

**CHAPTER VII.
ENVIRONMENTAL MANAGEMENT AND
MONITORING PLAN**



CHAPTER VII. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The Integrated Agriculture Development Plan and Initial Environmental Examinations (IEE) has demonstrated the importance of sound planning, high standard of project implementation and on-going sustainable development for a better, prosperous East Timor. There is little that can be done to correct soil erosion problem. However, steps can be taken to help *correct continuing soil erosion problem, damage to crops by insect, inappropriate farming system*, which was planned during Indonesian times. It is extremely important that these recommended measure be applied whether any of the other activities go ahead or not. If importance of these management plans is not recognized, there will be a very weak base for future development.

7.1 Environmental Management Plan

The negative impacts which have occurred and which might arise from Integrated Agriculture Development Project should be mitigated- i.e. measure should be planned to reduce or to eliminate their effects- and the positive impacts should be enhanced. The approach in formulating such measures is based on three considerations; technical applicability, economic feasibility, and institutional acceptability.

7.1.1 Proposed Environmental Management Plan for East Timor

An attempt has been made to construct a broad environmental management plan for East Timor. Some of the major environmental problems, recommended management plan and predicted benefits are briefly discussed as follows;

Proposed Management Plan for East Timor

Major Sets of Environmental Problems	Recommended Management Plan	Predicted Benefits
1. Low and declining economic and social welfare	<ol style="list-style-type: none">1. Diversity the farming system2. Introduce integrated pest control3. Improved roads and bridges	<ol style="list-style-type: none">1. Increase tree crop, coffee and crop production, reduce damage from pest and diseases2. Same as above management3. Improve all weather access to markets and public facilities
2. Environmental degradation of catchment and waterways	<ol style="list-style-type: none">1. Conservation of major watershed, waterways, and river from shifting cultivation, logging and land cleaning activities2. Create buffer zone around conservation and protected	<ol style="list-style-type: none">1. Improve environmental protection watershed, streams, reduce flood and flush floods2. Improve environmental protection of conservation and protected resources

Major Sets of Environmental Problems	Recommended Management Plan	Predicted Benefits
	areas 3. Create woodlots for fuel-wood diversity 4. Implement sound vegetative watershed management and soil conservation practices	3. Preserve the vegetation diversity and improve welfare of people 4. Reduce soil erosion and improve water conservation
3. Increase Environmental Hazards	1. Implement flood and flush protection measures 2. Improve public health and sanitation	1. Reduce flood and flush flood 2. Reduce environmental health hazards and improved quality of surface and groundwater

Many adverse environmental impacts on soil and water resources that have been created can be reduced through improved physical planning. Specific management plan, which will contribute to, improved planning and sustainable use of the vegetation, soil and water resources are shown below;

7.1.2 Important Components of Environmental Management Plan

1) Protect of Major Watersheds

- Protect watersheds, waterways and streams from shifting cultivation, logging and land clearing activities
- Create buffer zones
- Create woodlots
- Implement improved soil and water conservation
- Improved soil and water conservation
- Vegetative management
 - Woodlots / social agro-forestry
 - Buffer zone around conservation and protected areas
 - Participatory approach
 - Use of legumes as improved soil cover

2) Diversification of Farming System

The inherent characteristics of East Timor is not suitable for sustained production of food without inputs of capital, labor, fertilizers and technical skills which are beyond the means of people. It is therefore recommended that farmer based initiative, such as development of paddy, tree crops and food crops be officially encouraged along with the improvement of in the cropping and soil management technologies. An integrated system of vegetables, fruit trees, herbs, tree crops, fuel wood is suggested where crop rotation, use of leguminous plants and continuous soil cover is maintained. A proper land use planning for whole of East Timor is necessary.

- Fruit trees and tree crop plantation around settlement
- Small dams for irrigated paddy and garden crops
- Expansion of paddy areas
- Food support subsidies
- Coffee and other fruit seedlings availability
- Tree crop support system and extension agents
- Improvement of marketing systems

3) Improvement of the Infrastructure

Many of the pressing problems of access to markets and road communications within East Timor are the result of poor road alignment and the inappropriate design. Regular flush flood and land slips damage the bridges which require continuous expensive maintenance.

4) Environmental Health

Three principal management measures are recommended to improve public health, namely;

- Improvements in domestic sanitation facilities and water treatment to reduce bacterial contamination of water supplies
- Control of insect/water borne disease vector through the use of appropriate spraying techniques integrated with improved environmental management and increased public awareness of sources and control of disease.
- Strengthening intergovernmental cooperation and provision of environmental health support.

7.2 Environmental Monitoring Plan

A monitoring plan should be established to measure the effectiveness of the proposed mitigation in improving the bio-physical, economic and social performance of the project. The major factors which need to be monitored are as follows; Further explanation are necessary for indicators and parameters; eg. water quality are divided into two indicators groups, physical and chemical properties.

Parameters to be monitored

- | | |
|---------------------------|------------------------|
| - Water quality | - Livestock |
| - Climate and hydrology | - Pests |
| - Soil and land use | - Socio-economics |
| - Forestry and vegetation | - Environmental health |
| - Fishery | |

CHAPTER VIII. IMPLEMENTATION PROGRAMME



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8.1 Implementing Organization

8.1.1 Executing Body

Since the specific feature of the development plan is, generally, to cover various components, Ministry of Agriculture and Fisheries (MAF) could not solely handle all the components including implementation, management, and operation and maintenance (O&M). In the scope of development planning, MAF will play a vital role. On the other hand, construction/rehabilitation and supervision of irrigation facilities and structures will be under Ministry of Water and Public Works (MWPW), monitoring for process and/or results of whole of projects should be under Ministry of Economy Affairs and Planning (MEAP). Participation of Donors and NGOs, furthermore, is needed in each stage, namely planning, designing, implementation, operation and maintenance.

In the scope of forestry development plan, the Forestry division of MAF will play a vital role, and the executing body will be the District Agriculture and Forestry Office in each district. However a few official is disposed in the District Agriculture and Forestry Office, the plenty of correspondence will not expected. Therefore, the same as Agricultural sector in each stage, participation of Donors, especially NGOs are needed too

Likewise, many of the proposed fishery projects also expect involvement of the district fishery officers (DFO) in the course of some technical development. However, since number of them is rather limited, with an officer per coastal district, some of the human resource required will have to depend on aid organizations for the time being.

It is, therefore, planned to establish a project implementing organizations at three levels of the government, namely, Project Executive Committee (PEC), Central Project Management Office (CPMO) and District Project Management Office (DPMO). In these implementing organizations, MAF should be mainly in charge of supervising progress of project implementation.

The composition of these organizations and their respective responsibilities are as follows (refer to Figure 8.1-1):

Project Executive Committee (PEC)

This is consists of three ministry, namely MAF, MWPW and MEAP. Their main responsibilities are as follows;

- To formulate a basic policy on project implementation
- To provide directives to the Central Project Management Office.
- To resolve policy issues

- To allocate budget to each project sector
- To coordinate to Donors and NGOs

Central Project Management Office (CPMO)

This is consists of six divisions of MAF, namely Agriculture and Rural Extension, Irrigation, Livestock, Forestry, Fishery and Geography. Their main responsibilities are as follows;

- To coordinate project activities and to approve annual working plan with budget allocation
- To manage progress of project implementation and to report the result to PEC
- To coordinate to Donors and NGOs

District Project Management Office (DPMO)

This is consists of thirteen (13) district agriculture offices situated under CPMO. Their main responsibilities are as follows;

- To perform the current annual working program
- To prepare the successive annual working program with budget estimation and submit it to CPMO
- To monitor progress or project implementation and to report the result as well as problems /issues to CPMO
- To coordinate to Donors and NGOs

Donors and NGOs

Donors and NGOs participate in each development stage. They, East Timor side (PECC, CPMO and DPMO) and Donors/NGOs trade views and information on development programme.

