

Natan village VRF loaned 2.0 million kip in 1996 to four groups and 4.3 million to eight more groups in 1997. The total number of families covered is 76. Activities again are pig raising, fish culture, retailing and weaving. A pig raising group had made profits of 100,000 kip in 1996/97 and were projecting a 400,000 kip profit for 1997/

98 after repaying the loan with 24 per cent interest. One woman, whose profit was 70,000 kip, reinvested her money although she wanted to take another loan to increase her pig business which she claimed was very successful. With the devalued kip and the need to increase loans to members she realised that others in the village needed to avail of the VRF so she decided solely to use her profit and allow the credit to revolve to new borrowers.

In Na Bouam the fund had only started in 1997 with 6.3 million kip and loans were made to 33 families who made up five groups involved in pig raising, fish culture and one growing cash crops namely water melons and cucumbers in the dry season. This group borrowed 800,000 kip and have repaid it in full. Piou, who received training on the 30-ha Centre, said she made 400,000 kip profit from selling water melons to traders from Sayaboury town and even Luang Prabang town in the next province. From this she was able to buy fish fingerlings and piglets to raise in the wet season. When asked why the groups formed when the activities usually involved individuals in the practical day to day execution of activities the replies were unanimous. The group was the guarantee of all members paying back the loan. Although no members had defaulted in Na Bouam village, peer pressure would be used if this was ever the case. It was also explained that in case of sickness or natural disaster the group would rally round the stricken member. One woman also

Section A: Factual Presentation of Project

reported that they held group meetings where they discussed activities such as chicken vaccines and marketing opportunities.

On the impact on their families the VRF women in every group replied that their children were better fed and had decent clothes in which to go to school, something that had not been the case before the Project and the VRF came into their lives.

Some women when prompted by the Mission to explain other aspects of community organisation claimed that the birth spacing family planning component had made a big difference. With fewer children they could afford the time to involve themselves in business activities by taking loans from the VRF.

When asked why they did not previously use banks for loans for business and agricultural activities, all of the villages said the banks required collateral, had numerous forms that had to be filled out and were in the district towns which required long journeys that cost money. Many of them remarked that they were scared of getting into debt with a bank. One woman said that with the VRF the interest remained in the village and did not end up in the profits of the bank.

All villages would like to see the loan portfolio increased as beneficiaries now require larger loans due to the recent downward trend of the kip. When asked about future self-sustainability of the VRFs they said it would be a number of years before this was achieved because of the falling kip.

2.13 Externally-Financed Project Costs

Tables 2.5 and 2.6 summarise the costs incurred under each of the two project agreements. Annexes I and J show the amounts charged to individual budget lines and compare the budgets of the agreements with those of the latest budget revisions. These are Revisions K (1 June 1998) and R (1 July 1998) for LAO/86/008 and LAO/89/C02 respectively. Figure 2.1 shows the distribution by major expenditure classes of the combined cost of US\$4.7 million charged to the two budgets.

TABLE 2.5 Costs Incurred under LAO/86/008 (UNDP-Netherlands)

Description	Amount (US\$)	
Technical Assistance	889,449	51.8
UNVs	103,293	6.0
Local Consultants	191,323	11.1
Official Travel	94,266	5.5
Study Tours/Training	105,098	6.1
Transport Equipment	66,698	3.9
Miscellaneous Equipment	12,786	0.7
Expendables	20,025	1.2
Support Personnel	62,784	3.7
Operation and Maintenance	39,703	2.3
Reporting Costs	12,841	0.7
Sundries	93,712	5.5
UNOPS Mission Cost	24,202	1.4
Total	1,716,180	100.0

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TABLE 2.6 Costs Incurred under LAO/89/C02 (UNCDF)

Description	Amount (US\$)	
International Consultants	65,547	2.2
Local Consultants	3,000	0.1
Preparatory Studies	58,843	2.0
Engineering Design and Supervision	576,257	19.1
International Construction Contracts	952,097	31.6
Local Construction Contracts	337,811	11.2
Construction Materials	195,430	6.5
Transport Equipment	101,161	3.4
Agricultural Equipment	2,708	0.1
Office Equipment	5,800	0.2
Operating Expenses	269,920	9.0

Expendable Supplies	49,627	1.6
Support Personnel/Travel/Audit	15,020	0.5
Training/Study Tours	7,085	0.2
Community Development Fund	20,348	0.7
UNOPS Agency Cost	118,569	3.9
UNCDF Missions	232,158	7.7
Total	3,011,381	100.0

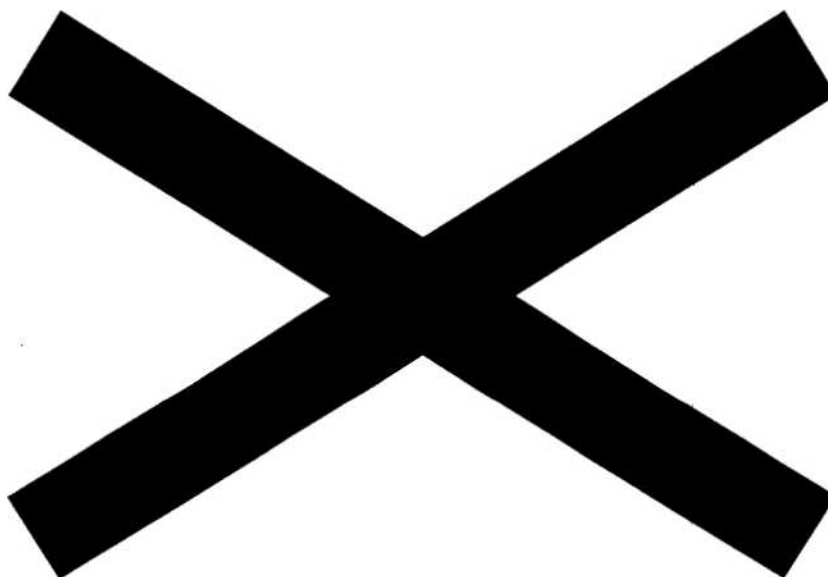


FIGURE 2.1 **Distribution of Total Project Cost (ÚS\$4.7 million)**

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Section B: Evaluation of Project Results

3 EFFICIENCY OF PROJECT IMPLEMENTATION

3.1 Input Supply

Financial Inputs

UNCDF provided its financial inputs in an efficient manner. The same cannot be said about UNDP, whose programmed funds were initially inadequate to respond to the needs of the Project. The problem was resolved about a year after the

project's start, when the required funds became available through a cost-sharing arrangement with the Government of the Netherlands.

Scheme Rehabilitation

No time was lost to mobilise the inputs necessary to undertake an emergency rehabilitation action in response to the collapse, in late 1994, of three metal culverts crossing the main irrigation canals. The Project was able to rapidly engage the means necessary (local engineering consultant and contractors) to replace the failed culverts and a washed-out drop structure on a main canal.

The supply of inputs to the rehabilitation of the irrigation scheme's civil works (main rehabilitation) was less than satisfactory. It consisted of the provision of engineering services, the provision of office facilities and transportation equipment in support of the delivery of these services, and the engagement of a contractor. First, time was lost in 1994 with the revision of tender documents prepared by the TEAM Joint Venture that were judged inadequate. Then, the international contractor selected through competitive bidding, the EAZIMA Joint Venture, failed to get adequately organised to undertake the required work. In response, the Project increased the responsibilities of the TEAM Joint Venture and eventually contracted three local companies to complete the work. In the end, substantial completion of the main rehabilitation work was delayed by only by a few months with respect to EAZIMA's contractual completion date of 31 December 1996, and the total construction cost was about 20 per cent less than EAZIMA's contract amount. The achievement of this relatively satisfactory result required a high concentration of the project personnel's efforts, which may well have been the principal cause for the neglect of other project components.

In the initial construction season (1994-95), block development was hampered by the late delivery and poor quality of construction materials (primarily concrete pipe) [Doc.4b]. The rectification of this situation for the subsequent seasons contributed to the work's successful completion in October 1997.

The project staffs proposal to the 1995 TPR meeting to build small weirs on natural drains was promptly followed by a feasibility study entrusted to a locally hired consultant and the construction of seven weirs by local contractors over the ensuing three dry seasons.

Section B: Evaluation of Project Results

Agricultural Development

Inputs to the rehabilitation of the 30-ha Centre which was to have been the driving force of the agricultural improvements in the Project were efficiently supplied. An access road, office and classroom facilities, fish breeding equipment, agricultural tools and equipment were supplied and, a refrigerator was installed. The Project office loaned four motor bikes for the Centre agricultural extension purposes. The Project and the Centre agreed that joint ventures would be governed by written agreements between both parties and these would be reviewed including by the farmers. These inputs and agreements were efficiently put in place. The Province provided three

extra agronomists after the 1996 TPR, bringing the strength of the Centre up to 15 staff which theoretically should have been more than sufficient for the agricultural needs of the farmers in the Project.

