9.2 Development Plan

9.2.1 Objectives and Components of the Project

1) Objectives of the Project

The short-term and medium/long-term objectives for the development of the Area are presented below:

Short-Term Objectives

- To settle the farmer beneficiaries in the Area with sustainable assistance and support,
- To preserve the environment conditions of the Area by determining proper land-use and preventing soil erosion,
- To generate productive lands by providing small-scale irrigation and drainage facilities, and farm-to-market roads,
- To strengthen productive activities by developing agricultural support and institution such as the provision of necessary post-harvest facilities, training, extension services, cooperative organization, peoples' social capability building etc., and
- To improve the environmental and health conditions of the Area by providing rural water supply, electricity supply for non-energized areas, access road improvement, school building construction and expansion, primary health care services improvement and multi-purpose center provision.

Medium/Long-Term Objectives

- To alleviate poverty and improve welfare conditions of ARBs by giving them opportunities to increase their income by improving and/or providing the necessary agricultural infrastructures and services, and
- To increase the annual income of the households to the target level of year 2000 in the Medium-Term Philippine Development Plan (MTPDP).

2) Components of the Project

The project components of the Marangog Area are as follows:

- Construction and improvement of access roads,
  - Improvement of barangay roads located in the Project Area,

- Formulation of agricultural development plan, such as, land-use, crop selection, sloping agriculture under scarce water source conditions, and development of animal husbandry
  - Provision of nursery and training and on-farm development,
  - Livestock (carabao) dispersal, provision of animal breeding center and poultry incubator.

- Development of agricultural and rural infrastructures,
  - Development of small-scale irrigation systems by means of tank systems and farm roads
  - Development of rural roads, rural water supply, social infrastructures such as barangay health center, provision of multi-purpose center and paramedical supplies etc.,

- Development of post-harvest and agro-industry facilities,
  - Provision of agricultural machine, post-harvest and agro-industry facilities

- Establishment/strengthening of farmers' organization and promotion of agricultural support services,
  - Establishment and strengthening of farmers' organization,
  - Promotion of agricultural support services,

- Environmental considerations,
  - Establishment of soil conservation, protection of agroforestry, rehabilitation and protection of watershed,
  - Environmental monitoring and evaluation

- Social capability development and institutional strengthening.
  - Undertaking of barangay, local government units (LGUs) and other local agency consultation,
  - Formation of Local technical working groups (LTWG),
  - Social preparation of the communities
  - Strengthening of institutions, DAR and other local agencies,

9.2.2 *Social Capability Building-up and Institutional Development Plan*

1) Participatory Approach plan

Plans must be made locally by those who will implement them and benefit from them. It is therefore necessary that in the planning and implementation of Projects, the beneficiaries of the Project and the supporters are involved in all phases of the development process from conception, planning and implementation stage for the Project to become sustainable.

The plan shall start at the beneficiary level where at the initial stage, problems, needs and interest are identified, prioritised and consolidated. During this period, recommendations and strategies for countering the identified needs and problems are discussed by the beneficiary themselves. Then, whatever is identified, discussed and recommended is put into an action plan that the beneficiary can use for the development of their community. The plan is then presented to concerned agencies and to other institutions at the local or provincial or regional or central level, for appropriate action, depending on the magnitude of the proposed action plan.

This activity shall be undertaken initially with the assistance and supervision of the concerned Community Development Worker, for this Project, by the DAR Development Facilitator and NGO worker (if available in the Area).

For the participatory approach, the following activities shall be undertaken in all phases of the development process:

Barangay Consultations

- *Need analysis of the community through participatory discussion.* This activity shall be undertaken through public meetings, small discussion groups, home visits, interviews, etc. The needs and problems of the *community shall be identified, listed and discussed and through consensus,* shall be prioritized and action plan developed. This activity may be undertaken more than once as the need arises,

- Presentation of the development plan that was elicited from the community in a formal assembly followed by in-formal discussion to identify gaps, other recommendations and to determine willingness of the community to provide counterpart contributions,

- Formalization of community participation and commitment. This participation will form as their equity or share in terms of labor (voluntary or reduced labor cost), participation in meetings, discussions or training; right-of-way for road or irrigation facilities/canals, provision of lot for multipurpose center or solar pavements or nursery, use of farm area for demonstration purposes, etc., and

- Presentation of the plan to concerned agencies and/or institutions from the local to the central level, if necessary, for implementation.

Local Government and Local Agency Level Consultations

- Participatory approach shall also include the involvement of all units/groups in the development of the community and this includes the outer community such as the local government unit, the other concerned agencies involved in the development of the community, the NGOs, the business group, etc.,

- Involvement of the LGU, the other government agencies and institutions concerned in the preparation of the plan, in terms of assistance to but not limited to the following: provision of data and information required; assistance in the undertaking of surveys, interviews; field work reconnaissance; discussions on their plans, programs, activities, problems and constraints in the development and implementation of projects, etc. in Sappaac Area. During this stage, the support and commitment of all concerned will have to be initially solicited,

- Presentation of the development plan by DAR to the LGU, agencies concerned in a formal assembly to initiate mutual consultation and or dialogue among them towards consolidation of the proposed projects or programs. During this formal meeting, the DAR will also solicit and confirm their participation in terms of what facilities, resources, manpower, support and time can be provided for the development of the ARC area. The output of this local level consultation are: (i) awareness of all agencies concerned on the plans and development proposed for the area; (ii) agreement of the proposed plan and inclusion into their own plans and programs; (iii) endorsement of the program/project through the Sanggunian; (iv) initial commitment and agreement forged for the support to be provided for the ARC area; (v) assignment of personnel for the Technical Working Group (LTWG) to be proposed and (vi) allocation and inclusion of budget for the committed counterpart support, and

- After the formal assembly, series of discussions will have to be undertaken between and among agencies initiated and coordinated by DAR provincial office for the formalization of agreements and/or contracts, hence, the completion of Memorandum of Agreements, budget preparations, sanggunian resolutions, endorsement, and the like.

2) Institutional and Social Capability Plan

The following activities/programs shall be undertaken for the development of the institutional and social capability of the community and the key implementors for the development of the Marangog Area.

a) Social Preparation of the Community

The levels of social preparation of the organizations in Marangog Area are still at the low stage level. The cooperative is newly organized with limited activity due to small capital. The cooperative membership is limited to barangay officials. The other beneficiaries have not joined the cooperative due to lack of money for capital share. Though some of the members and leaders of the various organizations have undergone training and exposure on farming techniques and other income generating skills, they have not started practicing the technology learned due to lack of capital and labor.

There is a need to undertake intensive social preparation in the community to prepare them to manage their organization and eventually their resources. The people in the community should be adequately trained to understand the nature of rural associations and their roles in them. Social preparation through community organization and training will help improve the management capabilities of organizations. Through proper education and training, members of the organization may understand the principles of cooperativism as a way of life and better understanding of their roles and responsibilities to the organization and the community. Earlier training conducted in the ARC area were inadequate and therefore more social preparation will solve the problems being faced by the organization. However, training and seminar are not enough to make the organization successful. It is necessary that during the social preparation phase, the community organizer and/or DF would instil into the members the need to identify with the organization. This identification with the organization can be gazed by the positive attitude of the members toward the organization.

The following activities should be undertaken for the social preparation of the community and Figure 9.2-1 shows the implementation plan of social preparation and institutional strengthening works:

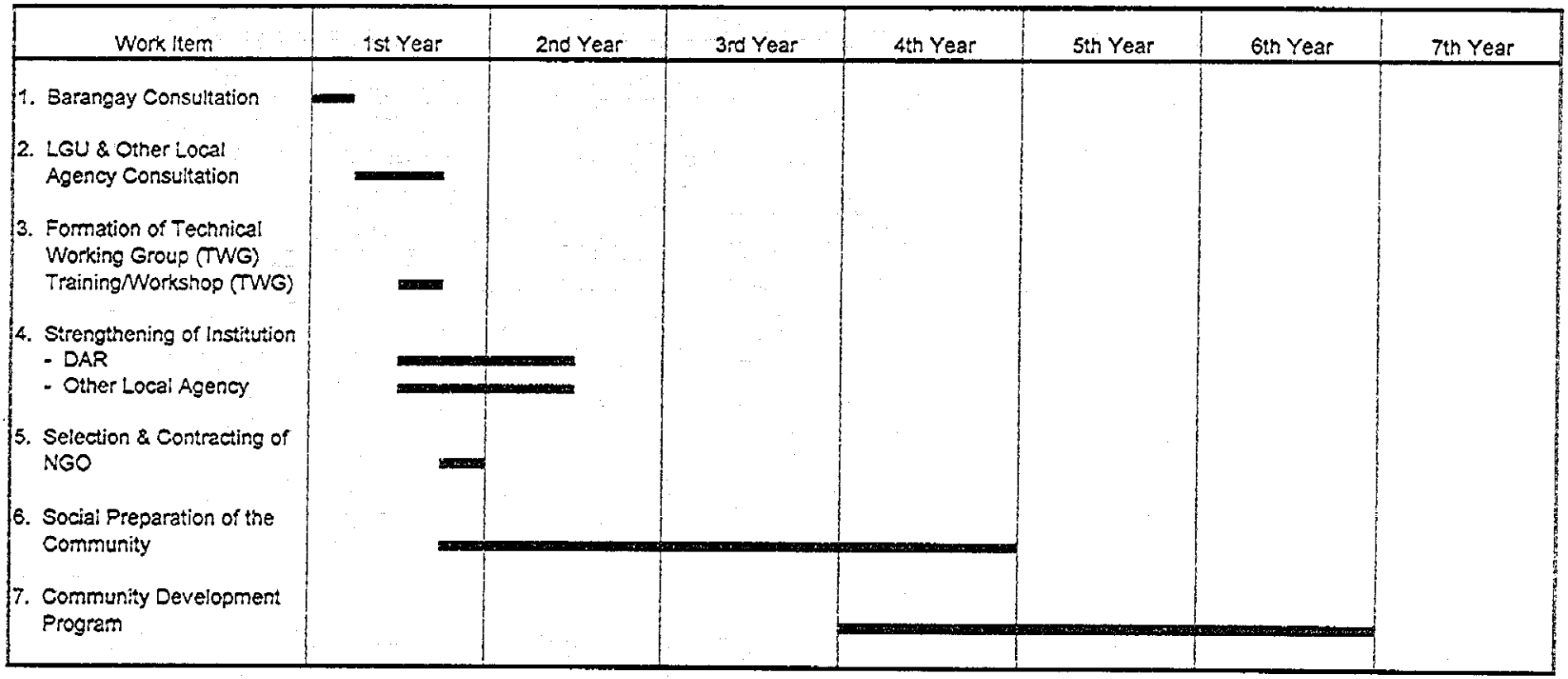
Community Capability Building-Up

Since the level of social preparation of the local communities, particularly the organizations in the marginal areas are still at the low level stage, there are a need to build-up and strengthen community capability for attaining self-sufficiency and management or their resources.