According to the staff increasing plan of MAF, total number of the MAF staff will be increased in 160 staff by the end of 2002 fiscal year, while present staff is 126 in total. And, 1.9 million of administration costs¹, which covers wages & salaries, goods & services, capital, etc. is appropriated for the MAF. Current station of 126 staff is of 35 staff at the central government and remaining of 91 staff is at district level (13 districts), respectively. However, it will be observed that total numbers of staff at district level are absolutely shortage. In order to cope with these shortages of necessary staff, effective recruitment of the government employees during Indonesia time, ETAVFFA's staff², NGOs staff, etc. is considered to be proper procedures to solve the problems in East Timor.

Related divisions to implement the project at distinct level are agriculture, livestock, forestry, fishery, and agricultural & rural extension. These divisions will need at least two

¹ East Timor-perpetuity Scenario (oil only)- Canberra Totals including Some Capital, 5 % GDP Growth

² East Timor Agriculture, Veterinary, Fisheries and Forestry Association (ETAVFFA) is a well-experienced technical group in the fields of crops, livestock, fisheries, forestry, etc.

technical staff in each division, exclusive of agricultural & rural extension division, so that 117 staff should be stationed for 13 districts (13 district x 4 divisions x 2 staff + 13 district x 1 division x 1 staff). Total number of staff of the MAF will be 156 adding the 35 staff of central level to the total district staff. This total numbers are almost the same to the increased staff numbers of 160 mentioned above. Therefore, MAF activities could be implemented within the appropriated budgets of 1.9 million US\$.

Major activities of MAF related division at district level are itemized as follows in close collaboration with MAF central office, CPMO, DPMO, etc.

- Discussion and coordination with MAF central office
- Extension and training activities in the fields of crop, livestock, fisheries, forestry, etc.
- Establishment and strengthening of farming groups such as water user's association (WUA)
- Training of agricultural extension offices at district level

8.1.2 Principle of Implementation

The implementation for the formulated development plans are proposed with the following principles:

- In the Project Executive Committee (PEC), the Ministry of Agriculture and Fisheries (MAF) should become the leading executing agency of the implementation.
- Under the PECC, MAF shall appoint a project director and shall become the direct executing body of the project. The project director will act as secretary of PEC as well as a chairman of CPMO. Under the project director, MAF shall appoint a project manager, who will be chairman of DPMO, and supervise the progress of implementation of each project component.
- On the other hand, also like the current on-going implementing project, Donors / NGOs and private sector play important role and these condition will almost never change in a short time on the implementation of these development plans. Therefore, to exchange opinions and information with close cooperation in all of implementing stage between MAF and Donors/NGOs is important for the smooth implementation of the Project to attain the project goal.
- Central Project Management Office (CPMO) and District Project Management Office (DPMO) also should be assisted by the Donors, NGOs and Consultants to divide proper guidance, technical supervision and monitoring of project activities
- At each project area, DPMO shall undertake the actual implementation. The irrigation facilities will be *mainly constructed / rehabilitated by private contractor*. The OPMO, therefore, should be organized to manage the progress of daily operations. Furthermore, the beneficiaries of farmers will actively participate into the implementation with the help the DPMO and other staff of the agencies including Donors/NGOs.

8.2 Implementing Schedule

Implementation schedule of the development plan is formulated considering that all component will be completed within 15 years. The implementation schedule, therefore, up to year 2017 from year 2003 is prepared. The implementing period varies from five years as mid-term development to 15 years at longest as long-term development on each development plan. In irrigation sector, this schedule includes the required period for feasibility study and detailed design for construction/ rehabilitation plans of irrigation facilities (refer to Figure 8.2-1).

The forest rehabilitation program in the forestry development plan is formulated to prepare and establish the implementing organization in the beginning of five years, and to rehabilitate the forest completely in the later 10 years.

Five projects proposed in the mid-term fishery development program are so formulated that these can be implemented and completed within five years. With regard to longer-term programs, development demands were analyzed as well. To allow further consideration, individual projects for these are to be directed for design and implementation stages by reviewing their priority after completing the mid-term programs.

Project implementation schedule in case of full- and minimum-development plans for agriculture, livestock, forestry and fishery sectors are given in Figure 8.2-1 and Figure 8.2-2.

8.3 Organization for Operation and Maintenance

8.3.1 Responsible Agency

Basically, the implementing agency, namely Ministry of Agriculture and Fishery (MAF), will be continuously in charge of operation and maintenance (O&M) activities of the each sectors' development plan including facilities and structures with the help of the Donors and/or NGOs like implementation.

It is also the fact, however, that in operation and maintenance works, the staffs of the district agriculture office and local peoples (community, farmers, the WUA etc.) will play also important role. Understanding and participation for O&M by local peoples is essential for sustainability of the development plans. In practice, some maintenance works for small irrigation facility like farm ditch and on-farm facilities would be managed by farmers group. The regular maintenance of the facilities, such as grass cutting at the canal, removal of debris and obstructions at inner canal, and so on, will be taken care by the farmers group and/or Water Users Association (WUA).

Also, on reforestation and greening plan in forestry sector, activities for O&M works by community are very important. It is, therefore, planned to establish a management group for O&M. On the reforestation and greening plan in the forestry sector, activities for O & M

works by community are also very important. It is, therefore planned to establish a management group for O & M. It is important that to operate and manage the rehabilitated forest should not be destroyed again by forest fire, illegal cutting, etc. For that reason the responsible agencies by participation of local people will be established.

All of five fishery projects proposed in the mid-term fishery development program are expected to implement under technical assistance programs. Since these projects do not include public buildings and facilities in their components, there will be little hardware segments that require operation and maintenance costs. The boat building project and the project for small-scale fishery enterprise will leave the components of micro credit after termination of the projects by technical assistance. Local bank will be kept in charge of the fund and credit management in the same measures as the project implementation stage.

8.3.2 Operation and Maintenance for Proposed Facilities

1) Operation of Irrigation Facilities and Its Organization

a) General

Operations refer to the appropriate adjustment and proper utilization of the facilities and structures for irrigation. On the other hand, maintenance is the proper upkeep of those facilities and structures. That is to keep it operational and properly functioning at all times. Operation and maintenance (O&M) is done normally in almost simultaneous manner at all time.

b) Operation

Operation activities are actions which are very much dependent on the plans on when, where and how much area shall be planted. The way the irrigation area shall be planted should be properly managed and organized. The plan of planting, therefore, shall define how, where and how much area shall be irrigated.

There are two important components in the management of operations, namely: i) cropping pattern and cropping calendar, and ii) water delivery and distribution.

Cropping Pattern and Calendar

The pattern of planting shall define how the service area shall be planted while the cropping calendar shall define when should the first and last farmers start their farming activities. The calendar is the graphic presentation of the start of seed sowing and to the end of harvesting in an irrigation area, a branch or village canal or the whole irrigation system. There are very much dependent on the crops and varieties to be planted.

Delivery and Distribution of Irrigation Water

The schedule of the delivery and distribution of irrigation water and the pattern of planting and cropping calendar are managed as one. The purpose of irrigation is to provide the agricultural crops the necessary water for growth. It must be applied when and where needed and in the required amount for optimum growth.

The schedule of irrigation must be prepared considering the following;

- The planned pattern of planting and cropping calendar
- The extent and allocation of the area to be irrigated periodically
- The growth stage of the crops at the time of irrigation

c) Maintenance and Repair

The maintenance works, to ensure the proper upkeep of the intake and irrigation facilities and structures to keep them operational and properly functioning at all times, are divided into three categories: i) *routine maintenance*, ii) *periodic maintenance* and iii) *repair*, and emergency repair work.