A consultant from the Netherlands carried out crop field trials as did the local consultancy MEKCONSULT in cooperation with project and district agricultural staff. Trials on various high yielding rice varieties were conducted with alternative use of various mixes of chemical fertilisers and insecticides. 160 plots on different elevations and fields sizes were employed. Farmers assisted in seed germination and preparation of seed beds. Records of these were systematically kept and prepared for the Project and [MAF.by](#) the consultants [Doc.28].

When the management structure of the Project changed with the MOU of September 1994, the specialist services of an agronomist were discontinued and both community development and agricultural inputs were to be provided by the same expatriate.

Community Development

Community development inputs were timely and largely efficient. The participatory approach with the farmers to form blocks which would use the water cohesively and equitably began in 1994 and over a period of three years brought the number of blocks to 92. These were formed into zones

based on use of the secondary canals, and inputs stressing the need for block and zone solidarity were brought to the farmers by the community workers employed by the TEAM Joint Venture. In 1995 the community development inputs brought about the formation of a WUA which in turn elected a Management Committee responsible for the operation and maintenance of the irrigation system. Village and block responsibilities for maintenance of the weir and the canals were instituted by the community development staff of both the new WUA, the Project and the TEAM Joint Venture.

Inputs to WID were also efficiently supplied. A project community development specialist ran a birth spacing project with other income generating training for activities such as handicrafts and toy making. This work was continued by a UNV and contacts were made with the UNFPA with a view to it supplying inputs. In 1995 the VRF programme was implemented with training for village committees to administer the funds and for potential beneficiaries in the management of their loans. Simple accounting and bookkeeping, calculating profit and loss and other aspects of simple financial management inputs were provided by community development workers and the NGO Consortium which also conducted a marketing study to aid the women in the choice of business ventures. Affirmative action was taken with the Management Committee of the WUA to ensure women were represented on it.

Section B: Evaluation of-Project Results

3.2 Project Management

Management by Development Partners

The management of the project's execution by the development partners was initially inefficient, a situation that began to improve with the Aide Memoire of September 1992 but was fully resolved only by the MOU of September 1994.

Starting in June 1994, the Tripartite Review (TPR) meetings were held regularly and had a wide range of representation to them. Their minutes, however, provide relatively limited evidence of meaningful guidance and leadership being supplied to the Project's execution. In fact, the major direction of the Project is not clear from the TPRs. The minutes document only some of the decisions to change the original project design, namely: the elimination of the construction of a bridge across the river Nam Tan; the addition of the construction of weirs on natural drains; and the addition of studies concerning watershed protection and agricultural extension.

One looks in vain to the TPR minutes to find the rationale for the decisions and agreement by all parties to drop Component 6 (drinking water supply, health monitoring, micro-projects) and to introduce the VRF for women. The minutes also contain no reference to the Inception Report, normally expected to update the project design based on current field conditions, to propose a detailed implementation plan and to be subject to formal approval.

When it was clear that the agricultural inputs were producing extremely limited impacts on the farmers, the TPRs indicate that year after year, there was some recognition and in some cases alarm about this but no concrete action taken to rectify this serious problem. In essence no decisive action was taken by the donors and the Lao PDR representatives to correct the contradiction that while the irrigation system was going from strength to strength in terms of water provision the agricultural system was not keeping pace. There is no indication in the TPR minutes of why the promotion of agricultural credit was abandoned.

Internal Management

As far as internal management of the Project was concerned, the reporting and monitoring requirements were carried out scrupulously (a notable exception being the project final report, which is not yet available) but the various reports were of limited value in providing direction to the Project and as such were inefficient for the purpose of good project implementation. They were frequently not objective, merely recording that such and such an activity was satisfactory without giving any analytical detail as to why. This is the case of most of the PPERs, which also failed to follow the format prescribed by UNDP and therefore did not provide a particularly coherent picture of the progress being made by the various project components. One serious omission in monitoring and reporting was the failure to carry out a mid-term evaluation which if implemented might have rectified some of the problems faced by

project staff.

At the outset of the Project much management time was lost and energy expended needlessly as a result of the confusion over responsibilities. The NPD was confused by the absence of a clear definition of what national execution entailed; this confusion is exemplified by the original budget which in fact gave UNOPS large areas of responsibility for project implementation. This inefficiency was the result of one of the Project Agreements indicating national execution (LAO/86/009) but essentially contradicting this by the role mapped out for UNOPS.

Section B: Evaluation of Project Results

When these ambiguities were cleared up by the MOU of September 1994, the day to day management of the Project became much more efficient. New regulations governing the management responsibilities were effected (these resulted in the abolition of the post of CTA) and the roles of both local and expatriate personnel were defined to suit the new management situation. The internal management of the Project thereafter showed a greater flexibility and was able to overcome with great efficiency the difficulties being experienced with a contractor who was clearly unsuitable for the contract he was being asked to fulfil. The one major casualty was agriculture and the structural changes to the organisation did nothing to improve this, indeed it made it relatively worse by combining agriculture and community development in one department.

3.3 Project Implementation

Scheme Rehabilitation

Despite the serious difficulties caused by the weak performance of the civil works contractor, the Project succeeded in producing appropriate results within an acceptable time frame and on the whole at a reasonable cost. The work was carried out virtually without disrupting agricultural production in the command area. It resulted in structures of generally good quality and clearly not only restored the irrigation scheme's original conveyance and distribution capacity but improved significantly its functioning at the tertiary-canal level and below. Table 3.1 summarises the costs incurred in rehabilitating the irrigation scheme proper, that is, including service roads (which run along main and secondary canals) but excluding village roads. The Engineering Services item concerns both Civil Works and Block Development. The amounts shown for Emergency Rehabilitation and Small Weir Rehabilitation do not include the cost of engineering services because for the former they are not readily available and for the latter the services were provided by the project TA staff. The unit cost shown in the table's last column is that for the 1,848 ha irrigable in the wet season. The overall cost of 1,020 US\$/ha is very reasonable. At the present international price of milled rice of some 400 US\$/ton, it is equivalent to the

value of 3.8 tons/ha of paddy, which exceeds by about 10 per cent the average yield of the wet-season crop in Sayaboury Province.

TABLE 3.1 Cost of Scheme Rehabilitation

Description	Cost		Unit Cost (US\$/ha)
	US\$	%	
Engineering Services	550,700	29.3	299
Civil Works (Main Rehabilitation)	970,998	51.7	528
Block Development	195,000	10.4	106
Emergency Rehabilitation	99,000	5.3	54
Small Weir Construction	61,000	3.3	33
Total	1,876,698	100.0	1,020

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The cost of Engineering Services may appear high, representing 47 per cent of the work to which they apply (Civil Works and Block Development), compared to the 12 per cent normally experienced for design and construction supervision of new work. Three things must be borne in mind: 1) rehabilitation work requires relatively more engineering services than new work; 2) the TEAM Joint Venture was asked to undertake work compensating for EAZIMA's incompetence; and 3) the TEAM Joint Venture participated in community development and training activities. Not only are community development activities always very labour intensive but, as in the case of the Project, they usually also take longer than planned.

The US\$99,000 cost of the Emergency Rehabilitation (3 culverts and 1 drop structure) is comparatively high. Cost estimates for the replacement of additional metal culverts by concrete culverts [Doc.6] present a maximum value of US\$15,000 per unit. Applying this unit cost for the culverts and the average cost of a small weir (US\$9,000) for the drop structure results in a rough estimate for the value of the Emergency Rehabilitation of only US\$54,000.

The small weirs together irrigate 295 ha. Their total cost of US\$61,000 therefore corresponds to a very attractive unit cost of 207 US\$/ha.

The 8.5 km of village roads were built at a total cost of US\$121,000, or US\$14,200 per kilometre, a reasonable unit cost for the type of gravel roads provided.

Agricultural Development

The implementation of the agricultural component of the Project has been markedly inefficient. The Province, which has control over the 30-ha Centre, appears to have a conflict of interest over what it requires from the Centre and what comprises the needs of the farmers in the Nam Tan command area. The agricultural extension

services to be provided by the Centre have made little impact over the period of the project life, which leads to the conclusion that it is not performing its function. Given the financial, technical and human resources, including a large number of local consultancies, that have gone into the Centre, the outputs both in the failure to persuade farmers to use higher yielding varieties and to diversify agricultural production in the dry season to any significant degree indicate a very inefficient use of a resource which was vital to the success of the project in its formulation. The inefficiency of the Centre was compounded by the fact that although the Lao/86/008 Project Agreement called for an expatriate agriculturist with knowledge of irrigated crops for a period of 18 months, none was ever mobilised [Doc.2]. There were short-term agricultural inputs but a project agriculturist who could have held the Province and the Centre to their obligations remained a position to grace the pages of the Project Agreement but never the Project itself.