The DAR, therefore, together with the NGO, LGU and other agencies and institutions concerned should provide the sustained support to attain social preparation of the community with providing the necessary training, supervision and materials needed until the community becomes self-reliant.

The initial step to be undertaken is the contracting of NGO by DAR to undertake the social preparation and community development activities. The first task of the NGO community development worker is to undertake a need

FIGURE 9.2-1 IMPLEMENTATION PLAN OF SOCIAL PREPARATION AND INSTITUTIONAL STRENGTHENING



assessment of the community and to validate the institutional capacity of the existing organizations within the Project Area through participatory approach. The next step is to make an inventory of existing resources (people, services and resources available), formal and indigenous technology, practices, beliefs, values within the community. Also to be considered is the identification of available outside community resources and technology applicable to community needs. Considering the findings, a program of implementation for the social preparation aspect of the beneficiary shall be undertaken.

Specifically, the social preparation shall include but not limited to the following:

- Need analysis of the community through participatory approach,

- Strengthening of the people's organization in the Project Area through value formation, that is, by slowly eradicating negative traditional values towards work and life, some examples of which are the need to pay debts, "Bahala Na" system attitude, luck, destiny, the importance of group work and cooperativism, social hygiene and sanitation, etc. through education, seminars, cross visits, etc.,

- Involving the farmer members in group or community activities through the initiation of low-level and costless projects (at the first stage) such as community sanitation, beautification, health related activities, waste recycling for bio-fertilizer production, etc.,

- Initiation of low-financed projects with assistance from outside community (ex. backyard vegetable farming, planting of herbal garden, poultry and pig raising, community mobilization, for example through assistance in the repair or maintenance of water system in the community, road clearing and cleaning, repair of day care center or barangay center, etc.),

- Trust and confidence building among members of the organization and within the community. This aspect is very important for any organization to succeed especially in cooperative organizations where material investments are involved. This can be undertaken by providing venue for building trust through initiation of low or medium financed projects with a larger portion of the fund coming from organization through group trading business (as buy and sell of crops/products, consumer store, fund drives for capital mobilization) or group buying of farm inputs, seeds, others, acquisition of income generating equipment or machinery or working animals. The farmers could be encouraged to form into small work groups with responsibilities given to as many persons as possible not only to one or two persons. Responsibilities should be rotated and every member should be given the chance to participate in all aspects of the activity. This would help develop trust and confidence among members,

- Development of reliance among members of the community and organization through savings mobilization (self-reliance in capitalization), regular training (which could develop local leaders, managers, local trainers for transfer of technology) through initiation of costless, low-level to medium or high level projects, etc., networking with GOs, NGOs, private/business groups for relevant assistance and other support services,

- Development of leaders and improvement of leadership pattern by eradicating traditional leadership pattern vested on formal authorities, by initiating consultation and decision-making by majority, formation of functional work committees or small working groups to assist each other through labor exchange, development of local trainers to transfer technology, identification and involvement of indigenous leaders and farmers with special skills and technology in the initiation and implementation of projects,

- Provision of technical and farm management skills necessary to the farmers, specifically related to the proposed development plan, such as, but not limited to the following: soil conservation-based farming systems, land use, soil survey, soil and crop management, SALT technology (A-frame, preparation of contour lines, contour ditches, silt trap, drainage canal, etc.), mechanisms for the availment of credit and related facilities, production and marketing plan to improve the potentials of farm produce, etc., and

- Provision of technical and other skills to other sectors of the community, such as, the women, youth and the elderly, such as income generating skills (handicraft, fruits and crop preservation, etc.), informal health activities, population and education, health and material care, etc.

The ultimate objective of the social preparation is the implementation of the proposed community framework plan with the active participation of the members of the community. Outside support and assistance from DAR, LGU, DA and other government services will be provided initially with the eventual turnover after the beneficiaries have become self-sufficient and capable to successfully sustain projects with very minimal support and intervention.

Deployment of NGO

The NGO shall be tapped and deployed in the ARC site to undertake the social preparation of the community and the associations. The NGO shall undertake the community organizing work to assist the DAR to form viable farmer's organization. The DAR provincial office shall select the NGO to work in the community. The NGO shall provide a full time community organizer in the ARC area who will stay in the community most of the time. Depending on skills' requirement in the training phase, the community organizer shall be backed up and supported by other members/staff of the NGO group, the DAR, other concerned agencies and institutions. The NGO shall provide the necessary training

for the strengthening of the organizations, specifically but not limited to: (i) value formation on self-help, self-responsibility, solidarity, cooperation, etc.: (ii) leadership training; (iii) organization management; (iv) marketing and financial management; (v) accounting/bookkeeping; (vi) savings mobilization; (vii) credit management; (viii) others, as needed.

The NGO to be selected will be a local NGO who has substantial experience in the field of participatory approach in community organizing, institutional organizing and agricultural development. The basis of the selection of the NGO would be the NGOs orientation towards grassroots community development, capable of community organizing and development work, knowledgeable in agricultural development, cooperatives, primary health care, commitment, integrity and reliability, to name a few.

Tap of Existing Organizations funded under DAR Undertaking Social Preparation Assistance Activities.

At present, the DAR is a recipient of ODA for the development of ARCs, the profile of which are attached in Annex Q. One of the existing ODA assistance to support ARCs, is the Technical Support to Agrarian Reform can be applied to the marginal areas as follows: on agribusiness linkages for agrarian reform beneficiaries and other skills' development and enhancement training not only for farmers but also to the other support agencies such as the LGU, the DAR directly involved with the community, etc. The DAR through special arrangements with TSARRD Project and other related projects shall provide part of their investment to undertake the above mentioned activities for the identified marginal areas.

Institutional Mechanism for the Social Preparation

For the implementation of the social preparation of the ARC area, it is proposed that a Local Technical Working Group (LTWG) be organized by DAR at the provincial and municipal level composed of DAR-MARO as chairman, the local government unit, MAO, CENRO, state university in the province, MHO, MSDW, DTI, DOST, Land Bank, ROS and NGO as members. The objective of the formation of the LTWG is to form a team that would assist in the social preparation of the organizations in the community before implementation of the infrastructure Projects. The assignment of the team members to the LTWG should be permanent until the duration of the Project. The formation of the LTWG shall be undertaken after the approval of the development plan.

After the formal presentation and the acceptance of the development plan at the local level, the DAR will initiate the formation of the LTWG. This group will initially undergo a workshop to be conducted by DAR (Central and Regional Office). The purposes of the workshop are: to prepare a team to work collectively in the social preparation of the community by providing their expertise for the duration of the activity; and detailed briefing on the development plans for the ARC area. The output of the seminar/workshop shall be: workplan for each

agency/institution for activities to be undertaken, implementation schedule and cost estimates for the activity plan. However, the programs and activities prepared may be changed from time to time depending on the need and on the basis of the progress of the overall activity in the marginal area.

The LTWG shall function as the agency/institution representative in all activities to be undertaken in the community in coordination with the Development Facilitator and NGO community organizer assigned in the area. Besides their activity that is to implement the programs conceived for the ARC during the seminar/workshop they will be consulted by the DF and NGO from time to time and be requested to provide technical assistance, training and/or extension activities as need arises.

The LTWG shall document all activities undertaken in the area for monitoring and evaluation purposes, to determine the progress of activity, to assess the impact of the activity on the community and would serve as a basis for future work in other areas.

The LTWG will meet regularly on a monthly basis. The meeting shall be presided by the DAR-MARO. During this meeting, progress, problems, needs, resolutions, etc. will have to be discussed. Issues and problems that cannot be resolved at this level will be presented to the PPMO for decision making and possible resolutions.

The structure of the institutional mechanism for the social preparation activity is presented in Figure 9.2-2.