Routine Maintenance Works

The routine maintenance works are done during irrigation period and include cutting of grass at the canals, particularly at inner sections. The works also include the removal of debris, soils and obstructions within the intake and irrigation facilities and structures.

Periodical Maintenance and Repair Works

The periodical maintenance and repair works should be done prior to the start of or just after a cropping season. That is during pre-irrigation or post-irrigation period. These periodic maintenance and repair works include both these for the intake and irrigation facilities and structures.

The works related to the intake facilities and structures shall include: i) *re-channeling of the river channel in the vicinity of the intake structures*; ii) *removal of silt in the conveyance and conducting canals*, and iii) *cleaning, repainting, oiling and greasing of the lifting mechanism of steel gates and sluice ways*.

These works may also include the periodic maintenance and repair of farm roads along the main canal to ensure that it is passable during the irrigation period.

Emergency Repairs

Emergency repairs may include repair of partial breach and breaks in canals and ditches due mainly to overtopping by excessive water supply and collapse of cross drains, road crossing

and others by floods brought by strong rainfall. Immediate action by the WUA on such works is very necessary to ensure that normal irrigation could take place anytime after each emergency repair.

The schedule on the maintenance and repair of irrigation facilities and structures could be roughly indicated as follows:

Schedule of Maintenance and Repair Works

Work Particulars	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Routine maintenance:														
- Grass Cutting														
- Debris Removal														
Periodical Maintenance/Repair														
- River Re-channeling														
- Silt Removal (Intake)														
- Silt Removal (Main Canal)														
- Re-Shaping of Embankment														
- Repair of Transitions														
And Protection Works														

2) Operation of Forestry Facilities and Its Organization

a) General

The facilities in forestry activities are seedling production facilities for rehabilitation, forest roads for management, hillside works for erosion control, etc. It is important that these facilities are maintained and managed suitably and demonstrates effectively.

b) Maintenance and Repair

Maintenance and management of forest is mainly executed by forest patrol. The primary factors of deforestation are forest fire and illegal cutting, therefore to prevent occurrence of deforestation by dense forest patrolling. However by the reason of limited officials in Forest division, establishment of dense forest patrol system by local people is expected. To improve the people's participation for forest conservation, it is necessary that the local people will get the recognition of the benefit from forest. And it is possible that decrease of damage for facilities such as roads and works by an early stage of maintenance.

c) Establishment of effective management system

The most important matter for the establishment of effective forest management system is the local people's recognition of the benefit from forest directly. For this purpose the

consideration such as selection of tree species (fuel wood, fruit-tree, fodder-tree, etc.), planting for the agricultural land conservation, works for the water supply, planting crops by using forest land, money income by offering labor power and others is needed in the stages of planning and executing.

Figure 8.1-1 Organization Chart of Project Implementation

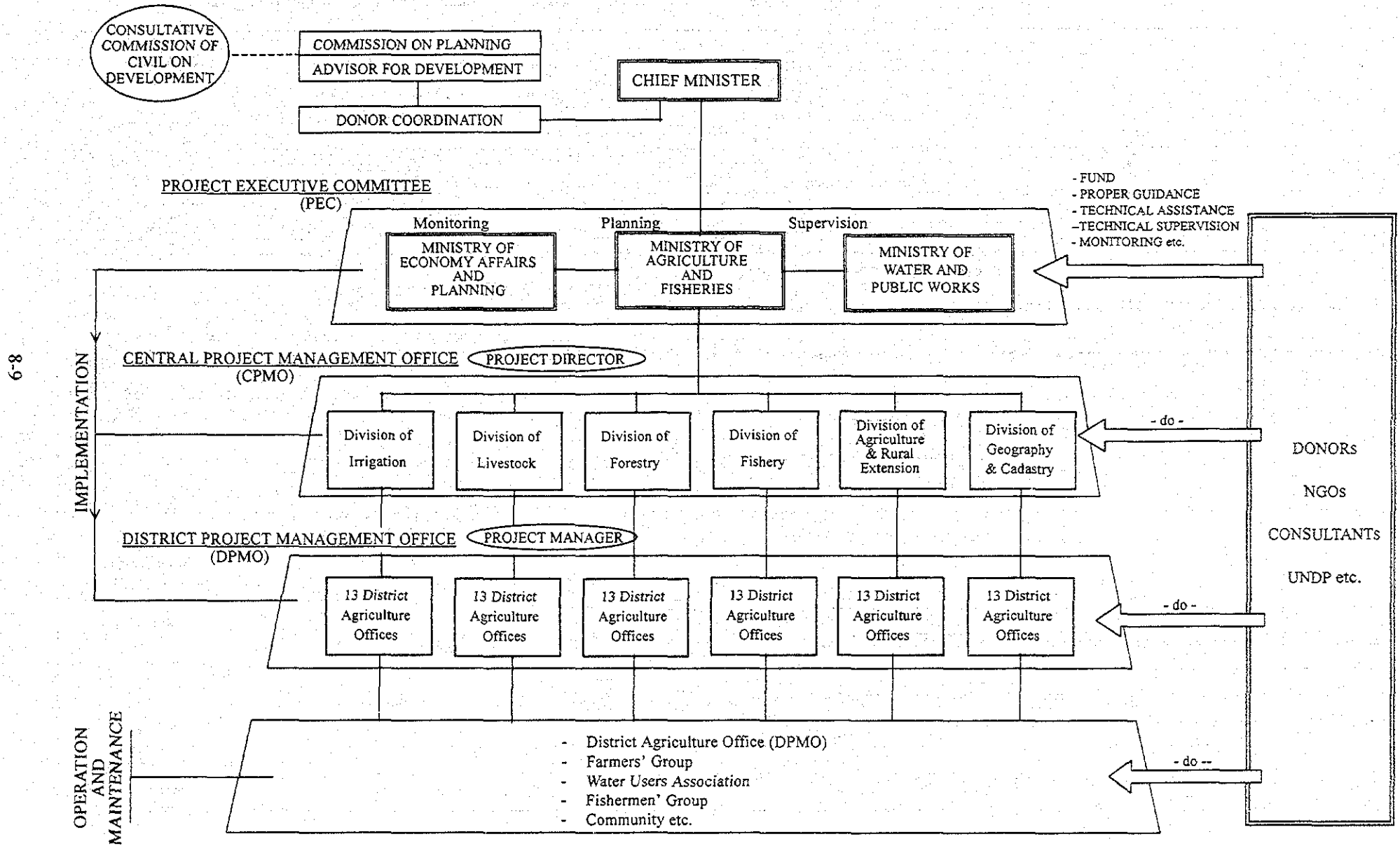







Figure 8.2-1 Project Implementation Schedule (Full Development Case)