Community Development

Apart from changes in direction occasionally, e.g. the WID and VRF, the implementation of this component of the Project was very efficient if measured in terms of the success of organising the water users in their various groups and the women in making a success of the credit made available via the revolving fund, although the VRF at present makes loans once per year and expects repayment at the end of it. Some activities require longer loan periods and may not coincide with the time when the loans are issued to members.

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Section B: Evaluation of Project Results

If the Project is to be measured in terms of providing a meaningful interface between farmers as water users and the WUA as trustees of the money generated by the ISF for operation and maintenance then it was less than efficient. The fact that the ISF collection since project inception has only ever reached around 70 per cent of the total indicates inefficiency in making all the farmers understand the vital need for this fund. This is further substantiated by the fact that many farmers do not understand what the fee is for. But generally speaking implementation of the community development component has been one of the most efficient aspects of the entire project.

3.4 Technical Assistance

The provision of TA, ostensibly hampered by the confusing conditions prevailing at the Project's start-up (Section 2.1), was marked by significant delays in the arrival and gaps in the presence of the long-term experts. In particular, UNOPS appears to have had difficulty finding a suitable CTA. Of four candidates who all participated in the Project during what were meant to be preparatory short-term assignments, one took the job for a 10 month period starting a year after the project began. His replacement reportedly turned out to

prefer working by himself, lacked the necessary communication skills and found himself in serious conflict with the NPD. This CTA's contract was terminated eight months after his arrival, when the decision was taken by the MOU of September 1994 to reorganise the PMU and abolish the post of CTA. The reorganisation entailed the subdivision of the PMU into two departments (Irrigation and Community Development) whose national heads both had the title of Deputy NPD and were to be assisted by an international expert.

Following the second CTA's departure the Project was left for six months without the presence of an international expert until the expatriate Irrigation Engineer arrived. The expatriate Community Development Specialist arrived four months later. The Irrigation Engineer, while young and relatively inexperienced at first, was a dedicated individual, communicating extremely well with all parties concerned with project implementation. There is ample evidence of his intelligent handling of the difficult situation caused by the under-performing civil-works contractor. The Community Development Specialist reportedly did his work efficiently when he applied himself but needed encouragement to do so. His lack of initiative and vision may have contributed to the less than satisfactory state of the WUA interface with farmers; this is generally unfocussed and indicates the obvious difficulty of the WUA to convince the farmers of the critical necessity of the ISF.

Of the two UNVs on long-term assignment the Community Organiser performed well. The Office Management UNV was less useful, essentially due to poor cultural adaptation and health problems. Ill health forced her to leave the Project before completing her contract.

The experts on short-term assignment were on the whole able to respond to the Project's requirements. Two CTA candidates, however, who were present on short-term assignments in late 1992 and early 1993 respectively failed to make a significant contribution.

The Project's start-up difficulties clearly resulted in a considerable waste of TA resources and, with the notable exception of the TA dealing with construction matters, a rather disappointing impact of the TA delivered.

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4 PROJECT IMPACT

The following impacts were recorded from project reports [Docs.3c, 3d, 8, 20] and from interviews with farmers in their blocks, the WUA Management Committee, project staff and women managers and beneficiaries in the VRF. Some agricultural data is not consistent and that which does exist has not been systematically documented or analysed. Health statistics are also lacking due to

the failure to undertake the monitoring of children's health planned under Component 6. The impacts described correspond to the conditions prevailing in 1998 (unless noted otherwise) compared with those observed in 1992.

4.1 Physical Impacts

The Project's fundamental impact is the increase in reliably irrigable land. This increase was 390 ha for the wet season (from 1,448 to 1838 ha) and 337 ha (from 228 to 565 ha) in the dry season. The annually irrigable rice area thus was increased by 727 ha, from 1676 to 2,402 ha. This is illustrated by Figure 4.1

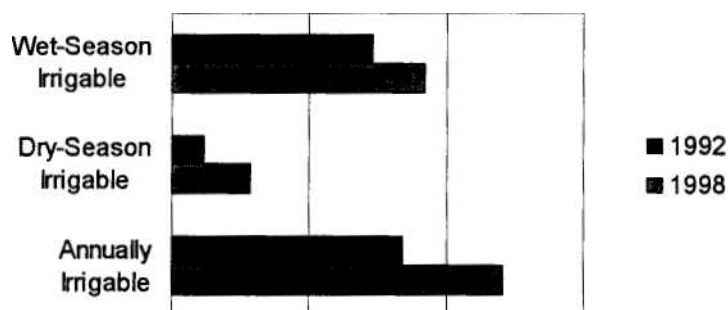


FIGURE 4.1 Irrigable Rice-Cropped Area

0
1000
2000
3000
hectares

The ultimate constraint on both the wet- and dry-season irrigable area is the water available from the river Nam Tan. In the wet season, considerable water-management improvements, during the field-preparation and planting stage and during dry-spells, will be required to increase the reliably irrigable area. In the dry season, a great increase in irrigable area can be achieved by cultivating alternative crops that consume less water than rice.

Additional physical impacts are:

- the road connection of six formerly isolated villages in the project command area to the UNCDF-funded Luang Prabang - Sayaboury - Paklay main provincial road, either directly or indirectly via the scheme's rehabilitated service roads;
- twenty-nine new bridges improving access of the command area's villagers to their fields and the service roads;

- the 30-ha Centre featuring a new access road, offices and a classroom building, aquaculture equipment, a refrigerator and training facilities;
- the increase of fishponds in the command area from 26 to around 120.

The Project also had at least one negative environmental impact, which remained undocumented and ostensibly was not considered by the project staff: the reduction of the dry season flow of the river Nam Phiang by the seven small weirs constructed to increase the irrigable area. Six of these weirs block the flow of drains that flow into this river and the largest one of them blocks the flow of the river itself. This loss is in addition to the loss of the water from the Nam Tan, a major tributary of the Nam Phiang, whose bed is totally dry below the weir feeding the irrigation scheme.

4.2 Agricultural Impacts

The area planted to wet-season rice within the command area increased only marginally, from 1,825 to 1,838 ha, since, before the Project, land not served by irrigation water was simply used to grow a rainfed crop. The availability of irrigation water on a larger portion of the command area in both the wet and dry seasons resulted in an increase of total annual paddy production by 3477 tons, from 4,191 to 7,668 tons (1997). The increased reliable availability of irrigation water thus has raised the average paddy yield in the command area from 2.04 to 3.19 tons/ha. This result was achieved by farmers largely continuing to grow traditional rice varieties, with very limited use of chemical fertilisers and no use at all of chemical herbicides and insecticides.

Over the years of project implementation there was a negative impact concerning the area planted to crops other than rice. In 1992 the figure was 44 hectares while by 1997 it had decreased to 29; the principle reason given by farmers was the lack of access to external markets and the lack of capacity to store or preserve these crops.

In 1992 there was no systematic agricultural training for farmers, by 1998 annual training at the 30-ha Centre was reaching a minimum of 100 farmers benefiting on average of five training sessions but virtually no on-farm extension services were being provided.

In 1992 approximately 800 farmers from within the irrigation command area reported they were having to resort to shifting cultivation to feed their families, by 1998 this figure was down to less than around 100 according to Mission visits to a number of villages. (Government legislation on shifting cultivation may have played a part in this but attitudes of officials within the project area suggest very liberal treatment of farmers who still use this method; the impression gained by the Mission was that these people have to eat somehow so there is a limit to imposition of the law prohibiting slash and burn agriculture).

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In 1992 the Water User's Groups system had collapsed. By 1997 the Project using a participatory methodology had assisted in the organisation of 92 blocks of farmers who had in turn elected leaders and helped in the formation of a Water User's Association.

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Section B: Evaluation of Project Results

In 1992 10 per cent of farmers claimed they had no irrigation water in the wet season, 63 per cent had insufficient water and illegal water usage was around 50 per cent. By 1998 all of the farmers within the irrigated command area had sufficient wet season water and illegal water usage had decreased. Indeed, before the Project only farmers whose fields were relatively close to the weir on the Nam Tan could be certain of getting irrigation, by 1998 even farmers at the tail-end of the conveyance and distribution canals reported they were happy with the water they were getting. The number of farming families served fully by the irrigation scheme in the wet season increased by 650, from 1,347 to 1,928.

The Project has negatively impacted on ISF collection rates, in 1992 these were 97.5 per cent while in 1998 they had decreased to around 65 per cent.

Total amount of ISF collected in 1992 was 5.33 million kip while in 1997 it was 16.22 million but had lowered as a percentage of the total ISF. In fact, considering the rise in the farmgate price of paddy from 100 kip/kg to 600 kip/kg over the period, in terms of paddy weight the collected ISF had dropped from 53 to 27 tons.