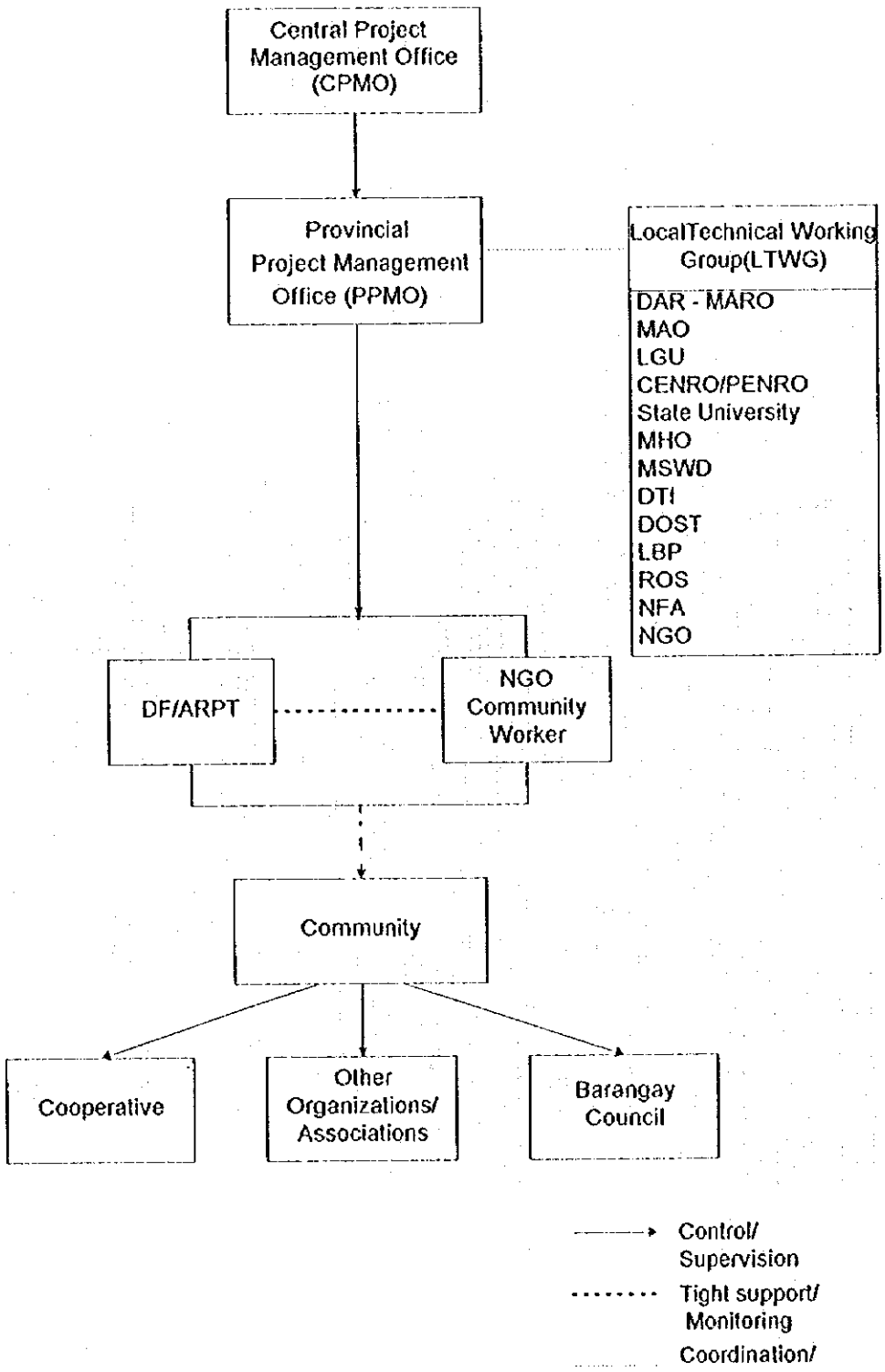
b) Strengthening of the DAR Field Offices

The DAR is the lead implementing agency for the development of the ARC marginal lands. It is therefore necessary that the implementors, specifically at the provincial and municipal levels be provided additional and necessary skills to keep up with the task of assistance in the development of the area. The capability building of the DAR field offices shall be prepared and programmed by the Bureau of Agrarian Reform Beneficiaries Development (BARBD). The BARBD will be assisted by the Bureau of Agrarian Reform Information and Education (BARIE) and the DAR Regional Office. Priority for training shall be provided in Areas covered by the Project. Specialized training shall also be provided such as, upland development technology, farm management, etc. This specialized training can be provided by existing agencies and institutions within the Project Area. Training and seminar shall be backed-up by on site visits of successful on-going projects of similar nature implemented by government, NGOs, private and business groups.

c) Institutional Strengthening of the LGUs

The enactment of the Local Government Code in 1991 was aimed at the improvement of local public service delivery and public investment resource

FIGURE 9.2-2 INSTITUTIONAL MECHANISM FOR SOCIAL PREPARATION



allocation. However, with the devolvement of the functions and institutions to the LGU, the expertise and efficiency in many areas has been lost and became weak. The main problem now affecting the LGUs is their build-up capacity and responsiveness to their constituents and their planning and implementation capacity. Considering the information and data gathered, the main problems of the LGUs are lack of funds and consequently, lack of personnel, equipment and field operation facilities to plan and implement programs and activities.

The development of the ARCs in marginal areas will need the support and assistance of the LGUs. It is therefore necessary that the local capabilities must be tapped and developed. LGUs directly involved, such as, the MAO, the MEO, MHO, MSWD, etc. must be strengthened and mobilized as a guarantee for continuity and sustainability. The LGUs must, therefore, acquire necessary expertise that will help them in the implementation of the ARC projects.

The strengthening of the LGUs shall be the responsibility of the national government (NG), specifically DILG and other support national agencies for providing necessary skills and competence to help support project implementation. Specifically, the NG will need to provide the following:

- Provide training on value/moral development for participatory coordination among concerned agencies,
- Provide incentives to which the LGUs can improve their ability to raise revenues locally,
- Provide services to LGU, specifically assistance to planning, budgeting, project monitoring and implementation,
- Provide technical support, e.g., project development, contracting and procurement, and
- Help provide access to credit for the LGUs machinery and equipment build-up

The strategies proposed for the program are:

- Access to formal training activities conducted by the NGs, specifically the Local Government Academy of the DILG, institutions, state colleges and universities, etc.,
- Skills' competence through upgrading and continuous training, and
- LGU and NG concerned prepare plan and corresponding budget allocation for the capability building-up component.

d) Training and Seminars

Training and seminars will be provided to the community organization or associations on continuos and regular basis to update and enhance skills and management capabilities. The NGO development worker will make an inventory of indigenous technology on farming systems within the Project Area and available technologies outside which are applicable to community needs. Substantial ideas

on farming systems will be provided and how these systems are applied at the field level followed by implementation of the approach at the field. Farm trials identified in the program shall be conducted, monitored and evaluated by the researchers (DA, PAO, MAO, others) and community members. Training and seminar will be backed-up by on-site training and cross farm visits and by information education campaign through public forum, distribution of information materials and radio broadcast to instill awareness. Initially, the training will be undertaken by the NGO in the area and assisted and supplemented by the Local Technical Working Group (LTWG).

Pre-membership training shall be given to all prospective members in the community. Regular meetings/seminars shall be conducted not only for the members of the association or organization but also to non-members so that they will see the advantages of joining organizations.

After completion of basic training on value formation and others mentioned beforehand, the NGO and DF assigned in the area shall consult and discuss with the organizations in the community, and determine the other specific skills and training needed by the organizations. Considering the identified training needs, the NGO together with the DF in the Area shall identify and source out agencies or groups who will provide the necessary skills training.

Training shall be provided after determining the needs of the community by the NGO and DF with the assistance of the LTWG. Training shall focus on but not limited to the following type of skills.

- Value formation, particularly on self-reliance through collective efforts
- Training on leadership and managerial skills
- Skills on networking and diplomacy for market sourcing, credit accessing for internal and external resource mobilization
- Skills on communication and negotiation where the participants will learn how to deal with the government and about who or what agency to talk to about specific issue
- Project proposal making for farming and community projects
- Training and exposure to health, sanitation, livelihood, responsible parenthood, specially for women
- Farm management technology, integrated pest management, crops and cropping system
- Land use plan at plot level through participation of the beneficiary
- Soil survey to provide adequate information on land use and soil improvement
- Investment plan and implementation on land development and soil improvement
- Resource mobilization to increase capital built-up to expand activity for organizations and to generate income generating activities.

e) Equipment and Facilities Support

In the self-assessment of support agencies conducted during the field works, the support agencies have identified the lack of facilities, equipment and transportation as the constraints in the implementation of the project in the marginal area. It is therefore necessary that support be provided with providing necessary facilities and equipment to the support agencies, specifically, the DAR, the MAO and the municipal government. Also, some basic equipment will have to be provided to the communities, specifically in the proposed barangay center where major activities of the community will be undertaken, (such as venue for meetings, seminars, forum, training, etc.). Motorcycles for mobility, computers, typewriters, projectors, television, video equipment for the barangay community for the training support and information campaign.

f) Partnership with Business Community

The LGU or NG shall tap the corporate community to provide financial support and encouragement for the program. The business partners can also assist by encouraging their employees to visit the area and/or organize field trips among the employees and planting trees from time to time. They can also assist by adopting a particular program of the community and provide the necessary support and logistic to implement this program for a specified time.

Considering the above-mentioned participatory approach and social and institutional capability plan, the development scenario expected of the rural community are measured by the following indicators (refer to Table 9.2-1):

9.2.3 Land Use and Environmental Management Plan

1) Land-Use and Soil Conservation Plan

The Marangog area has hilly and rolling terrain with relatively thin and no fertile top soils. Also, water resource is limited. Conservation of soils and land use aimed at sustainable agricultural production are required. Soil conservation measures are necessary for the land with a slope of more than 18 percent.

Soil is different from location to location. However, based on the slope of the area and on the results of the simple soil survey conducted, five cases of land use patterns are formulated. Among the five cases, Case-3 is selected as the most appropriate for the same reasons as Sappaac Area and also due to other the following reasons (refer to Figure 9.2-3):

(i) Most of the land with slope of 8 to 18 percent are suitable to develop fruit-based farming.

(ii) However, most of the areas with slope of 18 to 30 percent are only marginally suitable for upland crops because of shallow topsoil or rather high content of gravel and high intensity of rock outcrops.

The proposed land use for Case-3 is indicated in Table 9.2-1. Supplemental irrigation for paddy rice during wet season and irrigation for vegetables including squash will be available with the proposed irrigation project.

Fruit tree-based farming system will be developed in 90 percent of the land with slope of 8 to 18 percent. In the remaining ten percent of this land category, fast growing forest trees may be grown. In the areas with slope of 18 to 30 percent and where gravel is abundant, forest trees for production of timber are proposed to be planted.

Besides the above mentioned land use pattern, detailed land use plan at plot level has to be formulated in the Project Area. Hence, individual farm design shall be prepared with the participation of beneficiaries before any physical development is made. Also, additional soil survey on land development and management plan have to be carried out to provide farmers with basic information on soil and crop management..

2) Environmental Management Plan

All government agencies and private companies are required to prepare an environmental impact system (EIS) assessment for any project or activity that will affect the quality of the environment. These assessments that are systematic studies of the relationship between the project and activity and its surrounding environments are important in obtaining an Environmental Compliance Certificate (ECC) issued by the DENR. The ECC is needed to obtain approval for project implementation. The EIS is required only for projects in environmentally critical areas that includes parks, tourist destinations, habitats for endangered species, areas of unique value and in large scale industry and infrastructure projects.

For the marginal area development, an EIS is not necessary for the scale of the proposed projects does not belong to the above-mentioned restrictions.

Besides this environmental study, environmental conservation measures should be mainly undertaken through farmer's self-effort.