Sector	Project Component	Contents or Quantity	Mid-Term Development					Long-Term Development									
			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1. Agriculture Development																	
1.1 Irrigation	- Rehabilitation of irrigation scheme	- Proposed rehabili. area 17,191ha - Imple. area (Mid-term) 5,725ha	1,145ha	1,145ha	1,145ha	1,145ha	1,145ha										
1.2 Farm Road	- New construction	- Proposed imple. length 330km - Imple. length (Mid-term) 110km	22km	22km	22km	22km	22km										
1.3 Farm Mechanization, Training and Hiring Station	- Training and hiring facility and manpower for farm mechanization - Consolidation of repair and maintenance workshop	- Experimental and training field, land and building for station - Training and hiring machinery and equipment - Repair and maintenance workshop - Station support facility															
1.4 Agricultural Extension and Material Subsidization	- Strengthening agro-extension activity - Subsidization of inputs	- Procurement of materials - Training															
1.5 Micro Credit Finance	- Water users' association - Agro-cooperatives - Household processing groups	- Establish of micro finance															
2. Livestock Development	- Expansion of veterinary service - Intensification of Bali Cattle production - Promotion of animal traction - Integration of food & feed groups - Buffalo dairy - Increase of goats production - Improvement of horse production	- Capacity building - Procurement of materials - Capital outlay															
3. Forestry Development																	
3.1 Reforestation	- Government management Administration	- Proposed imple. area 177,107ha - Imple. area (Mid-term) 2,675ha	535ha	535ha	535ha	535ha	535ha										
3.2 Regreening	- Community management - Tree group plantation - Inter crop trial - Candle-nuts promotion - Fuel wood promotion - Administration	* Regreening - Proposed imple. area 42,585ha - Imple. area (Mid-term) 14,195ha * Candle-nuts tree plantation - Imple. area (Mid-term) 1,300ha	2,385ha	2,385ha	2,730ha	3,175ha	3,520ha										
4. Fishery Development																	
4.1 Fishing Vessels	- Development of open boat	- Term of imple. 2 to 5 years															
4.2 Fishing Operation (1)	- Fishing gears improvement	- Term of imple. 1 year															
4.3 Fishing Operation (2)	- Fish landing survey	- Term of imple. 16 months															
4.4 Fish Marketing	- Promotion of small-scale fishery enterprises	- Term of imple. 2 to 5 years															
4.5 Fish Administration	- Base line survey CBFM	- Term of imple. 8 months															
5. Capacity Building																	
5.1 National Government and Regional Level	- Central/District level - Water users' associations - Community group for forestry development	- Training facilities & equipment - Administration - Organization - Training															
5.2 Beneficiaries Level	- Cooperatives for fishery development																

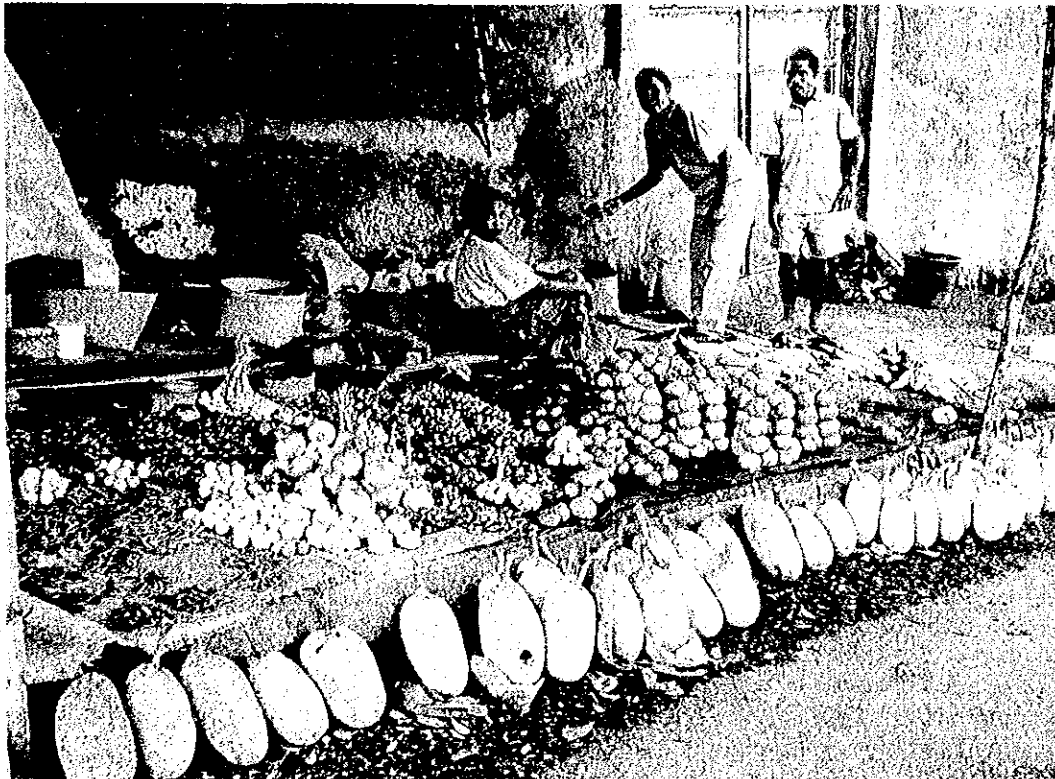
Legend: Construction of Facilities/Structures, Implementation, Operation, Operation and Maintenance, Farmers'/Communities' Participation

Figure 8.2-2 Project Implementation Schedule (Minimum Development Case)

Sector	Project Component	Contents or Quantity	Mid-Term Development					Long-Term Development									
			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1. Agriculture Development																	
1.1 Irrigation	- Rehabilitation of irrigation scheme	- Proposed rehabili. area 990ha - Imple. area (Mid-term) 990ha	198ha	198ha	198ha	198ha	198ha										
1.2 Farm Road	- New construction	- Proposed imple. length 330km - Imple. length (Mid-term) 110km	- N.A.														
1.3 Farm Mechanization, Training and Hiring Station	- Training and hiring facility and manpower for farm mechanization - Consolidation of repair and maintenance workshop	- Experimental and training field, land and building for station - Training and hiring machinery and equipment - Repair and maintenance workshop - Station support facility															
1.4 Agricultural Extension and Material Subsidization	- Strengthening agro-extension activity - Subsidization of inputs - Water users' association	- Procurement of materials - Training															
1.5 Micro Credit Finance	- Agro-cooperatives - Household processing groups	- Establish of micro finance															
2. Livestock Development	- Expansion of veterinary service - Intensification of Bali Cattle production - Promotion of animal traction - Integration of food & feed groups - Buffalo dairy - Increase of goats production - Improvement of horse production	- Capacity building - Procurement of materials - Capital outlay															
3. Forestry Development																	
3.1 Reforestation	- Government management - Administration	- Proposed imple. area 177,107ha - Imple. area (Mid-term) 5,875ha	- N.A.														
3.2 Regreening	- Community management - Tree group plantation - Inter crop trial - Candle-nuts promotion - Fuel wood promotion - Administration	* Regreening - Proposed imple. area 305,564ha - Imple. area (Mid-term) 31,500ha * Candle-nuts tree plantation - Imple. area (Mid-term) 4,100ha	- N.A.														
4. Fishery Development																	
4.1 Fishing Vessels	- Development of open boat	- Term of imple. 2 to 5 years	- N.A.														
4.2 Fishing Operation (1)	- Fishing gears improvement	- Term of imple. 1 year	- N.A.														
4.3 Fishing Operation (2)	- Fish landing survey	- Term of imple. 16 months	- N.A.														
4.4 Fish Marketing	- Promotion of small-scale fishery enterprises	- Term of imple. 2 to 5 years	- N.A.														
4.5 Fish Administration	- Base line survey CBPM	- Term of imple. 8 months	- N.A.														
5. Capacity Building																	
5.1 National Government and Regional Level	- Central/District level	- Training facilities & equipment - Administration - Organization															
5.2 Beneficiaries Level	- Water users' associations - Community group for forestry development - Cooperatives for fishery development	- Training															

Legend:  Construction of Facilities/Structures,  Implementation,  Operation,  Operation and Maintenance,  Farmers'/Communities' Participation

CHAPTER IX.
JUSTIFICATION OF DEVELOPMENT PLAN
AND PRIORITIZATION



CHAPTER IX. JUSTIFICATION OF DEVELOPMENT PLAN AND PRIORITIZATION

9.1 Basic Policies for Justification

9.1.1 Objectives of Project Evaluation

The major objective of the project evaluation for the development plan is to comprehensively prove the validity in terms of economic, financial, engineering and environmental points of view.