No information is available about the amount of rice reaching markets and providing monetary income for the farmers. A rough estimate can be made on the basis of the annually produced tonnage of paddy and an assumed per-capita requirement.

Considering losses and seed requirements to total 10 per cent of the harvest, the 7,668 tons of paddy produced in 1997 yielded 6,900 tons for self-consumption and sale. At an average per capita need of 350 kg, the 12,000 people in the project area have an

annual requirement of 4,200 tons of paddy. Thus the quantity available for sale would be 2,700 tons, which at today's farmgate price represents a value of 1,620 million kip. This amount corresponds to an average monetary income of 840,000 kip for each of the 1,928 families farming the Nam Tan command area.

Impacts on WD Programme

In 1994 women had no access to credit and therefore income generating activities, by 1998 VRFs had been set up in the 14 villages covered by the Project with the following results:

1996-97 Loans were 13.39 million kip at 12 per cent interest with one defaulter. 1997-98 Loans were 49.31 million kip at 24 per cent interest with full repayment 1998-99 Loans were 62.70 million kip with repayment due at the end of the period. As of December 1998 loans have been made to 1,396 families.

Reported impacts from village women state children are better nourished, have better clothes and require fewer visits to the health centre.

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5 PROJECT PREPARATION AND DESIGN

5.1 Project Conception and Rationale

The concept of the rehabilitation of the Nam Tan Irrigation Project and the rationale behind it are to be commended. To bring back into use an irrigation system that had fallen into a state of morbidity as a result of long years of war and internal conflict and a lack of finance by the Lao PDR reflects to the credit of all the funding and implementing agencies. The Nam Tan scheme, if used efficiently, can become a very cost effective model for the development of modern gravity irrigation in the Lao PDR.

Building participatory development into the project design was also a strong and positive feature of project conception even if in reality the engineering and construction at times threatened to leave the farmers behind. Fortunately the need for almost two years of preparatory studies, baseline data, agricultural trials, marketing studies (unfortunately there is little evidence of these having any impact) and community development with women and farmers coupled with a contractor who was inefficient, resulting in delays in much of the physical work, meant that the human and community development integral to the project conception did not suffer extensively.

One caveat in the project conception was the failure to realise that it is one thing to get farmers to diversify from rice and grow cash crops, it is quite another to market them. Had the idea of meaningful assistance in marketing

and post harvest technology been part of the project concept, the work plan would have had to cater for these significant changes in the way farmers in the irrigation command area approach seasonal cultivation.

5.2 Work Plan

The work plan for the physical rehabilitation of the irrigation system was designed in such a way that had it proceeded as originally scheduled it would have left behind the community development component. The work plan underestimated the time needed to organise the farmers in cooperating blocks based on equitable water utilisation. UNCDF recognised the need for the primacy of community development but this was not reflected in the timelines in which the physical rehabilitation was scheduled to begin one crop season after the community development work began, which in retrospect was far too close. As explained above, it was indeed fortunate that this did not happen due to delays in pre-construction activities and to poor contractor performance. Generally speaking, however, the work plan was a reasonable one, as indicated by the success in physically rehabilitating the irrigation command area while at the same time not only organising farmers into coherent groups of water users but also women in general human development issues e.g. birth spacing and more importantly bringing them into the economic life of their families and the community as small business entrepreneurs.

5.3 Description of Responsibilities

The two Project Agreements were ambiguous with respect to execution responsibilities. Both LAO/86/008 and LAO/89/C02 showed Sayaboury Province and UNOPS as Government

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Executing Agency and Cooperating Agency respectively. While both agreements also included budgets indicating the project as essentially being implemented by UNOPS on behalf of Sayaboury Province (Annexes I and J), Agreement LAO/86/008 stated that the Project would be nationally executed, without adequately specifying what this would entail. The Aide Memoire of September 1992 reduced UNOPS's involvement but it was not until September 1994, more than two years after the Project's start, that an MOU clarified the responsibilities of the national and expatriate project management personnel.

This late change in emphasis of the role of UNOPS to a heavier budgetary responsibility for national execution created serious difficulties according to the NPD. The departure of the first CTA who had equal responsibility with the NPD changed with his successor who was designated a subordinate role under

the NPD. The new CTA, according to the NPD, did not accept this change in status and conflict resulted. This was resolved by the above mentioned MOU which abolished the post of CTA. After the resolution of these difficulties the Project did not have the benefit of any expatriate long-term assistance until six months after the MOU when an irrigation engineer, acting as the UNOPS representative on the site, arrived to assist in the technical development of the Project.

It is unfortunate that the specific responsibilities for implementation had not been resolved before the start of the project as the resulting confusion created tension within the PMU and seriously reduced implementation efficiency.

5.4 Choice of Site Equipment and Construction Materials

The project design called for the bulk of the construction work to be executed by contractors using their own equipment and local materials.

Some construction equipment was to be procured for use in the rehabilitation of tertiary canals under a force-account arrangement and the equipment used after project completion in the operation and maintenance of the irrigation scheme. The originally intended equipment was not procured after it was decided to rehabilitate the tertiary canals as part of the block development undertaken by the farmers. The equipment is not missed by the WUA, which engages local

contractors to carry out repair work. The two vibrating plate compactors, bought for block development and turned over to the WUA, have so far not been overhauled and used because no maintenance of earthworks is being carried out.

As reported above (Section 2.8) the transport equipment procured was appropriate.

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6 PROJECT RELEVANCE AND

EFFECTIVENESS 6.1 Relevance

The Project has relevance at a

number of levels. ***Lao PDR Food***

Security and Poverty Eradication

For the government of the Lao PDR working in harmony with the UNDP, and the UNCDF in the case of Nam Tan, the issues of food security, the eradication of poverty, the stability of rural populations and the provision of decent agricultural land to peasant cultivators and resettled communities remain highly relevant objectives. Good irrigation schemes make these objectives that much more attractive and relevant to all of the agencies involved in the Project.

Protection of the Environment

The Project has the added relevance in the context of preserving natural resources by offering farmers the opportunity to engage in sedentary farming rather than resort to shifting cultivation which destroys forests and importantly, in the case of irrigation schemes, the watershed. This has relevance for the Lao PDR in its attempts to expand its management of the natural environment and conservation programmes.

Principles of National Execution of UNDP Assistance

The Project is also relevant to the UNDP guiding principles of national ownership of development projects and processes and resource mobilisation to finance capital and technical assistance for Lao PDR priority projects [Doc.21]. The objectives agreed to by the Lao PDR, the UNDP and UNCDF have particular relevance also in the context of ensuring that participatory approaches are used in development programmes [Doc.22]. Nam Tan farmers and women were included from the earliest days of the project in planning and implementation.

UNDP Gender Concerns

UNDP concerns with gender have particular relevance in the context of the Project with the affirmative action instituted in reserving places for women on the Management Committee of the WUA. The large number of women involved in the VRF also addresses the need to involve women in the economic life of their families and communities. The relevance of this development process to the Project and to the role of women in the socio-economic development of the Lao PDR is self-evident.

Capacity Building for Lao PDR People

Training and capacity building in the Lao PDR in general and the Project and surrounding district and province have particular relevance for future development of all. Skills and professional knowledge gained in the management of a complex irrigation scheme bring important opportunities for Lao men and women to become professionally involved in planning and developing similar schemes in other parts of the country.

The Lao PDR has recognised the need for relevant agricultural diversification beyond its present rural GDP earnings from forest products and rice. Irrigation systems like Nam Tan provide impetus for this strategy. Crops like cotton which the World Bank has recognised for valuable import substitution can be grown with minimal water from the irrigation scheme in the dry season. Exportable crops such as maize and cassava can also be promoted in the irrigation scheme as export crops. The FAO research reveals that beans, sweet potatoes and jute which needs much water can be valuable future export crops and as such have much relevance in the drive to eradicate rural poverty and improve the national economy[Doc.23]. Irrigation provision is relevant to all of these goals.

Sustainable Livelihoods for Farming Families

The relevance of the rehabilitation of the Nam Tan irrigation scheme for the farmers and their households is multi-faceted . It has increased the well-being of them and their families in terms of income, nutrition, shelter, clothing and better education for their children. It is also relevant for their self-esteem as farmers as they grow more with the benefit of irrigation water. Training programmes are also relevant to the new knowledge they gain of crops they have not previously grown.

Rural Community Cooperation and Solidarity

Finally there is the relevance of the component of the programme that leads to high degrees of cooperation among farmers when utilising water and their wives working in entrepreneurial groups availing of loans from the VRF. Farmers now manage the water regime as cohesive groups who take joint decisions in the block organisations the Project helped them to form.

Agricultural Productivity and National Food Security

The higher productivity of the farmers completes the circle and leads back to the Lao PDR major government objective of food security and poverty eradication and the relevance of UNDP/UNCDF assistance in pursuing that objective. I

Contemporary Relevance

The Project's development objective (to contribute to food self-sufficiency and reduce environmental degradation) is as relevant today as it was at the time the Project was formulated. This is confirmed by a cursory analysis of official rice production statistics.