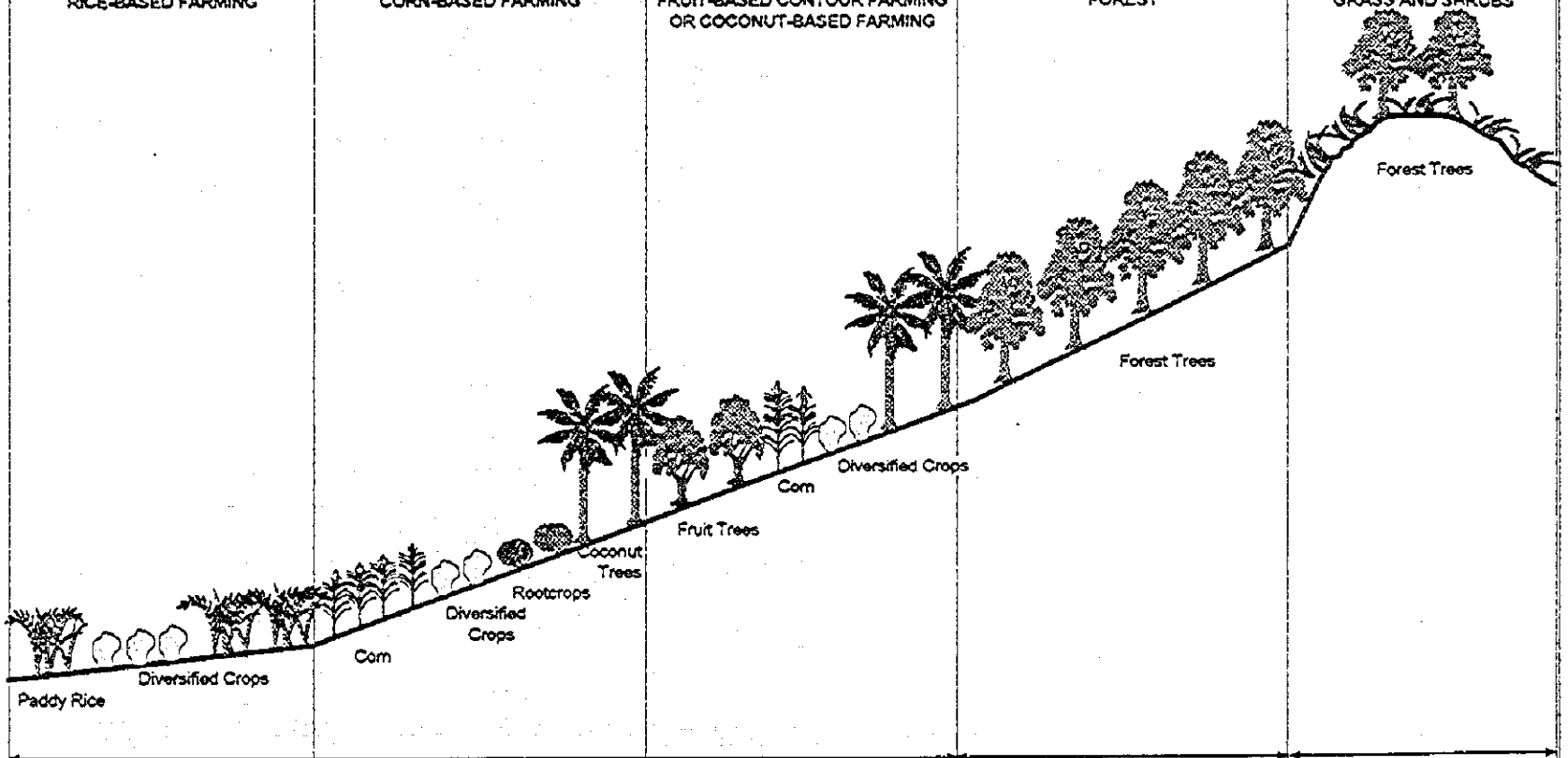
a) Soil Conservation

Recommended soil conservation practice, both for the on-farm and off-farm, training of the beneficiaries, protection of the orchard or agroforestry establishment from grassland fire, establishment of nursery for the pasture grasses to be used for vegetation cover of the riser and seed propagation of Flemengia, and demonstration farm for other soil conservation options for farmers to observe like

Table 9.2-1 Measuring Indicator for Rural Community Development

Indicators	Year 4 (After Social Preparation)	Year 6 (Community Development Program: NGO phase-out)
1. Status of Organization	Organization units/ committees are functional; cooperative activity has expanded to include activities other than consumer services and re-lending schemes	Self-reliant organizations with multi-purpose functions (retailing of basic household needs; provision of credit; rental & sale of farm input, seeds, implements, post harvest facilities; marketing services to rice, corn, vegetable, fruit farmers; small scale-processing of farm products; alternative livelihood activities bakery products, hollow-block making)
2. Member Participation in Group/Community Activities	Participation has expanded to community mobilization and self-help activities	Full & active participation in organizations & in solution of community problems & needs.
3. Attitude of the Community	Gradual break from negative traditional values (luck, destiny, faith)	Positive attitude towards work & life (enthusiasm for work, attitude towards new & innovative ideas, payment of debt)
4.. Trust and Confidence	Members of PO have grasp the importance of group work & endeavor; the importance of PO & how members depend on one another for success; there is less or minimum interaction	Full understanding & commitment to PO goals & objectives; there is cooperation & harmony though at times' conflict cannot be avoided, there is distribution of functions & responsibilities.
5. Leadership Pattern	Planning and decision-making by majority; existence of functional working committees	Planning & decision-making by majority; existence of functional working committee; emergence of new & indigenous leaders, local trainers.
6. Initiation of Organizational Projects	Initiation of low-financed projects with assistance from outside communities	Initiation of medium & high financed projects w/ minimum or no assistance from outside resources; networking w/ GOs, NGOs, private groups for relevant assistance & other services
7. Financial Status of Organizations	Medium level of financial viability	Self-reliance in capitalization hence can engaged in multiple income generating activities
8. Viability of PO or Community to Sustain Project Activity	Some viability; capable to sustain successfully small scale projects	Economically viable; capable of loan payment; capable to sustain medium & big-scale projects
9. Organizational Stability	Organizationally stable but still needs guidance	Very stable; has already established political presence as already recognized by the LGU and others; may have representations in LGU and other entities.
10. Technical and Farm Management Skills of Members	Medium technical and farm management skills through training	Functional farm-management and technical skill

FIGURE 9.2-3 PROPOSED LAND USE PATTERN (CASE-3)



FARMING SYSTEM	RICE-BASED FARMING	CORN-BASED FARMING	FRUIT-BASED CONTOUR FARMING OR COCONUT-BASED FARMING	FOREST	GRASS AND SHRUBS
		Agricultural Production Area		Production/Protection/Forest	Idle/Uncultivated
Predominant Slope (%)	0-3	3-8	8-18	18-30	> 30
Proposed Crops / Trees	Paddy Rice Diversified Crops	Corn Beans Root Crops Coconut Trees	Coconut Trees Fruit Trees Diversified Crops Hedge Row Shrubs	Forest Trees Coconut Trees Fruit Trees	Forest Trees
Present Crops / Trees	Paddy Rice Corn Root Crops	Corn Rootcrops Coconut Trees	Coconut Trees Shrubs/Cogon Grass	Shrubs/Cogon Grass Coconut Trees	Shrubs/Cogon Grass Kaingin Forest Trees

other type of hedgerow, and pasture grasses on the riser are the parts of the soil conservation plan.

The on-farm soil conservation for various slope conditions shall be simple and cheap method of soil conservation-based farming system. The off-farm soil conservation will use bio-engineering techniques as grass waterway and check dam constructed using the branches of trees, boulders, shrubs and grass.

Upland with Land Slope Less Than 8 %

On slopes less than eight percent, plowing along the contour, intercropping, crop rotation and strip cropping of row and creeping plants will be promoted. The runoff from the farmlot will be disposed properly by constructing dike along the slope with ditch on the upper slope to convey the runoff water into the canal. The ditch should have sediment traps along the channel to avoid the concentrated surface flow by digging about 80 cm deep.

Flemengia Contour Hedgerows

Contour hedgerows of flemengia with napier grass on the riser will be established for slopes of 8-30 percent. Guinea, setaria and star grass or any fast growing pasture grass could be used instead of napier grass or both. The vertical distance between contour hedgerows is one to two meters (4-10 m surface distance between contour). The use of a "T-stick" with appropriate marking of the vertical distance will be very useful for setting the height of the riser. A-frame is used to establish the contour line using bamboo stick as the markers. With marked contour line at the midpoint, about one meter wide is thoroughly cultivated with a plow to form a raised bed. Two furrows spaced 0.5 m apart are prepared.

Inoculated pre-treated seeds of flemengia are drilled at the rate on 2-3 seeds per hill with a spacing of 0.6 cm between hills. The seeds shall be firmly covered. Plant the napier tillers with spacing of 30 cm or drill the riser with napier seeds at five kg/ha.

Contour canal is prepared below the riser that will convey the runoff water from the alley into the drainage canal. Soil trap of 0.8 m deep and one meter long is constructed in the drainage canal to retain the transported soil materials. Check dam is established to reduce flow velocity and the eroding power of the runoff water. This is placed at the drainage canal using big kakawati branches with diameters of 3 cm. Bamboo split strips are weaved between peg. Boulders or bush is placed on the upper side of the dam. The check dam will be closely spaced on steeper channel. This should be maintained after heavy rain.

Replant the Missing hills of hedgerows. Cut the hedgerows to one meter height from the ground when they begin to shade the field crops. The cutting shall be placed in the alley as mulch. To minimize competition with the food crops, trim

the roots that spread into the alley using a spade or plow. The napier grass can be trimmed to 15 cm from the ground as fodder for cattle or carabao.

A contour ditch is established at the end of the uppermost alley to collect the surface runoff from the upper part of the hilly area and divert the runoff into the drainage canal.

For annual food and cash crops, strip cropping and rotation of legume and non-legume should be practiced to maintain soil fertility and soil condition. Non-legume is planted on the strip previously planted to legume. The stover of the harvested crops should be filed on the hedgerows. No burning of farm residue should be done.

If possible, cultivation of alternate strip should be done till the flemengia is fully grown, so that the unplowed strip will retain the soil particles transported by runoff. Otherwise, the strips of flemengia hedgerows are too small to retain the transported soil materials during the first cropping season.