9.1.2 Methods of Project Evaluation

1) Financial Aspect

The financial viability shall be evaluated in terms of FIRR (*Financial Internal Rate of Return*) calculated by the project costs and benefits valued at financial prices (domestic market prices).

2) Engineering Aspect

Since a certain project includes irrigation facilities, farm roads and a farm machinery station, the engineering aspect shall be qualitatively evaluated in considering the degree of difficulty in these construction works.

3) Environmental Aspect

Out of several environmental concerns in this study, critical impacts have been selected for qualitative judgment.

9.1.3 Conditions for Project Evaluation

The following parameters are adopted as conditions for the project evaluation;

1) Project Life

The project life for the evaluation is 30 years from 2003 to 2032, including the construction period as well as study period starting from the feasibility study, in order to cover the longest durable years of irrigation facilities among all the project components in this plan.

2) Without Project Case

Usually, it is expected that the present agricultural, forestry and fishery productivity would increase as a result of improvement in those technology or working efficiency without project. The increase in the Study Area is considered trivial and the present condition can be regarded as the without project case.

3) Cut-Off Rate (Opportunity Cost of Capital)

Generally, it is rather difficult to precisely determine the opportunity cost of capital to be used in economic analysis, and that a ten-percent assumption is reasonably acceptable to be used in to agricultural projects in developing countries.

4) Currency and Exchange Rate

The currency for the project evaluation shall be based on US dollar (US\$), and the exchange rate to convert the local currency to Indonesian currency (Rp) shall be US\$ 1 = Rp 8,710, which is the average exchange rate in September 2001.

5) Price Level

The financial prices in all the related project costs and benefits shall be used in the price level as of September 2001. Unit Unskilled Labor Price is 3.5US\$/day, which is taken from Coffee Garden in Dili.

9.2 Financial Analysis

9.2.1 Project Costs

1) Initial Investment Costs

Initial investment costs consist of i) direct construction costs, ii) site expense and engineering fee, iii) contingency etc. Full-and minimum-scale development cases for the mid-term integrated agricultural development plan were studied. Initial investment costs and its disbursement schedule, which are expended from FY2003 to FY2007, are estimated as shown below (refer to Table U-1 and Table U-2 in details)

Initial Investment Costs and Disbursement Schedule (Full-Scale Development Case)

(US\$)						
Sector	FY2003	FY2004	FY2005	FY2006	FY2007	Total
1. Agriculture Development	11,144,000	6,789,000	6,789,000	6,789,000	6,789,000	38,300,000
2. Livestock Development	209,000	1,432,000	761,000	662,000	369,000	3,433,000
3. Forestry Development	3,013,750	3,013,750	3,260,500	3,578,650	3,825,300	16,691,950
4. Fishery Development	2,200,000	0	0	0	0	2,200,000
5. Capacity Building	3,651,000	871,000	871,000	871,000	871,000	7,135,000
6. Administration	1,920,000	1,911,000	1,911,000	1,911,000	1,911,000	9,564,000
Total	22,137,750	14,016,750	13,592,500	13,811,650	13,765,300	77,323,950

Initial Investment Costs and Disbursement Schedule (Minimum-Scale Development Case)

(US\$)						
Sector	FY2003	FY2004	FY2005	FY2006	FY2007	Total
1. Agriculture Development	6,249,000	1,894,000	1,894,000	1,894,000	1,894,000	13,825,000
2. Livestock Development	157,000	107,000	107,000	107,000	107,000	585,000
3. Forestry Development	0	0	0	0	0	0
4. Fishery Development	0	0	0	0	0	0
5. Capacity Building	3,651,000	871,000	871,000	871,000	871,000	7,135,000
6. Administration	1,920,000	1,911,000	1,911,000	1,911,000	1,911,000	9,564,000
Total	11,977,000	4,783,000	4,783,000	4,783,000	4,783,000	31,109,000

2) Divided Costs

The initial investment costs were further divided to clarify the relations between each cost and benefits to be used in the analysis. Agriculture, livestock, forestry and fishery developments were broken down into their components and capacity building in beneficiaries level were sorted to the components, respectively. Capacity building in government level and administration were prorated to each sector through proportions of other costs.

Divided Costs and Disbursement Schedule (Full-Scale Development Case)

(US\$)						
Component	FY2003	FY2004	FY2005	FY2006	FY2007	Total
1-1. Rehabilitation of Irrigation Facilities	5,987,213	5,506,187	5,538,948	5,521,726	5,525,314	28,079,388
1-2. Construction of Farm Road	2,119,905	1,949,588	1,961,187	1,955,089	1,956,360	9,942,129
1-3. Farm Mechanization	5,606,950	0	0	0	0	5,606,950
1-4. Extension for Agricultural Technology	1,105,869	993,231	999,141	996,034	996,681	5,090,956
2. Livestock Development	270,324	1,703,361	910,594	789,670	440,449	4,114,398
3. Land Rehabilitation	4,092,038	3,763,275	4,080,921	4,447,739	4,745,038	21,129,011
4-1. Fund for Fishing Boat	1,034,731	0	0	0	0	1,034,731
4-2. Fund for Fishery Enterprise	1,920,720	101,107	101,709	101,393	101,459	2,326,387
Total	22,137,750	14,016,750	13,592,500	13,811,650	13,765,300	77,323,950

Divided Costs and Disbursement Schedule (Minimum-Scale Development Case)

(US\$)						
Component	FY2003	FY2004	FY2005	FY2006	FY2007	Total
1-1. Rehabilitation of Irrigation Facilities	2,364,403	2,575,317	2,575,317	2,575,317	2,575,317	12,665,672
1-2. Construction of Farm Road	0	0	0	0	0	0
1-3. Farm Mechanization	7,465,175	0	0	0	0	7,465,175
1-4. Extension for Agricultural Technology	1,472,370	1,566,198	1,566,198	1,566,198	1,566,198	7,737,162
2. Livestock Development	270,365	200,698	200,698	200,698	200,698	1,073,159
3. Land Rehabilitation	258,311	281,353	281,353	281,353	281,353	1,383,722
4-1. Fund for Fishing Boat	0	0	0	0	0	0
4-2. Fund for Fishery Enterprise	146,376	159,433	159,433	159,433	159,433	784,109
Total	11,977,000	4,783,000	4,783,000	4,783,000	4,783,000	31,109,000

3) Initial Costs of Rehabilitation Plan for Irrigation Facilities

The rehabilitation plan includes not only rehabilitation of irrigation facilities but micro credit finance and capacity building for water users associations. In the financial analysis, the initial investment costs were calculated. The costs include the construction expenses, allotted cost of micro credit finance, capacity building for water users associations, capacity building for staff and administration, etc.

Irrigation Rehabilitation Costs and Disbursement Schedule (Full Development Case)

Component	(US\$)					
	FY2003	FY2004	FY2005	FY2006	FY2007	Total
Canal Rehabilitation	3,745,000	3,745,000	3,745,000	3,745,000	3,745,000	18,725,000
Micro-finance for WUAs	30,210	30,210	30,210	30,210	30,210	151,050
Capacity Building for WUAs	16,642	16,642	16,642	16,642	16,642	83,210
Capacity Building for Staff, Administrat	1,112,582	718,549	745,385	731,277	734,217	4,042,011
Total	4,904,434	4,510,401	4,537,237	4,523,129	4,526,069	23,001,271

Irrigation Rehabilitation Costs and Disbursement Schedule (Minimum Development Case)

Component	(US\$)					
	FY2003	FY2004	FY2005	FY2006	FY2007	Total
Canal Rehabilitation	489,000	489,000	489,000	489,000	489,000	2,445,000
Micro-finance for WUAs	6,840	6,840	6,840	6,840	6,840	34,200
Capacity Building for WUAs	3,768	3,768	3,768	3,768	3,768	18,840
Capacity Building for Staff, Administrat	195,175	149,290	153,950	151,507	152,017	801,939
Total	694,783	648,898	653,558	651,115	651,625	3,299,979

4) Operation and Maintenance Costs

Operation and maintenance costs consist of i) personnel expenditure (salary), ii) fuel cost, iii) materials, iv) general expense etc. O&M costs would be needed on the sector of agricultural development, namely for keeping in good condition irrigation facilities such as intake structure, canal, etc. Increments per year of the costs are estimated as follows (refer to Table U-4, U-12).