Based on data published by the Lao National Statistical Centre [Doc.32], Table 6.1 assesses rice production and availability in Sayaboury Province with respect to conditions in the Lao PDR as a whole and in Saravane, the province with the highest per capita rice availability of the country.

The table reproduces the data on areas planted and on production for wet season (both rainfed and irrigated), irrigated (dry season only) and upland rice and computes the average paddy yield for each type and the per-capita availability of milled rice.

The table shows that Sayaboury Province lags behind the country in per-capita rice

availability, producing annually an estimated 171 kg of milled rice per head, compared to the national average of 203 kg. It also shows that in the Province the area planted to upland rice (generally by slash and burn practices) represents 41 per cent of the rice-cropped area and produces 26 per cent of

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total annual paddy tonnage. At the national scale, upland cultivation is practised on 25 per cent of the rice-cropped area and produces only 15 per cent of the total annual harvest. For Saravane the corresponding figures are 13 and 7 per cent.

In Sayaboury Province there clearly remains a considerable need to intensify production on the scarce lowlands and to reduce the pressure on the fragile mountain environment. Irrigation of lowland rice, particularly in the wet season, is an essential means to achieve this. Dry-season rice production is in Sayaboury subject to significant temperature constraints that prevent the province from attaining the yield levels observed under the more favourable conditions of most of the rest of the country.

TABLE 6.1 Rice Production and Per Capita Availability (1997)

	Sayaboury		Lao PDR		Saravane	
Harvested Area (ha)						
Rice Total	31,800	100%	598,700	100%	43,885	100%
Wet-Season Rice	17,790	56%	421,000	70%	37,200	85%
Irrigated Rice	950	3%	26,700	4%	1,185	3%
Upland Rice	13,060	41%	151,000	25%	5,500	13%
Paddy Production (tons)						
Total	89,060	100%	1,660,000	100%	127,000	100%
Wet-Season	62,300	70%	1,300,000	79%	118,000	89%
Irrigated	3,260	4%	113,500	7%	5,800	4%
Upland	23,500	26%	243,000	15%	9,000	7%
Average Paddy Yield (tons/ha)						
Total	2.80		2.77		2.91	
Wet-Season	3.50		3.10		3.06	
Irrigated	3.43		4.25		4.22	
Upland	1.80		1.61		1.64	
Population	309,000		4,845,000		271,000	
Per Capita Availability (kg/yr)						
Paddy Produced	288		343		471	
Losses and Seed	29		34		47	
Paddy Available	259		308		424	

Milled Rice Available	171	203	280
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6.2 Effectiveness

Increasing Irrigated Area and Agricultural Production

The Project has been effective in rehabilitating the previously moribund irrigation scheme and constructing a functional water delivery system to the farmer's fields, entailing a significant increase in area irrigated in both wet and dry seasons, in paddy yield and in paddy production.

Farmer Organisation

The Project has been effective in creating strong farmer organisations to manage the irrigation scheme at the level of the farm, both in terms of operating the tertiary canals and field ditches and in maintaining their agricultural blocks to a good standard.

Technical Capacity Building

The Project has not been effective in providing the human technical capacity, both quantitatively and qualitatively, to operate the irrigation system to its full potential, especially at times of water scarcity, e.g., during the early days of the wet season and the entire dry season.

Scheme Management

The Project has not been effective in creating a management structure for the irrigation scheme that is stable, administratively and technically competent, able to convince farmers of the need for full payment of the ISF and to fully engage provincial and district resources, human, technical and financial, in the overall management of the irrigation scheme.

Controlling Shifting Cultivation

The Project has been effective in reducing the numbers of farmers who resort to shifting cultivation on the hillsides and by extension damaging the environment and degrading the watershed; this has been achieved not only by rehabilitating the irrigation scheme and increasing rice yields above subsistence levels but by ensuring that there is greater equity in water distribution.

Agricultural Extension

The Project has not been effective in setting up agricultural extension services that encourage farmers in large numbers to grow high yielding rice varieties or to grow other cash crops in large quantities during the dry season, thus as yet not realising the full potential of the irrigated command area.

Women and Revolving Funds

The Project has been effective in bringing women into the economic life of the community with the VRF and as a result strengthening the role of women in the community and also contributing to the economic well-being of their families, resulting in better nutrition for them and their children. Less effective but capable of reaching greater comprehension and application is the keeping of accounts by VRFs and the need for more flexible timing of loans.

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Women in Irrigation Management

The Project has not been effective, apart from the statutory reservation of two places on the WUA Management Committee, in promoting women in the day to day management of the irrigation scheme such as group and block leaders; this even when there are as many as 158 women-headed households within the irrigated area and women work in the fields on a daily basis during a cropping season.

Family Planning

The Project has been effective in introducing the concept of birth spacing as a family planning method with women in the villages, thus affording women the opportunity to get involved in business activities while also contributing to the farming cycle on the family land and bringing up their children.

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7 CRITICAL ISSUES

7.1 Irrigation System Management Structure

The organisational structure of the project irrigation system is unnecessarily complex. There appear to be a bewildering number of institutions and individuals connected in one way or another in the management of the provision of water to farmers. These are blocks, zones, village chiefs, DATs, district and provincial officials, hired technical staff and for the present the project staff. This means that around 100 people are involved in the management of irrigation water provision.

The intended organisational outcome when the scheme is finally handed over to the community is one in which the irrigation system in its entirety is the responsibility of the WUA and will be managed on a day to day basis by the elected Management Committee of the WUA with assistance from technical staff hired and paid by the WUA and some other technical and financial assistance from provincial and district authorities. With the relative complexity of the diversion and conveyance system it is asking farmers or their representatives in the case of the Management Committee to operate and

maintain technology which requires a certain degree of technical knowledge to run effectively. At the time of this evaluation farmers were expressing considerable doubt about their ability to undertake complete responsibility for the operation of the weir, canals and structures above the level of the tertiary system.

What has to borne in mind is that the Nam Tan irrigation scheme had already failed to a considerable degree before the present Project was devised to rehabilitate the irrigation infrastructure. The USAiD funded water control structures are largely still in place and regarded as sound by civil engineering standards. Yet the provision and management of water to the farmers had by the mid 1980s degraded to the point where yields were dropping below subsistence levels for the families farming in the Nam Tan command area. It is certainly true that the farmers had no organisation capable of operating and maintaining the irrigation system. They appear to have been operating often quite independently of each other and water was removed from the system without regard to the general good of the community. Even in the present situation over 30 per cent of the farmers will not pay the ISF. It is undoubtedly the case that the Project has strengthened the communities by the formation of the WUA to the point where the majority do cooperate and understand the importance of this as far as good provision of irrigation is concerned. But to go from the simple principles of good community organisation to operating and maintaining a relatively large complex water regime is quite another matter. The president of the Management Committee at a meeting with the Mission was quite adamant that as of the present time he still needed back up from the District for technical assistance and the Province for money when large repairs were needed and the ISF could not meet these. Two alternative models of the management of the irrigation system present themselves. Both separate the provider of the water from the user as is the case in the provision of public utilities in most modern and many developing economies.

In the first case the WUA would still have the right to full utilisation of the entire irrigation system but as a company will hire professionals to operate and maintain the system. Elected members of the Management Committee would be replaced by persons with management and financial planning, administrative, engineering and other technical skills relevant to the management of a

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large irrigation system. Seasonal work and financial plans could be presented to the WUA and the ISF negotiated accordingly. The WUA would still be

responsible for collecting the ISF. Indeed the Management Committee could still be elected by the members of the WUA but would act as a Board of Directors rather than an implementing institution.

In the second case the total management of the Nam Tan irrigation scheme, apart from the blocks and the tertiary canals, would be handed over to an appropriate government agency, probably the provincial irrigation service. The members of the Mission have seen this system operate to good effect in Vietnam. Prior to the beginning of each agricultural season the farmers elect a representative, in this case the block leader, who negotiates with the irrigation system management the delivery of water and the amount of ISF his members will pay, within parameters set by the provincial authorities, if the water is delivered in the right quantities and at the time it is needed.

The positive outcome of both these scenarios is that farmers or their representatives do not have to worry about the technical aspects of water provision and can get on with the business of growing crops, which is what they are best at.

7.2 Sustainability of Irrigation Infrastructure

It is perhaps a truism to state that the irrigation infrastructure is only as good as the agricultural production and the value realised from it, but it was not clear to the Mission that this is fully understood by all concerned with the scheme. Since 1994, extension efforts, albeit limited, have been made in the command area, yet the amount of high yielding rice grown in the wet season and agricultural diversification in the dry season is minimal. Rice cultivation practices remain stubbornly local with random planting instead of in rows uniformly spaced which lead to optimal density and higher yields and make weeding by a rotary hoe a simple and efficient task. It is true that during 1998 wet season rice yields were low and the Province has instructed farmers to grow only rice in the dry season but previous dry season cropping patterns suggest farmers are either not accepting extension messages and training or there are other problems in acceptance of alternative crops that do not require large amounts of water.