Plant perennial crops every third strip and borders of the farmlot. Only the spot for planting is cleared and dug. Only ring weeding is employed until the hedgerows are large enough to hold the transported soil. If the soil of the strip is bouldery, gravely, or without top soil and not suitable for annual food crop, permanent crops (as fruit trees or forest tree species) tolerant to drought are preferable. Short and medium term crops are planted between the strips of permanent crops as a source of food and regular income while waiting for the permanent crops to bear fruits. To avoid shading, short plants are planted away from the tall ones.

Table P.2-23 shows that the contour cropping and contour hedgerows could markedly reduce the loss of the soil from the farm. This requires proper maintenance of the channels below the risers and soil traps. Repair of the check dams and hedgerows after the occurrence of abnormally high rainfall events particularly when the legume and the pasture grasses are not yet well established are required. The grasses and shrubs during the construction of the hedgerows should be pile on the hedgerows.

b) Establishment of Napier Grass Nursery

In the demonstration area, 0.25 ha of farmlot will be prepared by plowing and harrowing several times to have a fine seedbed. The existing weeds on the farmlot should be reduced if not eliminated by allowing the weed seeds to germinate and killed by harrowing. Do these twice or three times to reduce the weed population before seeding the Napier seeds. Make furrow with 75 cm spacing. The napier seed is placed in the furrow at the rate of 6 kg/ ha.

c) Establishment of Flemengia Seed Production

Prepare 0.25 ha by plowing and harrowing till a fine seedbed like for seeding upland rice in the demonstration area. Make furrows of one meter apart and then drill the Flemengia seed at the rate of 6 kg/ha. Inoculate the seeds with Rhizobium before seeding. Hilling up should be done when the plants are about 50 cm tall. Weeding of the area between rows should be done till the canopy close.

d) Farmers Training on Soil Conservation

Farmers training and cross visit to the SALT area of other farmers will be done to develop skills and knowledge on soil conservation. Farmer beneficiaries that require soil conservation establishment would be organized for a cross visit in Matalon, Southern Leyte before the conduct of the actual field training in the demonstration farm. The cross visit will expose the farmers to the benefits of and other issues on SALT establishment, based on farmers' experiences and maintenance. The training will include the use of A-frame to establish the contour lines of the hedgerows, the preparation of land along the marked contour line, the planting of flemingia and napier, and the construction of contour ditches below the riser, silt trap, drainage canal, and check dams. Work group will be formed to assist each other through labor exchange in establishing SALT.

These activities will be undertaken as a part of works of multi-purpose cooperatives.

e) Contour Rock Walling

In the farmlots with abundant rocks on the surface like the farm near the Barangay Proper, contour rockwalling will be appropriate. After the contour lines have been established and the stakes are still on the ground, upslope side of the contour stakes is dug to a depth of at least 15 cm. This is to ensure firm anchorage on the ground so that during heavy rainfall the structure will not slip or collapse. Stones and boulders are piled with bigger ones on the base. If there are enough stones, make the height of the rockwall parallel with the midpoint of the vertical distance between two contour lines. Kakawate stem cuttings or seeds are planted at the base of the rockwall to stabilize it. The contour rockwalling is as efficient as the contour hedgerows (Table P.2-17).

f) Soil Erosion Control from Infrastructure Projects

The drainage canal of the road must consider the size of the catchment above the road and the maximum rainfall intensity at 80 percent exceedance probability. Construction of the barangay road should start toward the end of the wet season. The spoil from the removal of the over burden should not be disposed into the waterways or creek to prevent sedimentation of the creek. It should be placed in areas free from runoff and protected by seeding grasses. The cut slope should have 1V: 3H dimension to have a relatively stable surface. Check dam

should be established for safe disposal of the runoff from the drainage canal of the road. Ditches, culverts, and catch basins must be kept free from debris and obstruction. Shoulder and bank undercutting must be avoided.

Seeding of grasses and planting of shrubs should be done at the cutslope and backslope to control soil erosion and sedimentation of the canal.

During the operation of the barangay road, cleaning of the sediment in the channel, repair of the eroded channel, and construction of gully plug using vegetative method should be done to minimize the cumulative impact

g) Protection of the Agroforestry Establishment from Grassland Fire

Grassland fire is a major hazard during the dry months for the newly established agroforestry located on or near the cogonal area. Natural fire breaks, fire lines and counter fire are the most common fire control in the upland. Establishment of strip of banana hills around the agroforestry farmlots together with under brushing before the onset of the dry season will deter the spread of grassland fire. The various methods for controlling grassland fire to be carried out by LGU are follows:

Natural Fire Breaks

Any strip corridor free from vegetation like road, river and canals will deter the spread of fire. The removal/minimization of vegetation beside these natural firebreaks during dry season will increase their ability to contain a fire.

Fire Lines

The 10 m wide vegetation-free strip needs to be established at the borders of the agroforestry and/or forestry establishment on the grassland and at 50 m interval inside the plantation. Fire lines at the borders can be established using tillage equipment or by controlled fire started the early part of the dry season. The second option is quite risky and should be done by experienced personnel.

Fire lines and natural fire breaks are the first options to prevent the spread of fire from the nearby areas. During the outbreak of grassland fire, the farmers should stay outside the outermost fire lines to beat off the small fires being initiated by the sparks coming from the conflagration.

Counter-fire

A controlled counter fire is initiated outside the borders of the plantation when the major is early detected early enough and the wind direction changes towards the fire. The counter fire will move towards the major fire. The spread of

the fire can be stopped in this manner. It is also initiated at the upper slopes of a hill on the other side. It is the spreading fire so that it will spread towards the major fire.

h) Watershed Rehabilitation and Protection

The watershed of the small irrigation dam at the tributary of Hilongos River should be reforested to enhance the water yield to irrigate the vegetables. Technical assistance of the DENR-PENRO and CENRO should be sought to delineate the watershed of the irrigation source to declare it as a critical watershed. The Irrigators Association of the ARB must reforest the delineated watershed to ensure the sustainability of the water yield.

Tibig (Ficus nota) will be planted in the easement of the creek and the farmlands. This species is good for watershed protection but undesirable for fuelwood. Farmers should be encouraged to adopt soil conservation based farming system together with agroforestry using gmelina, mahogany or any species of significant to the community.

The area around the spring of the source of drinking water in sitio of Cabangangan should be acquired by the Sangguniang Barangay through eminent domain and just compensation. The area should be at least 0.5 ha and should be reforested and fenced so that nobody will enter. This will protect the spring from pollution. The level-II water supply improvement shall include this sitio for equitable sharing of benefits.

i) Environmental Education

Supplementary curricular material on Environmental Science for the Marangog Elementary School will be developed to elucidate the basic concepts in ecology, environmental health, and nutrition using the development in the Model ARC as the example (Workbook in Science, Health, Nutrition, and Environment: the Case of Marangog ARC in Marginal Area). This will help the children of the farmer beneficiaries to understand and appreciate the project components and the interrelationships of various activities of the Project for the development of the community. The VISCA Program in Applied Tropical Ecology, University of the Philippines Los Baños-Institute of Environmental Science and Management, and DECS-Hilongos District will work together in the preparation of the curricular materials including teacher guide and the pilot testing in Marangog. The pilot-tested materials would be used for the ARCs in the marginal areas in the province and even in the region.

The environmental video tapes for training of the beneficiaries at the multi-purpose building will be made available to the pupils of Marangog Elementary School DECS.

j) Rural Life

Production of Medicinal Plant

The Barangay Health Workers and the Midwife assigned in the community should make an inventory of the available medicinal plants in the community. The medicinal garden of the Barangay Health Station should be expanded to have a nursery of medicinal plants in cooperation with the ARB Cooperative.

Mother plants of uncommon medicinal plants will be acquired and propagated in the main nursery and in the medicinal garden. Training for housewives on the use of the medical plants shall be conducted.

Public Health

The home garden should be improved to be able to grow low input requiring vegetables like winged beans, lima beans, ampalaya, patola, malunggay, papaya and the like. The home garden will provide good supply of nutritious vegetables for the households. The animal waste should be used as compost for the crops in the home garden. Pigeon pea and malunggay could be grown at the boundary of the property as fence and at the same time as source of plant protein.

Primary health and population education must be a continuing program in the Area. They should be aware of the preventive measures to avoid the causes of morbidity like the needs for having a toilet in the households. The use of the herbal medicine for the common diseases should be taught for all members of the community.

The facilities of the Barangay Health Station must be upgraded to provide first aid treatment. The basic medical instruments for diagnosis and treatment of common diseases and some medicine should be provided.

k) Environmental Monitoring and Evaluation

The community-based monitoring evaluation team for the implementation of the various components of the project should monitor the environmental impacts of the project activities. This environmental monitoring and evaluation team are composed of the representatives of the farmer beneficiaries selected by the community, Sangguniang Barangay, MARO Office, Municipal Government, and the NGO assisting the project.

The changes in the physical, biological, social, and economic environmental indicators must be established. This would require the establishment of the baseline environmental data before project implementation. Training of the monitoring and evaluation team is needed to identify and quantify the parameter including the methodology and the interpretation of the data. The results of the

monitoring and evaluation must be presented to the farmer beneficiaries for decision and action particularly against negative impacts.

9.2.4 Farming and Institutional Development Plan

1) Proposed Crop Selection and Cropping Pattern

Paddy rice will be planted during wet season, followed by diversified crops as vegetables (squash) in the irrigated rice land. In the rainfed rice land, wet season paddy followed by corn will be grown. As for the gently sloping upland, the same existing crops as corn, root crops (sweet potato, gabi and cassava) will be produced during the wet and dry season.

In the proposed land use, about 50 percent of the cultivation land will be covered by the existing coconut land. Since most of the coconut land has only low intensity of coconut trees, it is proposed to plant additional coconut trees. Also, such crops as abaca, banana, corn and beans (peanut and mungbean) could be intercropped to develop multi-storey cropping in the coconut land.