Increments per Year of Operation and Maintenance Costs

Items			Increments per Year
Proposed Improve Area (ha)	Full Development Case	a	1,145
	Minimum Development Case	b	198
O&M Cost per Hectare (US\$/ha)		c	34
O&M Cost (US\$)	Full Development Case	d=ac	38,930
	Minimum Development Case	e=bc	6,732

9.2.2 Project Benefits

1) Quantification of Project Benefits

The quantifiable benefits generated by each project are shown below. The difference

between a full development case and a minimum development case is the scale of each project, and they are supposed to have the same cost performance except for the irrigation facilities rehabilitation plan.

- Effect of irrigation : Rehabilitation of irrigation facilities increases cropping area of paddy and the crop yield.
- Effect of farm road : Construction of new road saves the moving and travel cost.
- Effect of farm machine : Introduction of tractors saves the farming cost.
- Effect of agricultural extension : The use of high yielding crop varieties and fertilizers with agricultural extension activity raises the unit crop yield.
- Effect of livestock development: Livestock extension activity raises the weight of animals.
- Effect of land rehabilitation : Reforestation and greening increases the source of forest cover.
- Effect of fishing boat fund : Increase of fishing trip days raises fish production.
- Effect of fishery enterprise fund : Fishery enterprises using the fund produce more income via increased fish sales.

2) Effect of Irrigation

The effect of rehabilitation of Irrigation facilities is calculated below. The net incremental value is shown as the profit from increasing crops yield, which has been calculated during the feasibility study in respect to rehabilitation of identified irrigation schemes.

$$\begin{aligned} \text{Total Benefit (US\$)} &= \text{Unit Benefit (US\$/ha)} \times \text{Beneficiary Area (ha)} \\ \text{Unit Benefit (US\$/ha)} &= \text{Net Value of Sample (US\$/Irrigable Area of Sample (ha)} \end{aligned}$$

The irrigation effects in the full case and the minimum case were also calculated, respectively, since the damage level in the target facilities are different. The level of damage in the full development case is serious, and in the minimum case, it is light to medium.

3) Effect of Farm Road

ASMC is given by a unit benefit multiplied by the length of road construction. The unit benefit is given by SMC multiplied by annual moving times for farming. The quantity equals ADMT multiplied by the number of annual working days. The annual cost of the maintenance was estimated at about five percent of initial cost.

$$\begin{aligned} \text{ASMC (US\$)} &= \text{unit benefit (US\$/km)} \times L \text{ (km)} \\ \text{Unit benefit (US\$/km)} &= \text{SMC (US\$/time)} \times \text{Quantity (time)} \\ \text{Quantity (time)} &= \text{ADMT (times/day)} \times \text{Annual working days (days)} \end{aligned}$$

Where,

- ASMC = Annual saving of moving cost (US\$)
- L = Annual length of road construction (km)
- SMC = Saving of moving cost per time (US\$/time)
- ADMT = Average daily moving times (times/day)

4) Effect of Farm Machinery

The benefit is shown as a saving cost, which is given by a time saving from the use of farm machinery multiplied by a labor price. The saving time is the difference between working times with and without project.

$$\begin{aligned} \text{Total benefit (US\$)} &= \text{Saving of Lot (US\$/lot)} \times \text{Number of Planning Lots (lots)} \\ \text{Saving of Lot (US\$/lot)} &= \text{Unit Saving Cost (US\$/ha)} \times \text{Service Area (ha/lot)} \\ \text{Unit Saving Cost (US\$/ha)} &= \text{Unit Saving Time (persondays/ha)} \\ &\quad \times \text{Labor Price (US\$/personday)} \\ \text{Unit Saving Time (persondays/ha)} &= \text{Working Time without Project (persondays/ha)} \\ &\quad - \text{Working Time with Project (persondays/ha)} \end{aligned}$$

5) Effect of Agricultural Extension

Total benefit is given by a unit benefit multiplied by cropping area, which is assumed to be double cropping. The unit benefit is given by a unit price multiplied by incremental unit yield. Production cost includes costs of fertilizer and incremental labor.

$$\begin{aligned} \text{Total Benefit (US\$)} &= \text{Unit Benefit (US\$/ha)} \times \text{Cropping Area (ha)} \\ \text{Unit Benefit (US\$/ha)} &= \text{Unit price (US\$/kg)} \times \text{Incremental Unit Yield (kg/ha)} \end{aligned}$$

6) Effect of Livestock Development

Total benefit is given by a unit benefit multiplied by annual target heads. The unit benefit is given by a unit price multiplied by an annual rate of incremental weight. The annual rate of incremental weight is the incremental weight divided by the actual weight and growing cycle years. Double Maintenance and Operating Expenses (Table U-7) was accounted for O&M cost in regard to labor cost is equal to the material cost. These service life is assumed to be 5 years.

$$\begin{aligned} \text{Total Benefit (US\$)} &= \text{Unit Benefit (US\$/head)} \times \text{Annual Target Heads (heads)} \\ \text{Unit Benefit (US\$/head)} &= \text{Unit Price (US\$/head)} \\ &\quad \times \text{Annual Rate of Incremental Weight (\%)} \\ \text{Annual Rate of Incremental Weight (\%)} &= \frac{\text{Incremental weight (kg/head)}}{\text{Actual weight (kg/head)}} \\ &\quad / \text{Growing cycle (years)} \end{aligned}$$

7) Effect of Land Rehabilitation

Reforestation work and greening work are analyzed together as land rehabilitation, since the difference is only the division of the cost share, and the components are same. The benefit consists of the wood and the fruit. The wood benefit is given by a tree resource multiplied by the unit price. The tree resource is given by a number of planting trees multiplied by the tree volume. The number of planting trees is determined by unit number of trees multiplied by the planting area.

$$\begin{aligned} \text{Wood Benefit (US\$)} &= \text{Tree Resource (m}^3\text{)} \\ &\quad \times \{\text{Unit Price (US\$/m}^3\text{)} - \text{Harvesting Cost (US\$/m}^3\text{)}\} \\ \text{Tree Resource (m}^3\text{)} &= \text{Number of Trees (trees)} \times \text{Tree Volume (m}^3\text{/tree)} \\ \text{Number of Trees (trees)} &= \text{Unit Number (trees/ha)} \times \text{Planting Area (ha)} \end{aligned}$$

8) Effect of Fishing Boat Fund

The benefit is given by a number of incremental trips multiplied by the unit net income. The number of incremental trips is given by unit incremental trips multiplied by the planned boats. The unit incremental trips are shown by the difference between a number of trips by a planned boat and an actual boat.

$$\begin{aligned} \text{Benefit (US\$)} &= \text{Incremental Trips (trips)} \times \text{Unit Net Income (US\$/trip)} \\ \text{Incremental Trips (trips)} &= \text{Unit Incremental Trips (trips/boat)} \times \text{Planning Boats (boats)} \\ \text{Unit Incremental Trips (trips/boat)} &= \text{Trips by Planning Boat (trips)} \\ &\quad - \text{Trips by Actual Boat (trips)} \end{aligned}$$

9) Effect of Fishery Enterprise Fund

Annual benefit is given by a unit net income multiplied by the number of enterprises. The unit net income is given by a unit loan multiplied by the net income rate. The rate was assumed double figure of the interest rate, which was using in similar projects by WB.

$$\begin{aligned} \text{Annual Benefit (US\$)} &= \text{Unit Net Income (US\$/enterprise)} \\ &\quad \times \text{Number of enterprises (enterprises)} \\ \text{Unit Net Income (US\$/enterprise)} &= \text{Unit Loan (US\$/enterprise)} \times \text{Net Income Rate (\%)} \end{aligned}$$

9.2.3 Results of Financial Analysis

Financial internal rate of return (FIRR) is that discount rate at which the present value of the project benefits is equal that of the project costs. This is one of the indicators in determining the financial viability of a project. The result of the calculation of FIRR per project is summarized below.