The 30-ha Centre which was supposed to be the fulcrum of agricultural extension in the Project appears moribund. One of its objectives was to develop double rice cropping and agricultural diversification. Another was to take the district agricultural extension techniques and messages into the villages. Farmers occasionally go to the Centre for in-house training but claim there are no extension workers coming out of the Centre to the farms. The Centre receives water every dry season at no cost and grows rice, part of which goes to the government, but its intended role as the focal point of agricultural improvement, especially as far as on-farm extension work is concerned, is virtually non-existent. The Phiang District agricultural extension service, on the other hand, is

putting in place a network of model farmers. The number of such farmers is presently limited to 15 for the district, five of which are in villages of the Nam Tan scheme. It is hoped that additional resources will eventually allow to increase the network's density to three to five model farmers per village. A further problem is a lack of knowledge about post harvest technology for cash crops. At meetings with farmers the Mission was frequently informed that farmers could not grow large quantities of the latter since they had no means of storing them and in the case of water melons,

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which grow well in the area, handling and transporting them. Furthermore they claimed that they do not know where the markets are outside the area. Women working in a cucumber field informed that they knew absolutely nothing about preserving crops such as cucumbers and cabbages and therefore only grew amounts that corresponded to what they would eat and what the local market could stand in the dry season. Any crop which does go out of the area is bought by traders to whose tender mercy the farmer is subjected. One farmer reported that the trader even brings men who know how to handle the water melons and store them in the truck.

This failure to develop significant quantities of cash crops, both as a result of poor extension services and a lack of knowledge of post harvest technology, represents a marked underutilisation of the irrigated areas and as such contributes to a missed economic opportunity. Farmers who not only get good rice crops from the irrigation provision, but also cash crops they are confident of growing in large quantities because of good marketing and storage opportunities, are more likely to contribute willingly to realistic financial funds needed to sustain the irrigation system.

The WUA Management Committee, who are all farmers when not attending to the affairs of the irrigation scheme, also stressed the failure to adopt cash crops in considerable quantities. Marketing of alternative crops is a major problem they stated. The President had discovered on a training visit to Chiang Mai in Northern Thailand that the Chamber of Commerce there would buy cotton and maize if the Nam Tan farmers grew them in sufficient quantity. But investing in these crops, which are fully capable of being grown in Nam Tan with much less water than rice, will only occur if there is transport to take these crops out of the area and the contract to supply them is firm and payment is assured. It would also require that the government assists the farmers in dealing with custom and tariff restrictions. It must be noted that the upgrading of the PaklayKanthao road will improve communication with Thailand.

Finally as far as sustainability is concerned there is the problem of the government, at least for the time being, having to subsidise the irrigation scheme. If the ISF, set by the Province, is only roughly half (the case at the time of the Mission visit) what is really required to operate and maintain the system, Nam Tan command area can only be sustained at the expense of other budgetary needs of the Province or the District. In a country as poor as the Lao PDR this is putting considerable strain on already scarce financial resources. If farmers, however, become more productive through increased rice yields, marketable cash crops grown in the dry season and off farm activities made possible through capital accumulation, they will in all probability be willing to pay an ISF which will fully sustain the irrigation scheme in which so much has been invested on their behalf.

7.3 30-ha Centre

The failure of the Centre to deliver adequate and intensive on-farm agricultural extension services as required to improve the productivity of the command area's farmers (Section 7.2) is not its only feature inhibiting the realisation of the Nam Tan scheme's potential. The Centre contributes to the scheme's inefficient use in two more ways, namely by:

- not providing technical support to the management of the scheme;
- being allowed to irrigate every dry season without paying ISF.

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The Centre's was expected to perform essential tasks such as: up-dating and analysis of agroclimatic data; flow measurements on the Nam Tan and on the natural drains flowing through the command area; measurement of the scheme's irrigation efficiencies; establishment of crop water requirements; and post-harvest assessment of the results of cropping seasons [Doc.1]. It is not providing these services. Without them the effect of the limited amount of available irrigation water cannot be maximised.

Concentrating on rice production, the Centre enjoys water provision all the year round without paying ISF, unlike the farmers who generally don't receive irrigation water in every dry season and whose payment of ISF is a fundamental prerequisite for the scheme's sustainability.

Supplying the Centre with water in every dry season is incompatible with the method of subdividing the command area into sectors of contiguous blocks (say 4 sectors of approximately 500 ha each) that receive water in an annual rotation. Compared to the current practice of irrigating here and there over the entire command area, this method would result in a significant réduction of conveyance and distribution losses and a corresponding increase in irrigable land. It would require the Centre to be part of one of the sectors supplied in

the dry season every fourth year. (The cycle could be reduced to three years if instead of rice less water demanding dryseason crops were grown and the annually irrigated sectors were increased to some 700 ha.)

Dry-season irrigation of the Centre's land also clearly benefits the farmers lucky enough to have land along the 2 km of secondary canal leading from the LMC to the Centre. They use the water (without their land being scheduled for dry-season irrigation and therefore presumably without paying ISF) to grow vegetables and water melons. This practice and the visual impact of the 30ha Centre's lush farming area in the midst of a difficult agricultural existence must appear inequitable to many farmers who are struggling to make a living from a small plot of dry season land irrigated one year in four, doing little to motivate them to pay their ISF. For the landless who are scattered around the command area and in the foothills nearby the envy must be extreme.

7.4 Resettlement Problems

In terms of providing land for refugees displaced by the Second Indochina War in the 1960s and 70s and now assisted in their return from Thailand by UNHCR, there is resettlement in villages located in the irrigation command area but in very few cases is irrigated land available for them. This is also true of families who are encouraged to come down from the mountains to resettle in villages in the Nam Tan area. There is now so much pressure on irrigated land as a result of resettlement programmes that future strains on the entire system may emerge at some future date.

In interviews by the Mission in Hua Na and Phone Xieng villages, where 46 families have been resettled since 1994, the household heads claimed they were given land outside the perimeter but they had to resort to shifting cultivation to grow rice and in some cases maize. The average amount of land they can cultivate is about one third of a hectare because, they claimed, it was difficult to clear and even more difficult to weed the crop and the paddy yield of a traditional rice they plant is only 1.2 tons/ha. This does cause degradation of the environment as they can only get this yield for two years until the soil is so depleted they have to slash and burn a new area.

This extremely arduous upland farming, they said, only met their rice needs for two months of the year. When asked about the opportunity for off farm employment they reported that the only work

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was on the land of farmers in the irrigated command area. A typical wet season routine would be for them to clear an area of trees and scrub and plant their own upland rice, go into the irrigated area and prepare land and plant rice for the farmer who hired them, harvest their upland rice which matures some weeks before irrigated

varieties and return once more to the irrigated area to bring in and process the crops there. For this tenuous seasonal labour in the irrigated area they are paid 3,000 kip per day plus a lunch; government daily rates for agricultural labour are 5,000 kip per day plus 1,000 kip allowance if working away from the home area.

In the dry season they go to the mountains to collect forest products like rattan, bamboo shoots and a leaf used for making a local herbal tea. Previously, they claimed, they could hunt with locally made guns but the police took these away as laws on environmental and wildlife protection were applied. For eight months of the year the majority of these families rely on these upland forest products to survive. In these villages there was strong visual evidence of poverty not seen by the Mission in villages where irrigated land was available. Children looked malnourished, frequently had no skirts or pants, had scabies and other skin diseases and looked listless. In Phone Xieng villagers claimed they were three kilometres from the health centre at Naxing and the only other health facility in the area was seven kilometres away at Na Bouam. Those children who do go on to high school have to walk four kilometres each day.

In both villages families claimed there was lowland cultivable land outside the irrigated area which could be cleared mechanically of scrub and trees and farmed regularly in the wet season. There was also scrub land within the irrigated area which could be cleared. If they were given this land when it had been properly cleared their lives would be much better but stressed the land would have to be cleared using machinery. When they clear it using slash and burn techniques the scrub and trees regrow very quickly.

These resettled families will continue to be a critical issue in the project area until some effort is made to give them employment opportunities and accessible land which they can properly farm during the wet season. This will have obvious benefits in the watershed area which they will have less need to exploit for a living.

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8 Findings and Recommendations

This chapter assesses the degree to which the Project has achieved its immediate and development objectives and summarises the Mission's findings and recommendations concerning each of the following areas:

- project implementation management;
- scheme rehabilitation;
- scheme management;
- agricultural development;
- community development;

It concludes with identifying a set of priority actions aimed at attaining the Nam Tan irrigation scheme's sustainability.