In the land with 8-18 % slope, jack fruit will be selected as the representative tree crop from the aspect of soil suitability and marketing. Production of jackfruit is recommend by Department of Agriculture (DA) as priority crops in Region-VIII, due to large domestic demand and great export potential. The multiplication technology of the fruit has already been developed at the regional experimental station. An adequate supply of grafted seedlings is already available for distribution. The planting design for the fruit tree-based farming is indicated in Figure F.2.-46, where nurse tree of falcata (Paraserianthes falcataria) and hedgerows will be planted to protect the soils from soil erosion and to improve soils. In this farm, upland crops as corn and beans (peanut and mungbean) can be intercropped especially during the establishment period of fruit trees.

In areas with slope of 18 to 30 percent, forest trees as mahogany and bagalunga can be grown respectively, as climax and nurse trees (refer to Figure F.2-49). In this area, ten percent of the total area are allotted for protection forest to prevent land sliding as well as forest fire.

The overall cropping intensity in the proposed cropping pattern is accounted at 168 percent to the total cultivated land for Case-3 as shown in Table 9.2-2.

2) Proposed Farming Systems

Establishment of soil conservation-based farming systems are the most important system in Marangog Area. Besides the improvement of the existing farming systems of rice, corn and coconut-based systems, fruit tree-based farming system

Table 9.2-2 Proposed Cropping Area in Marangog Area (Case-3)

Kind of Land	Land Area (ha)	Cropping Intensity (%)	Crop	Season	Area
1. Rice Land					
- Irrigated	11	100	Paddy Rice	Wet	11
		100	Diversified Crops (Squash*1)	Dry	11
			Subtotal		22
- Rainfed	13	100	Paddy Rice	Wet	13
		60	Paddy Rice	Dry	8
		40	Diversified Crops (Corn)	Dry	5
			Subtotal		26
Total	24				48
2. Upland	16				
- Rainfed		30	Corn	Wet	5
		70	Root Crops (Sweet Potato*2)	Wet	11
		80	Corn	Dry	13
		20	Beans (Peanut)	Dry	3
			Subtotal		32
3. Coconut	86				
		100	Coconut		86
		20	Corn	Wet	17
		20	Beans (Peanut)	Dry	17
		10	Banana		9
		10	Abaca		9
			Subtotal		138
4. Orchard	29	40	Banana		12
		60	Abaca		17
			Subtotal		29
5. 8-18% Slope Land	17	20	Corn	Wet	3
		20	Beans (Mungbean)	Wet	3
		20	Corn	Dry	3
		20	Beans (Peanut)	Dry	3
		80	Fruit trees (Jackfruit)		14
		10	Hedgerow plants (Flemingia)		2
		18	Nurse trees (Falcata)		3
		12	Fast growing tree (Gmelina)		2
			Subtotal		33
6. 18-30% Slope Land	29	100	Climax trees (Mahogany*3)		29
		100	Nurse trees (Bagalunga)		29
			Subtotal		58
7. More than 30% Slope Land	106				
8. Other Land	23				
Total	330				338

Overall cropping intensity = 338ha/ (330ha-106ha-23ha) x 100 = 168.2%

Note: The crops in the parenthesis show the respective representative crops.
*1.... Including stringbean, tomato, eggplant, etc.
*2.... Including gabi, cassava, etc.
*3.... Including narra

Source: JICA Study Team

and production/protection forest shall be introduced in the development of the Area. These farming system and production/protection forest shall be expected to increase agricultural production and sustain land productivity. On the other hand, the nurse trees and hedgerows will protect the land from soil erosion. Also, it will improve soils directly and supply the materials for organic fertilizer.

Soil management technology including application of phosphate and organic fertilizer and remedy of zinc deficiency shall be developed in the Area. Moreover, it is necessary to improve farming practices, which may include use of quality seeds and seedlings and adequate farm inputs. The recommended seed and seedlings, the required farm input for respective crops and the farming practices for each crop are shown in Table F.2-29 and Figure F.2-50 to F.2-58.

The unit yield and crop production with project for respective crops are estimated as shown in Table 9.2-3.

To supply quality seedlings for fruit, nurse, and forest trees and other seedlings, a nursery station is proposed at the barangay level. The layout of the nursery is indicated in Figure F.2-59. Furthermore, a demonstration farm shall be established to introduce the respective farming system technologies in the Area. The facilities, items and costs required to establish the nursery and demonstration farms are shown in Table F.2-31 and F.2-32.

The fruit tree-based farm and the production/protection forest shall be established within four years as shown in Figure 9.2-4

3) Animal Husbandry and Inland Fishery Plan

a) Animal Husbandry

From the study of the present situation and projections in the Area, the following possible projects are identified:

(a) Carabao Development

This program is a joint undertaking of the Project Area (DAR) and the Philippine Carabao Center (PCC). PCC network will support the dispersal program, training of farmers and establishment of community organization and cooperative. PCC will also assists in addressing the control and eradication of diseases.

Carabao Dispersal

Female pregnant F1 carabaos will be distributed to qualified and interested farmers' beneficiaries, which are selected based on proper criteria. These carabaos shall be introduced from PCC at Visayas State College of Agriculture (ViSCA).

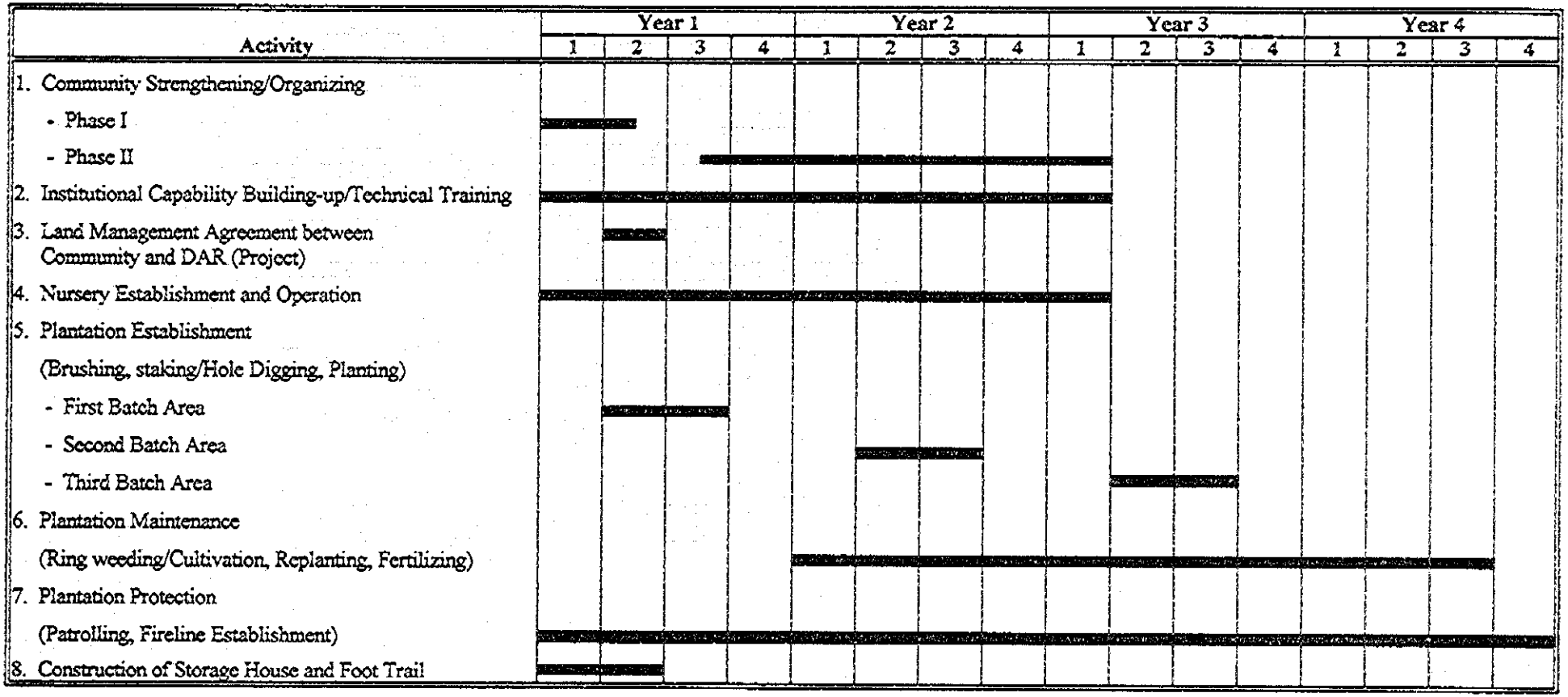
Table 9.2-3 Crop Production With Project (Case-3)

Crop	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Remarks
1. Rice land, Irrigated				
Wet season				
- Paddy Rice	11	4.4	48	
Dry season				
- Vegetables(Squash)	11	3.2	35	
Sub-total	22			
2. Rice land, Rainfed				
Wet season				
- Paddy Rice	13	3.1	40	
Dry season				
- Paddy Rice	8	3.1	25	
- Diversified Crops (Corn)	5	3.0	15	
Sub-total	26			
3. Upland				
Wet season				
- Corn	5	3.0	15	
- Root Crops (Sweet Potato)	11	6.8	75	
Dry Season				
- Corn	13	3.0	39	
- Peanut	3	0.9	3	
Sub-total	32			
4. Coconut Land				
- Coconut,Existing Crop	34	0.7	24	
- Coconut,Newly Planted	52	2.5	130	
- Banana	9	10.0	90	
- Abaca	9	1.3	12	
- Corn,Wet season	17	3.0	51	
- Beans(peanut)	17	0.9	15	
Sub-total	138			
5. Orchard & Abaca				
- Banana	12	10.0	120	
-Abaca	17	1.3	22	
Sub-total	29			
6. Contour Farming & Agroforestry				
- Fruit tree (Jackfruit)	14	3.3-7.5	105	
- Corn, Wet season	3	3.0	9	
- Beans (Mungbean),Wet season	3	0.9	3	
- Corn, Dry season	3	3.0	9	
- Beans (Peanut)	3	0.9	3	
- Nurse trees (Falcata)	3			
Pulpwood		20.0 cu.m	6	6th Yesr
Pulpwood		47.7 cu.m	143	10th Year
Fuelwood		4.0 cu.m	12	10th Year
- Forest Trees (Mahogany)	29			
Fuelwood		7.0 cu.m	203	6th Yesr
Poles		8.2cu.m	238	15th Yesr
Sawlog		77.9 cu.m	2,259	25th Yesr
- Forest Trees (Bagalunga)	29			
Poles		16.6 cu.m	481	7th Yesr
Poles		56.1 cu.m	1,627	15th Yesr
Fuelwood		8.0 cu.m	232	15th Yesr
- Gemelina	2			
Fuelwood		10.8 cu.m	22	7th Yesr
Poles		20.8 cu.m	42	10th Year
Sawlog		51.7 cu.m	103	15th Yesr
- Hedgerows (Flemingia)	2			
Sub-total	91			
Total	338			

Note: The crops in the parenthesis is show the representative crops.