- Rehabilitation Plan of Irrigation Facilities		
Full Development Case	:	16 %
Minimum Development Case	:	19 %
- Construction Plan of Farm Road	:	15 %
- Plan of Farm Mechanization	:	21 %
- Extension Plan for Agricultural Technology	:	14 %
- Livestock Development Plan	:	10 %
- Plan of Land Rehabilitation	:	9 %
- Fund Plan for Fishing Boat	:	11 %
- Fund Plan for Fishery Enterprise	:	22 %

From the viewpoint of household economy, the direct impact to household was studied using the rehabilitation plan of irrigation facilities. The unit benefit of this plan is 891 US\$/ha, and the average paddy plot is 1.0 ha/farmer (a result of the village survey), so the incremental net income per household is 891 US\$, which corresponds to 57 percent of the average annual household consumption (a result of the household survey).

But, the planning area is limited to 5,725 ha (Full development case) and 990 ha (Minimum development case), and total average benefit, which is divided by the number of total household is 28 US\$/household (Full case) and 5.0 US\$/household (Minimum case), approximately. These figures correspond to two percent and 0.3 percent of the annual consumption.

9.3 Appropriateness of Technical Level

In accordance with the contents of construction works, the difficulty to implement such works is qualitatively judged and ranked on a ranking standard, as shown below:

<u>Project</u>	<u>Difficulty</u>	<u>Rank</u>
- Rehabilitation plan of irrigation facilities		
• Full-Development	Medium	A
• Minimum-Development	Medium	A
- Construction plan of farm road	Medium	A
- Farm mechanization plan	Low	A
- Extension plan for agricultural technology	Medium	B
- Livestock development plan	Low	A
- Plan of forest land rehabilitation	Low	B
- Fund plan for fishing boat	Low	A
- Fund plan for fishery enterprise	Low	A

<Ranking Standard>

Difficulty	FIRR	Rank
Medium	15% -	A
	10% - 14%	B
Low	10% -	A
	5% - 9%	B

9.4 Initial Environmental Examination (IEE)

9.4.1 Introduction

An initial environmental examination (IEE) is required for any project to ensure that development options under consideration are environmentally sound and sustainable, and that any environmental consequences are recognized early and taken into account in the project design. An initial environmental examination (IEE) will identify cross sector environmental issues early in the project cycle, designing environmental improvements into projects; and compensating for the adverse impacts.

An initial environmental examination (IEE) and associated screening of Integrated Agricultural Development (agriculture, forestry, fishery and livestock) projects are to be completed for this study. The objectives of the environmental examination are as follows:

- Determine whether or not the Integrated Agricultural Development of East Timor is environmentally sound.
- Study the initial environmental examination at the early feasibility level.
- Identify steps required by the JICA Standard Guideline (JICA Guideline For Agricultural and Rural Development Project) to implement such projects.

9.4.2 Purposes of the IEE

- To determine if the project requires a full blown an environmental impact assessment.
- To determine, if possible with secondary information, if the projects should be rejected because it will result in significant adverse impacts which can not be mitigated, or if the project should be reformulated in ways that would minimize the adverse impact.

9.4.3 Methodology

An environmental reconnaissance is to be carried out using the JICA guideline for screening and scoping of the Integrated Agricultural Development Project. The following steps would be taken to complete the initial environmental examination (IEE).

- Review of the project information.
- Field review on the existing environmental condition.
- Identify environmental issues (SEI'S) and concerns.

The screening and scoping have been structured as follows;

- Preparation of project description (PD) and site description (SD) Forms.
- Checklists analysis for Initial Screening and Scoping

The IEE checklist for initial screening and scoping are completed for Los Palos, Natrabora and Maliana sites. The IEE checklist broadly identifies and describes the most significant anticipated environmental effects (SEI's) potentially associated with the project. The screening is also necessary to determine whether any environmental fatal flows exist in the pre-feasibility planning and design of the Agricultural Development Project. The project description (PD), site description (SD), screening and scoping forms are presented in Table T.2-8 to Table T.2-13 and further described in the following section. The evaluation of each screening item is based on seven items of the social and natural environment, and overall potential SEI's discussed in the checklist for scoping. They are according to the following three ratings (JICA Guideline for Agricultural and Rural Development Projects, 1992):

Evaluation of Each Screening Item

- Even if one potential SEI's is identified (marked with "A") in the checklist for initial scoping for each issue, the corresponding column for "Evaluation" for the same issue in the checklist for initial screening should then be marked "Yes".
- If no potential SEI is identified (marked with "C") in the checklist for initial scoping for each issue, then the evaluation column is marked "No" in the checklist for initial screening.
- If a combination of SEI's marked "No" and SEI's marked "Unknown" ("C" and "B") are identified in the checklist for each issue, then the "Evaluation" column is marked "Unknown" in the checklist for initial screening.

A joint screening and scoping was attempted but eventually not carried out with the Timor Environmental Protection Unit (EPU) due to a lack of qualified personnel and the absence of any policy guideline on environmental assessment (EA).

SEI's will be assessed for the Integrated Agricultural Development Project, based on Section 1 of JICA Guideline. Screening and scoping done on sites in Los Palos, Natrabora and Maliana are inconclusive. The SEI's was not sufficiently clarified in the initial scoping stage, therefore further studies on future pilot projects (IEE) are also recommended. This also holds true for the overall rating. In Annex T2, a list of all protected and endangered species are also given for reference.

9.4.4 Agriculture Sector Priority Recommendation

In addition to IEE, some important issues regarding the agricultural sector are to be addressed such as:

- The need for an approach to watershed management which recognizes concerns and responsibilities of several agencies- DAA, WSS, Disaster Management, infrastructure and EPU. An integrated approach is proposed.
- A similar cooperative / collaborative approach is required for the coastal zone.
- The need for detailed assessment of the state of the environment, including bio-diversity. (Needs to feed into agriculture study)
- Development of laws and regulation governing the use of natural resources that empower support for customary laws and practices.
- Need to adhere to minimum agriculture input in order to promote environmental sustainability in agriculture sector.
- The need for environmental oversight of licensing decisions within the agriculture sector in order to avoid conflict of interest (e.g. Forestry & Fishery concessions). For projects, the ideal size will have to be addressed.

CHAPTER X.