8.1 Achievement of Immediate

Objectives The Project

had the Immediate

Objectives:

- to increase the beneficiary group's organisational, management and production capacity;
- to modernise the irrigation infrastructure of the Nam Tan Scheme, increase the irrigated area and improve irrigation performance;
- to strengthen the institutional capacity of the provincial and district services providing assistance to the rural users groups.

The Immediate Objectives of the Project have been achieved to varying degrees.

The organisational capacity of the beneficiary groups was increased by block and zone formation of the farmers and the organisation of village women into managers and recipients of revolving funds. Management objectives were achieved with the formation of the WUA and election of a Management Committee but its capability to manage the irrigation scheme needs much improvement, especially in the collection of ISF, financial administration and the organisation of the operation and maintenance of the main infrastructure. Production capacity has increased as a result of the reliable availability of irrigation water but farmers remain largely committed to lower yielding local rice varieties and have not taken up agricultural diversification to any significant degree.

A well designed earlier irrigation scheme built with support from USAID has been successfully rehabilitated. The reliably irrigable area in both the wet and the dry season has been substantially increased, largely as the result of the rehabilitated irrigation scheme providing the physical means for the better management of water distribution. At the level of the blocks, irrigation performance has improved substantially but at the level of the main and secondary canals the potential for good operation, especially in the dry season, has yet to be realised.

While the 30-ha Centre has been rehabilitated and training has been provided for many provincial and district technical staff, little achievement is observable in the provision of support services to the farmers in the command area, resulting in the conclusion that the Immediate Objective of strengthening the institutional capacity of these support services has not been achieved.

8.2 Achievement of Development Objectives

As stated in the LAO/89/C02 Project Agreement, "the Project aimed at ensuring food self-sufficiency in Sayaboury Province in the long term and limiting environmental degradation caused in Laos by hillside shifting cultivation."

The above development objective as framed is not rigorous but if one assumes that what is really meant is contributing to (rather than "ensuring") provincial food self-sufficiency then there has been some achievement towards attaining this objective. Rice yields have increased, resulting in farmers obtaining surpluses. Although there is no information on how much of the surplus reaches provincial markets the Mission estimates, based on the reported production increase, that it could be of the order of 2,700 tons of paddy per year (Section 4.3). The potential clearly exists for the Nam Tan irrigation scheme to produce a considerably greater marketable surplus than is presently attained.

The Development Objective of reducing the number of farmers resorting to shifting cultivation has been achieved in considerable degree. This is overwhelmingly the result of not only better provision of irrigation water but greater equity in its distribution. A small number of farmers on the periphery of the irrigation scheme and landless families, mainly refugees, unfortunately have no alternative but to resort to slash and burn methods of cultivation.

8.3 Project Implementation Management

Overall the implementation of the Project was carried out satisfactorily. But there were negative aspects to implementation management that were predominantly the result of the unplanned shift in execution responsibilities in the initial stages of the Project. This shift, the rationale for which is not documented, was not well dealt with and the resulting confusion led to serious conflict between national and expatriate project personnel and a considerable waste of TA resources.

Other than the Aide Memoire of September 1992 that reduced the involvement of UNOPS and the MOU of September 1994 restructuring the PMU and abolishing the post of CTA, many decisions affecting the Project appear to have been taken on an ad hoc basis between UNDP/UNCDF and the PMU. It is particularly surprising that the Inception Report was never formally approved or rejected as the basis for executing the Project (Section 2.1). Many of the changes to the project design, e.g. the change in utilisation of the village micro-project fund to a revolving fund for women, are either poorly documented and in some cases not documented at all, e.g. the failures to set up health monitoring of children and to activate the agricultural credit fund. Thus much of what might have been useful information, not only to reconstitute the project history and evaluate the Project but also to design future projects, has been lost.

The Mission recommends:

- ***That when there is more than one agency involved in assisting a project, e.g. UNDP/UNCDF/Netherlands Government and the Lao PDR Government in the case of Nam Tan, execution modalities be unambiguously defined in the Project Agreements and that great attention be paid to the careful delineation of responsibilities of the personnel***

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implementing the project and care be taken before the project begins to ascertain fully that all staff very clearly understand these-responsibilities.

- ***That changes to the project design be properly recorded for the benefit of both the parties concerned with the Project's implementation and those planning similar projects in the future.***

8.4 Scheme Rehabilitation

Rehabilitation of the main water conveyance and distribution system was successfully achieved. The Project adequately overcame the difficulties caused by an under-performing international contractor by engaging local contractors. The farmers created an effective system of water distribution at the tertiary canal and field level with their own labour. Although not originally planned, the construction of small weirs replacing earth dams traditionally built by farmers on natural drains within the command area have significantly increased the area that can be reliably irrigated.

Not originally planned was also the replacement of metal culverts under the main and secondary canals. The Project replaced 18 such culverts with concrete structures after three of them collapsed before the start of the rehabilitation work. Not replaced were 26 existing metal culverts. Installed in the early 1970s, they have reached the end of their useful life and can be expected to fail any day, disrupting irrigation and their replacement straining the WUA's financial resources.

The rehabilitation restored the original scheme's water control structures of the main and secondary canals. These structures, while clearly of good quality and functional, are relatively complex to operate because they allow the water level in the canals to vary, which results in the flow through a given gate opening of the canal off takes to vary also. The difficulty of translating these conditions into simple effective operating rules leads to the waste of irrigation water and seriously hampers the optimal distribution of the available water, as required to further increase the reliably irrigable area in both wet and dry seasons.

The Mission recommends:

- ***That a programme of systematic replacement of the remaining old metal culverts under main and secondary canals with reinforced concrete pipe be planned and implemented***
- ***That the operation of main and secondary canal structures be thoroughly assessed, appropriate operating rules be developed and, if and where found necessary, these canals be equipped with fixed-height weirs to simplify the operation of the off-take gates.***

8.5 Scheme Management

The organisation of the WUA is very complex and entails a large number of people involved in the provision of water to the farmers. The WUA also holds elections for Management Committee office bearers every two years, potentially resulting in full-time officials changing too often for the institutional retention of skills and knowledge gained as a result of managing the operation and maintenance of the irrigation scheme.

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ISF collection remains a serious problem with only between 60 and 70 per cent of the water users ever paying their fee to the block they are part of. This has serious consequences for the operation and maintenance of the scheme and, compounded by the provincial government refusing to allow the WUA Management Committee to impose a realistic ISF, offers a dim prognosis for the irrigation scheme ever being self sustaining.

Notwithstanding the provincial order setting the ISF at a lower rate than is necessary for the good operation and maintenance of the irrigation scheme, farmers do not as yet understand 'the concept of planned preventive maintenance and as a result many of them do not see the need to pay a fee which would allow the Management Committee of the WUA to develop longer term plans for the future of the irrigation scheme.

The main canals are still damaged by buffaloes using them for drinking water and bathing (the project formulation claimed this was also true of elephants but the Mission found no evidence of this) although there are WUA regulations banning this practice. The canals are also used by village families in enormous numbers for bathing and washing clothes and in some cases for drinking water. The health risk in this utilisation of the canal water is self-evident.

The 30-ha Centre is not providing the expected technical support necessary for the effective management of the irrigation scheme. The only entity with the potential to

provide this support is the provincial irrigation division, which is well aware of its obligation and responsibility to ensure the continued well-being of the Nam Tan irrigation scheme but seems to need encouragement to assume this on a regular working basis.

The participatory methodology designed and utilised for the block formation was well formulated and appropriate to the needs of the farmers. Its implementation over a period of three years ensured that problems and lessons learned could be utilised in gradual implementation of the block as the basic unit of water usage in the command area. The end result is blocks within which irrigation water is equitably distributed and whose canals and structures are well maintained by the farmers.

The arrangement for keeping the weir clear of silt and weeding the main canal by labour brigades raised by the village chiefs is effective as far as these tasks go but inadequate to prevent the development of major erosion damage to the canal slopes. The only means to avoid such damage is a rigorously applied programme of routine maintenance.

It seems inequitable that families who have no land in the irrigation command area but live in villages in this location are required to join the **labour brigades clearing the weir and weeding canal embankments.**

The Mission recommends:

- ***That the constitution of the WUA be amended to the effect that the Management Committee become a Board of Directors and that professionally trained staff (either hired by the WUA or supplied by the Province) be appointed to draw up seasonal operation, maintenance and financial plans and to operate and maintain the irrigation scheme down to the tertiary level.***

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- ***That the Board of Directors be responsible to the membership of the WUA for the smooth running and sustainability of the irrigation scheme under the new management of fully professional staff.***
- ***That the provincial irrigation service be assisted in acquiring the capacity to supply the technical services necessary for the optimal planning of cropping and water delivery schedules and the efficient functioning of the scheme's water conveyance and distribution facilities.***
- ***That landless families, both new (refugees and people resettled from the mountains) and indigenous to the villages be offered to be trained for performing effective routine maintenance of the irrigation scheme and be paid by the WUA from the ISF for this employment. This will not only provide very poor families with some form of regular income but will further prevent them from resorting to shifting cultivation and***

potentially destroying the watershed on which the irrigation scheme depends.