Source: Study Team

FIGURE 9.2-4 SCHEDULE OF ESTABLISHMENT FOR CONTOUR FARMS



Training of farmers in the Area is also supported by the PCC at Visayas State College of Agriculture (ViSCA).

As an alternative plan of animal breeding, raising of pigs is considered. However, raising of pigs will be carried out by only a few beneficiaries, and this situation does not meet the overall requirement of the Project plan. Therefore, carabao dispersal plan is recommended. Furthermore, carabao dispersal is vigorously being promoted by PCC, so that the plan is being considered to be expanded in the Area.

Carabao Mini-Breeding Station (Bull Camp)

Heat or weak estrus is a serious constraint in carabao breeding. Under these field conditions, it is necessary to (i) build a mini-breeding station; (ii) females be one of group and better still; (iii) teaser bulls be provided. A bull keeper will be trained at PCC and responsible for feeding the bull. Bull will also be introduced from PCC at CLSU. The use of natural breeding might be the best alternative in upgrading the native carabaos.

The maintenance and management costs of the breeding station will be shouldered by the beneficiary farmers' organization.

(b) Poultry Development

Native chickens have been raised for meat and eggs for centuries. It has been an invaluable source of protein food for the rural people. It is adaptable to rural conditions, generally much hardier and more resistant to diseases and high temperatures than the exotic breeds. Furthermore, their meat and eggs are generally regarded as of better flavor. At present, consumer demand is increasing and thus has a great potential in the market. However, the rural people still rely on natural incubation, since they do not have artificial incubation. Provision of mini-incubators (kerosene operated) does not need special techniques. Therefore, with the incubator, the farmers can easily produce significant number of chicks.

4) Post-Harvest and Agro-Industry Plan

Post-harvest plan in the Project Area should be based on the solution and reduction of the present problems and constraints and be formulated on the premise that necessary infrastructure and farming system development plan would be properly implemented and the production of crops be increased. The present farming and institutional development process and post-harvest conditions should be considered. As the development of post-harvest may depend on the development of farming technology, it is difficult to introduce full-scale development at one time. It should be conducted gradually, not promoted everything simultaneously. Therefore, the development plan of the post-harvest for the Area was formulated as shown below:

(a) Primary Stage (one to three years)

Minimum Essentials

- Encourage the farmers to sell their produce in bulk or what we call "Organized Selling." Small production when pooled together becomes bigger in volume. In this manner, the farmers can dictate their price without control by traders. Or, they can directly negotiate/transact their business with established marketing institutions, and

- Encourage the farmers to buy farm inputs also in bulk or what we call "Organized Buying." As a matter of business practice, private dealers give significant discounted rates when customers buy in bulk. There are even instances where cost of delivery is free of charge. In this way, costs of farm inputs are drastically lowered adding to farmer's income.

Some Hard Infrastructure Measures

Aim to accelerate the farmer's income and ultimately sustain some hard infrastructure measures are suggested as the above Chapter already mentioned.

- All-weather farm-to-market roads,
- Conduct continuos organizational, managerial, and technical training programs, and
- With all the things mentioned above properly in place, the cooperative/s may invest in transportation business. The farmers can benefit from the business because the transportation cost can be minimized.

(b) Secondary Stage (four to five years)

Organizational Consolidation

This phase calls for the formation of Federation/s. In this manner, exchanges of ideas among farmers, market positioning, and influencing market price policies are consolidated.

Economic Integration

This phase calls for the integration of some economic activities, to wit:

- Establishment of central processing facility, and
- Area-specific Production Activity, for example, one to three ARCs producing the same high value crops either to create a demand or responds to market demands.

As the proposed major crops in the Area are rice and corn, the farming plan should consider post-harvest equipment and facilities, that are available and popular nearby the Project Area.

Pre and Post-Harvest Plan

The production volume of rice and corn in the Project will be increased by 113.5 and 138 ton/year, respectively, based on the farming development plan (Case-3) and also the lack of man-power for harvesting season may become severe, the introduction of post-harvest equipment and facilities could solve its deficiency problems.

Threshing and drying facilities will be effective in improving the quality and reduction of harvesting and processing losses. Prime mover type rice thresher is proposed, because the manual type is less popular in the Area and within the vicinity. One multi-purpose dryer will be proposed in the warehouse for storage of input, to get better input, to obtain better selling prices and to store emergency food.

The plan of multi-purpose dryer and warehouse with multi-purpose dryer in the same size as rice or corn agro-industry center, are shown in Figure K.2-1 and K.2-2. Simple mechanical dryer will be introduced to obtain high quality seeds by the farmers themselves. Moreover, agricultural machines proposed will correspond to the initial farming development plan. These agricultural machines are of animal-drawing type and are more suitable for the proposed farming system.

Agro-Industry and Processing

Production volume of rice and corn in the Project Area will be increased with the provision of infrastructure and farming technology. However, the volume will not be sufficient for the introduction of rice or corn agro-industry center, even a small-scale milling plant. On the other hand, since road and bridge may be constructed/rehabilitated in the Project, it will facilitate the access to the market.

These plans are made based on the selection criteria for the post-harvest and agro-industry facilities shown in Table K.1-5. It was revised according to the results of further study considering the farmers' intentions and present conditions.

In these development plans, multi-purpose dryer and warehouse will require installation areas. Selection of suitable places for the plan is made based on the following consideration;

- Better access for collecting and forwarding the produce,
- Flat land and enough space for installation,
- Near the production area and residence, and
- Preferably idle or public land.

However, further confirmation will be needed at the detailed design and implementation stages. It is essential to obtain the legality of land ownership.

Plans for other farming and institutional development of agro-industry and processing, such as, coco-charcoal making and banana chip making will be considered according to the farming development. However, since the development should be implemented step by step, they should now be started considering the future expansion of home made or cottage industry.

These developments should be carried out by using the farmers' extra time and by mean of the activities of WID. Initial stage of development will require the training and instruction by the government and related agencies concerned. This training and instruction should be conducted periodically. Special equipment and facilities will not be required, except for the meeting and demonstration rooms (maybe inside the barangay hall) at the first development stage. However, the farmers' intention for development and cooperation will also be required.

Development plan is shown in Table K.2-9.

5) Marketing Plan of Agricultural Products

With the implementation of project, it is envisioned that agricultural productivity and production at Marangog Area will increase substantially, both in volumes and varieties. Besides having more agricultural commodities to sufficiently meet the home consumption requirements of all households in the Project Areas, a much larger marketable surplus of both the traditional and new commodities is expected. This requires a good and efficient marketing plan wherein the objectives of increased income and improved quality of life may be realized.

The integration of rural roads in the Project will facilitate the transportation of large volume of production to the market at preferable prices to the producers. The rural roads will provide opportunity for traders from both inside and outside the Project Area to venture in marketing the increased farm products. The post harvest and agro-industry components of the Project are expected to help improve the qualities of the various produces while creating new products not earlier existing in the market.

To cope with the expected large increases of agricultural and related products, the foremost plan already included as part of the project is institutional development. The program envisages the establishment of strong and efficient farmers or people's organization to facilitate or directly take action in moving much the increased agricultural production to the market at reasonable prices. Support services in the forms of training, information, and other technical assistance are already incorporated in the Project.

The existence of Barangay officers along with cooperatives in the Project Areas will help expedite the successful implementation of this institutionalization development of the Project. Once the cooperatives or any other forms of less formal groupings of farmers are ready to take up the marketing function, how they will work it out should totally be left to their discretion. DAR and other public institutions should only play the role of technical and institutional supporters to them.

This institutionalization movement, particularly among the rural poor, has been known to be time-consuming and subject to strong resistance from those having benefited from the unorganized poor. In many cases in the past, efforts toward creating such efficient people's organizations failed to create sufficient impact within a foreseeable period. Apart from the need for strong commitments from all concerned, supplementary marketing activities before the full fledge operations of a strong people's organization have to be put in place.

The supplementary measures that may be initiated along with the rural institutionalization program of the Project are the following:

- The establishments of a farmer's market in the Project Area where the buyers and the producers are invited to meet, negotiate and bargain on the prices as well as other marketing options acceptable to both,

- The creation of a program to promote collective ownership of selected marketing facilities such as scales, dryers, shellers, small trucks, etc., and

- The local functionaries of DAR, DA and other related departments are to regularly provide all price and market information to the villagers. They, together with other LGUs and NGOs, may serve as technical advisors to the people's organization on any marketing problems of their produce.