SUGGESTIONS AND RECOMMENDATIONS



CHAPTER X. SUGGESTIONS AND RECOMMENDATIONS

As the suggestions and recommendations of the study, following issues were pointed out;

1) Food Security of East Timor

Both the National Development Plan for the agriculture sector and the Agricultural Joint Donor Mission emphasized “sustainable” and “wide-range ” approach to sustain food security in East Timor. Thus, to sustain food security at the community and household levels, self-sufficiency of rice as well as comprehensive food security policies such as quality improvement, mitigation of post-harvest loss, improvement in access to market, etc. would be recommended. In general, the food security policy is divided into the narrowly defined economic policy options and the broadly defined agricultural policy options as shown below;

Economic policy Options

- Tariff
- Import restriction
- Subsidy for producers
- Subsidy for exporters,

Agricultural policy options

- Productivity improvement by expansion of irrigated area and yield
- Improvement of access to market
- Mitigation of post-harvest loss
- Quality improvement

2) Basic Development Scenario for Staple Food Supply

Major development objectives of the agricultural sectors are to increase self- sufficiency in food production, to increase income level, and to improve living standard through economic development in the rural area. To meet these objectives, the prioritized sectors considered to make development sustainable are food crops production, poverty alleviation , community development, environment-oriented agriculture, and capacity building and human resources development, etc.

The donor countries have proposed agricultural development policy from 2000 to 2005 to help increase food production of staple food in East Timor that includes among others such policy as introduction of open market economic system and full cost-sharing by beneficiaries (full cost recovery). However, from the point of view of future sustainable agricultural development, creation of employment opportunities, conservation of watersheds in East Timor, etc., this report recommends that the required demand of staple food for the nation would be supplied through local production as much as possible, and the balance of the demand would be imported from other countries.

Since the development framework for the agriculture sector for East Timor will directly be influenced by the future situation of Timor Gap, the study examined two cases of development

scenario for the agricultural sector as follows;

Case-A : Agricultural development in case of full-scale development

Case-B : Agricultural development in case of minimum-scale development

As a result of the study, the following supply and demand balances are recommended for the mid-term agricultural development of East Timor.

Balance of Supply and Demand of Rice in 2007

Case	Total Demand (milled) (ton/annum)	Supply (milled)	
		Local Rice (ton/annum)	Imported Rice (ton/annum)
Case-A	71,010	47,110 (67%)	23,900 (33%)
Case-B	71,010	41,890 (59%)	29,120 (41%)

3) Crop Production Increase Plan

Major staple food of East Timor is maize, rice, cassava, etc. The following policies are proposed to promote self-reliance and self-sufficiency of these crops.

Maize Production

Maize with a production of about 94,500 tons in 2001 currently plays the most important role for supplying staple food in East Timor. In this study, expansion of maize cropping area is not recommended considering the mitigation of soil erosion caused by shifting cultivation of maize in slopping areas. However, because of the apparent shortage of staple food, it will be necessary to increase total production of maize. Therefore, an adequate countermeasure mainly proposed is through the improvement of post-harvest facilities to minimize post-production losses.

Paddy Production

Paddy with a production of about 50,900 ton in 2001 is the second important staple food. The total potential irrigable areas counted are 33,060 ha in 57 irrigation schemes for the whole county. Of the total area, about 13,750 ha in 18 irrigation schemes are presently functional. The remaining irrigation facilities are damaged with conditions ranging from seriously damaged to slightly damaged. In this plan, rehabilitation of irrigation schemes that are lightly to medium damaged will be given high priority to increase the paddy production. In this rehabilitation plan, irrigation schemes that will be rehabilitated under the agricultural rehabilitation projects (ARP) managed by TEFT and bilateral funds will be excluded.

4) Formulation of Land Use Plan inclusive of Forest Land and Forestry Development Plan

Total land area of East Timor is about 1,461 thousand hectare. Out of this area, forestland area is about 1,113 thousand hectare (76 %) while cultivable land area is about 174 thousand hectare

(12%). According to the Land Utilization Design by Indonesian system, forestland areas are divided into two categories of inside forest area (national forest) and outside forest area (private forest). The boundary of these forestland is not clear. Under the situation, early formulation of land use plan inclusive of forest land is recommended, in order to anticipate the rehabilitation of critical forest land, promotion of reforestation and re-greening, management of sustainable rain-fed farming, promotion of soil conservation in watershed, environment-oriented agricultural development, etc. The following plans were recommended in the forestry sector;

- Rehabilitation of forestland
- Reforestation for national forest and re-greening for private forest
- Development of community forests

5) Fishery Development Plan

The present problems of the fishery sector are summarized as follows; i) present level of fishery production in East Timor seems not likely to be able to satisfy the potential demand for national diet namely, animal protein, ii) insufficiency of dugout canoes, the most common form of fishing vessel in the area, iii) difficulty of transporting fish due to the present ineffective infrastructures and, iv) fisher's households not being able to have daily adequate meals. The following plans were recommended for the fishery sector;

- Boat building project (Phase III)
- Fishing gears improvement project
- Implementation of fish landing survey
- Small-scale fishery enterprise project
- Implementation of baseline survey for the community based fishery management (CBFM)

6) Capacity Building and Farmer's Organization Plan

The most serious problems of East Timor are absolutely undeveloped situation of law/regulations and institutional organization, shortage of resource persons such as leaders, specialists, etc., lack of peoples autonomy, lose of the will to work, etc. To improve these present situations it will be necessary to level-up education, undertake capacity building of concerned persons and groups, sustainable donor's support and cooperation. etc. The target groups for the capacity building are agricultural officers at central and local (district) level, agricultural extension workers, international and local NGOs, and farmer's representatives. Especially, organization of farmer's groups should be undertaken through the following processes;

- Step-1 : Support for building the awareness and mentality of farmers
- Step-2 : Confirmation of leaders respected by the community and provision of necessary training and capacity building to these leaders
- Step-3 : Support to the representative organization of the community
- Step-4 : Identification of organization responsibility, roles and rights in the implementation of the project
- Step-5 : Raising whole community's commitments to the projects

7) Project Implementation and Its Prioritization

Implementation plan of the project was formulated for both cases of mid-term development plan (2003-2007) and long-term-development plan (2003-2017) with full and minimum- development cases. Full-scale development is integrated agricultural development plan involving agriculture, livestock, forestry, and fishery sectors. On the other hand, minimum-scale development is the minimum development case under restricted revenues from Timor Gap revenues. In this plan, project plan is at the minimum level with limited rehabilitation of damaged irrigation schemes (light to medium damaged areas) and capacity building for the related fields.

Estimated project costs for the mid-term integrated agricultural development plan classified into government, donors and community categories are presented below;

Preliminary Project Costs for Mid-Term Integrated Agricultural Development Plan

(unit : 1,000US\$)

Items	Full-Scale Development	Min.-Scale Development
Government	17,882	11,259
Donors	51,712	18,515
Community	7,730	1,335
Total	77,324	31,109

The rate of projects costs mentioned above against the total revenues including donor's financing amounts is estimated as follows; agricultural sector in case of full-scale development will need a budget equivalent to about nine percent, while three percent for the minimum-scale development. The estimated nine percent budgets are almost the same rate calculated for the East Timor Combined Sources Budget in 2001/2002 prepared by the Ministry of Finance. Therefore, the scale of development plan is considered to be adequate.

However, as a reference moderate development plan, which stands for intermediate case between the full- and minimum-development plans was additionally studied in terms of implementation plan and preliminary project costs. This moderate development plan indicates the plan subtracting the forest land rehabilitation plan, which is deemed to be low priority from viewpoint of the development priority (see paragraph 9.3 "Appropriateness of Technical Level") from the full development plan case.

In this moderate development plan, project costs are preliminarily estimated at 60,632 thousand US\$ with following burden; government: 17,882, donors: 36,550, community : 6,200 thousand US\$ respectively (refer to Table U-13 and Figure U-2).

Project justification from viewpoints of economical and technical aspects and prioritization for project implementation was analyzed, and as a result, following plans are recommended to be high priority for implementation.

- Rehabilitation plan of irrigation facilities
- Construction plan of farm roads

- Farm mechanization plan
- Livestock development plan
- Fund plan for fishing boat
- Fund plan for fishery enterprise

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