- ***That the WAU be authorised to set the ISF as required to cover the entire cost of both operating the scheme and ensuring its sustainability through an appropriate maintenance and replacement programme.***
- ***That the method of billing every farmer individually for the ISF be discontinued and the ISF be levied on the block which would receive a bill for all the hectares in the area it commands and that the block leaders have the responsibility for collection of the ISF apportioned to farmers on a pro rata basis. This is less difficult administratively for the WUA Management Committee and will almost certainly have the effect of greater peer pressure being applied to farmers in the block who refuse to pay.***

8.6 Agricultural Development

The agricultural extension services provided by the 30-ha Centre leave much to be desired. While training was conducted inside the Centre and other agricultural tasks were carried out to benefit the Project, e.g. seed multiplication, the staff of the Centre seldom ventured outside its gates and into the fields of farmers in the irrigation command area. This appears to be borne out by the small number of farmers who implement lessons they received in the Centre on their farms. Centre staff appear to think that if the farmers understand the lesson in the classroom that is sufficient to ensure its eventual implementation.

Farmers appear to have a subsistence mentality as far as agricultural production is concerned. It is possible they have off farm economic opportunities but as cultivators who are beneficiaries of a large irrigation scheme there is little evidence to date that higher rice yields to market surpluses and diversification into other cash crops are a serious priority.

The provincial agricultural division has identified four high yielding rice varieties suitable to Sayaboury Province and is using on-farm training and back-up for model farmers to cultivate these with the intention of bringing other local farmers round to the idea of switching to more productive rice varieties. At present, the Province lacks the means to implement this extension programme with a sufficiently high density of model farmers.

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The Mission recommends:

- ***That agricultural extension services based on on farm methodologies be implemented and monitored with the full participation of farmers***

- *That full use be made of those extension services being offered by provincial and district agricultural institutions and that these institutions be supported in intensifying on farm extension activities in the Nam Tan command area.*
- *That an expert proficient in the marketing of cash crops and post harvest technologies (including storage, handling, transportation) assist the Nam Tan command area's farmers in improving the poor record to diversify into cash crops that are suitable for the area.*

8.7 Community Development

The participatory methodology developed and utilised with farmers to ensure effective block formation was very successful.

The Village Revolving Fund is an excellent credit scheme. It has brought women firmly into the economic life of their communities and families and made them stronger as a result. The benefits to them and their families are tangible and the practical educational benefits to women in calculating profit and loss, making economic decisions on a day to day basis and planning income generating activities is plainly evident. Excellent repayment rates suggest a high degree of commitment to the fund not only as recipients of credit but also as responsible members of the community. There is still a need for training in good bookkeeping and revolving the credit on a more flexible basis but in essence the system can only improve.

While the VRF brings women into business activities and as a result strengthens their position in their communities, there is not a single woman leader in the 92 irrigation blocks or eight zones (there is no physical reason why women cannot fulfil these jobs) although 158 women headed households are within the command area of the Project. There are two positions on the Management Committee of the WUA reserved for women, one from the RMC and one from the LMC; this suggests that the position of women in the Project is such that imposition of the statutory requirement was the only way women would achieve some degree of representation.

The Mission recommends:

- *That the VRF be strengthened and expanded and that this be assisted by the appointment of a credit specialist who provides training in all aspects of running a revolving fund and helps the village committees and women members, especially from poorer families who are afraid of borrowing, to understand and implement the necessary changes, including greater flexibility in credit provision.*
- *That VRFs at this time not become part of the operation of the UNDP*

Microfinance Project as this may undermine the solidarity and success built up by the women during the past three years.

- ***That community organisation efforts be seriously made to convince farmers and women that women from families farming in the irrigated command area are capable of serving in***

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the capacity of representatives at all levels of the WUA and not only in the two positions reserved for them on the Management Committee of the WUA.

8.8 Priority Actions

In the Mission's view, as a minimum the following actions, listed essentially in order of priority, need to be taken as a matter of urgency to allow the Nam Tam scheme to achieve its potential and become sustainable. Most of the recommendations in the preceding sections would advantageously be implemented at the same time, as an integral part or complement of one or the other of the proposed actions. The priority actions are:

1. Amend the constitution of the WUA to the effect that the Management Committee becomes a Board of Directors representing the interests of the farmers and supervising the exercise of the planning, operation and maintenance functions related to the use of the infrastructure by professionals in the employ of the WAU or of Sayaboury Province.
2. Strengthen the capacity of the Sayaboury Irrigation Section
 - to provide the technical services necessary to operate the irrigation scheme with a view to maximising the return from the investment in the irrigation infrastructure (up-dating and analysis of agro-climatic data, flow measurements on the Nam Tan and on the natural drains flowing through the command area, measurement of the scheme's irrigation efficiencies, establishment of crop water requirements, post-harvest assessment of the results of cropping seasons, etc.);
 - to assist the WUA in the seasonal planning of cropping and water delivery schedules, including the establishment of a rational annual dry-season rotation of sectors of contiguous irrigation blocks.
3. Authorise the WAU to set the ISF as required to ensure the adequate functioning and the sustainability of the irrigation infrastructure.
4. Establish the irrigation block (or an appropriate set of contiguous blocks) as the contractual entity receiving irrigation water in return for payment of ISF (rather than the individual farmer as is currently the case).
5. Strengthen the capacity of the provincial and district agricultural extension

services to effectively promote in the Nam Tan command area the intensification of rice production and the growing of alternative dry-season crops (provided the markets for such crops have been identified).

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9 Lessons Learned

As with any endeavour as complex as a development project, much can be learned from the history of the Nam Tan Irrigation Rehabilitation Project. Among the many lessons learned (and embodied in the findings and recommendations of the preceding chapter), two are overarching. They stem from the analysis of the way in which the development partners defined their cooperation and supervised the execution of the Project.

9.1 Concerning the Definition of Cooperation Modalities

The modalities of cooperation among the development partners, the Project's management structure and the responsibilities of key project personnel should be clearly defined at the time of signature of the Project Agreements, and the terms of the Agreements scrupulously adhered to, to avoid confusion, conflict and the waste of project resources.

The Nam Tan Project was handicapped from the outset by the apparently differing views of UNCDF and UNDP about implementation responsibilities. The Project Agreements of both agencies assigned an important role to UNOPS, while UNDP's agreement stated in addition that the Project would be nationally executed but did not adequately specify what this would entail. The Project's initial months were indeed marked by a gradual shift into national execution, which led to the reduction of UNOPS's responsibilities and eventually, 30 months after the Project had started, to the abolition of the CTA position.

The resulting confusing conditions led to serious conflicts between key national and TA staff and hampered the mobilisation of TA personnel, particularly of the CTA when the post still existed. They are the fundamental cause of the generally disappointing impact of the TA delivered and, consequently, have contributed significantly to the Project not reaching all its objectives.

9.2 Concerning the Supervision of Project Execution

The development partners should apply a minimum of rigour in the supervision of the Project's activities to ensure that these activities remain

directed toward the achievement of the immediate and development objectives, to formally agree (where applicable) upon changes to these activities and objectives, and to make certain each participating entity lives up to its obligations.

The implementation of the Nam Tan Project featured a number of instances where the supervision mechanism at the highest level, the TPR representing the Consultative Committee, was not effective in ensuring that activities towards the attainment of project objectives stayed on track. While the TPR meetings were held regularly, their minutes seldom spelled out clearly the decisions taken and did not always record the elimination of planned project activities and the addition of unplanned ones. There is no evidence of the Inception Report ever having been the subject of a review and of whether the reorientation of the Project it proposed was approved. The planned mid-term evaluation did not take place. These omissions have contributed to the situation where a well-designed project to rehabilitate a first-rate irrigation scheme produced a result that is not

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sustainable. The two key factors for the lack of sustainability are the technical and management weakness of the WUA and the non-performance of the 30-ha Centre. The TPR clearly should have treated the calls for the strengthening of the WUA with greater circumspection. A very cursory institutional analysis would have revealed that the WAU Management Committee, composed of elected farmers, provides an inadequate basis for the strengthening to have any effect.

The TPR failed to Make sure the 30-ha Centre performed the two crucial functions it was assigned by the Project Agreements: 1) providing the technical support without which the effective use of the rehabilitated irrigation infrastructure is impossible; and 2) providing the extension services necessary to intensify rice production and to shift into alternative dry-season crops, as required by the farmers to generate marketable surpluses and the money to pay the ISF.