6) Farmers' Organization Plan

a) Present Status of the Marangog Farmers Multi-purpose Cooperative

Present status of the Marangog Farmers Multi-purpose Cooperative is in pre-takeoff stage. The activity is limited only to buying and selling of copra and empty bottles. Even this activity has stopped due to lack of capital. There is no other income source for the cooperative. The present cooperative members are only 18 percent of the total farm households in the barangay. The cooperative has a plan to increase it's members, because the present membership is composed only of barangay officers and others who have been receiving honorarium from the barangay council. An intensive campaign showing benefits of joining cooperatives must be presented to the community. Considering such situations, the five year plan was prepared as shown below;

b) Development Plan of the Cooperative

To attain the above aims, five year development plan of the cooperative was made as shown below:

Five Years Development Plan of the Cooperative

Year	Aims	Activities
1st to 2nd year	Strengthening of organization and management of cooperative	Education and training of cooperative members, officers and employees are needed to understand fully the aim and principles of cooperative, the right and the duty of the cooperative members, management of cooperative, etc.
	Increase in production and introduction of cash crops	The cooperative concentrate their energies on increase in production of crops and introduction of cash crops (coconut, abaca, jackfruit, mango) with improved technology and expanded area by project. The expected production increase with the project is 3.3 times in lowland crops, 1.9 times in upland crops and 3.4 times in coconut and 2.3 times in orchard.
1st to 5th year	Promotion of group activities	(i) Group purchase of agricultural production materials such as improved seeds/seedlings, fertilizer, agricultural chemicals and agricultural implements/ machinery through cooperative. (ii) Group sale of agricultural products through cooperative. (iii) Group production of abaca suckers
	Management of consumer store	The cooperative opens consumer store for the convenience of the residents and for profit.
	Recruiting new members	To strengthen the cooperative organization, the cooperative recruits new members.
	Accumulation of cooperative capital	Cooperative promotes accumulation of capital through collection of share capital from the members, thrift and saving of money, group activities and management of consumer store for the application of loans from the LBP/CDA.
	Introduction of production loan	After completion of the cooperative's conditions for the grant loans of the LBP/CDA, the cooperative will be introduced the grant loan for productive and provident purposes.
	Making own property for increased product-ivity and new business	(i) Solar dryer for grain drying, (ii) warehouse for storing grains and production materials, (iii) corn milling machines, (iv) abaca processing machines and facilities
	Development of market	Development of market for increased productions such as cash crops, abaca products and handicrafts

The above five-year development plan of the cooperative can be achieved first through the social preparation activity that will be undertaken in the community by the DAR, NGO and other concerned agencies and institutions. However, the following activities based on experiences should also be considered to achieve relative success and sustainability:

(1) On Education and Training

- Pre-membership training (PMT) should be provided to all prospective members within the community by DAR,

- A thorough re-orientation and intensive membership expansion campaign must be undertaken for inactive and new members to encourage then to actively participate in the activities of the cooperative,

- A continuous and intensive education program/sessions should be conducted to improve the management and entrepreneurial skills and capability of the members/officers. Program and conduct training activities based on the needs and resources of the community,

- Education and training programs should consider the availability of farmer-members, hence, proper scheduling and timing are necessary to get good attendance, and

- Since women play important roles in the family and community as a whole, the women should be equipped with the skills necessary for their various roles in the family, the cooperative and the community. The women should be provided training on (but not limited to) consumer education, savings and thrift, household planning, family budgeting, livelihood skills' development, business planning, introduce gender-issues to motivate them to initiate women specific projects.

(2) Financial and Management

- Management style should be participative. Members and officers should be encouraged to participate in the planning, problem solving and decision making of the organization,

- Projects and activities should be responsive to the needs of the members to gain complete support,

- Financial reports should be prepared consistently, if not monthly, at least quarterly with complete audit and inventory,

- Accounting and bookkeeping systems should be simplified,

- Increase capital build-up by pursuing savings' mobilization schemes to develop self-reliance and independence,

- There should be planning and budgeting every year by specialized groups within the organization,

- Specified meetings should be regularly held to stir up membership interest,

- Organize the group into smaller groups by functions and/or by geographical location, and

- Continuous and regular monitoring and evaluation even after the turn-over of the project facilities should be undertaken by DAR.

(3) Linkages

- Linkages' initially (through the assistance of DAR, LGU and NGO assigned in the Project Area) should be developed with government agencies and institutions, non-government institutions, other cooperative groups within and outside the Project Area and business group.

The expected organization structure of the cooperatives in the Project Area by the end of the plan period after the cooperatives has become self-reliant is shown in Figure 9.2-5.

As the cooperatives expand its activity, it is expected that the numbers of committees are increased. Also managers and/or officer-in-charge with support staff is appointed or employed by the cooperative. With the expansion of the organization, additional training and seminar to enhance skills to improve specific functions will have to be undertaken.

Detailed presentation of the development of cooperatives in the Philippines, the reasons for its success and failures and presentation of how to develop and organized cooperatives are presented in Annex H.

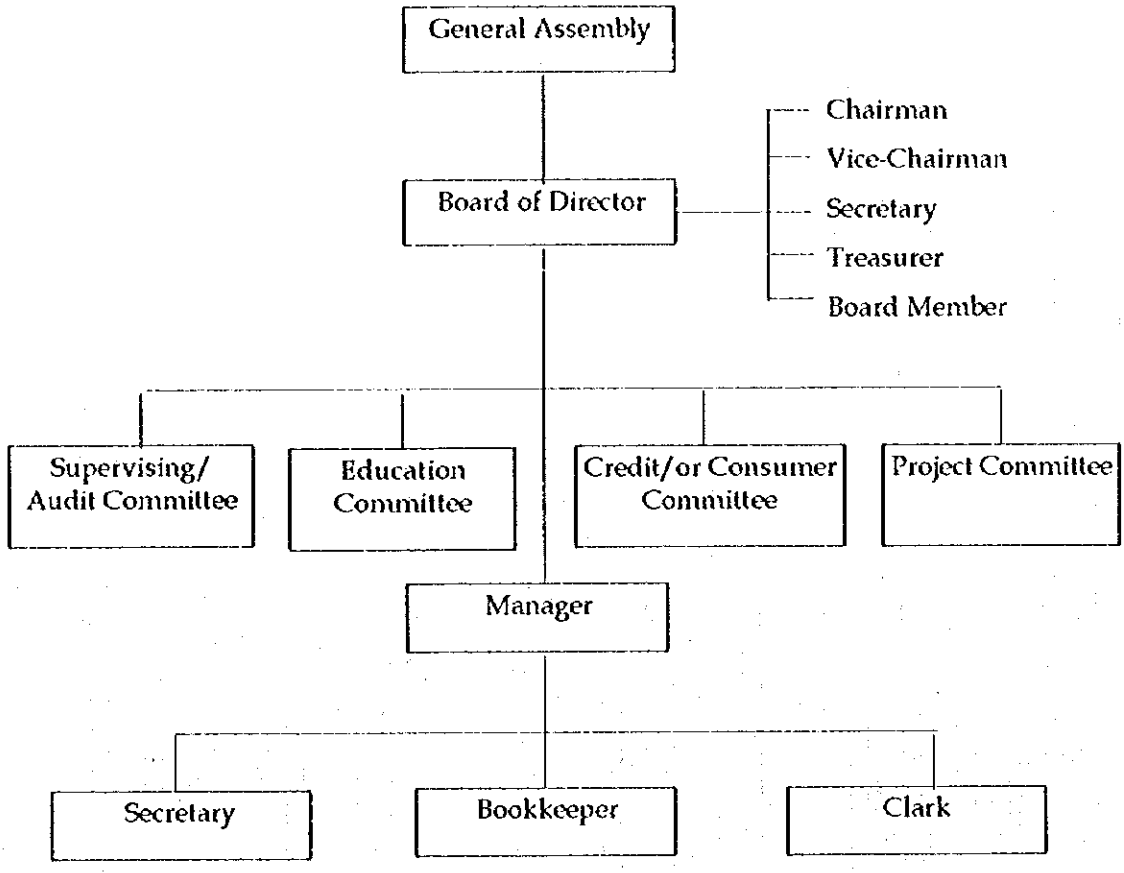
7) Institutional Development Plan

a) Institutional Support System

To attain success of the agricultural development plan for the Marangog Area, establishment of an institutional support system comprising relevant support agencies of the central and the local government units is indispensable.

DAR plays the role of coordinator and facilitator of the support activities to be carried out by the agencies concerned. For every specific activity to be undertaken, Memorandum of Agreement (MOA) will have to be executed. This will ensure that activities for personnel component, time and necessary logistics are provided. An example is a MOA between DAR and PAO concerning support to be provided by PAO for the project (provision of training for farmers in the Area, specific number of seedlings, budget for experiments, or demonstration farms in the Project Area, etc.). To serve the above purpose, DAR shall organize the PPMO who will be responsible for the implementation of the Projects.

FIGURE 9.2-5 PROPOSED COOPERATIVE STRUCTURE



b) Plan of Support Activities

(1) Formulation of Land-Use Plan

Land-use plan will be formulated in consultation with RIARC, ROS, DENR, MAO and farmers in the Project Area considering soil, meteorological condition, irrigation condition, topography and farming conditions, etc. The joint work will be coordinated by MARO and development facilitator (DF).

(2) Technology Support

The main crops/trees to be introduced in Marangog Area are rice, corn, peanut, squash, sweet potato, abaca, mango, acacia and mahogany. The technologies to be introduced such as suitable variety selection, proper time of seeding/transplanting, necessary input, yield expected, crop rotation, farming and farming income expected, etc. will be supported by EVIARC, ROSs of Babatngon and Salcedo. Malitbog ROS will provide support for the forage and pasture, the National Abaca Research Center (NARC) in ViSCA will support abaca, and the NARC and Department of Plant Protection, ViSCA will support mushroom culture using abaca wastes. PCC and ROSs of Malitbog and Salcedo shall be responsible for livestock technology.

(3) Supply of Agricultural Input Materials

Before the start of farming, the DAR development facilitator shall discuss with the farmers the amounts of agricultural input materials (seeds, seedlings, the number of livestock and fries and amounts of fertilizer and agricultural chemical) to be provided by the agencies. On the fruit seedlings, the number of seedlings to be provided by each agency should be arranged taking their production capacities into account. The fruit seedlings have to be grafted and virus free and the best variety to survive in the market competition in the future. The price of the agricultural materials should be cost price of production. The main agricultural materials planned to be introduced in the Marangog Area and the respective suppliers are shown in Table H.2-10.

To diffuse the advanced technology, it is required that DAR advances to the farmers the costs of seeds of improved variety and fertilizer necessary for the improved technology on rice and corn crops. The advance payment shall be paid by the farmers within five years after the commencement of the Project.

(4) Extension and Training

Technology transfer is being carried out by the Regional DA, PAO, MAO, ATI, RIARC and its ROSs in their close linkage. Hence, developed technology at the research and development agencies are directly or indirectly transferred by the Regional DA, PAO, MAO, ATI, RIARC and its ROSs to the farmers through techno-demo farms and training.

Establishment of Techno-Demo Farms

PAO and MAO provide techno-demo farms on advanced lowland farming and upland farming with SALT in the Project Area as shown in Table H.2-7.

Farmer's Training

Training on cooperative management and crop cultivation, processing and handicraft technology of abaca is important, as the cooperative established in 1995 is still at infant stage. Furthermore, abaca is a promising crop in the Area. The training details are given in Table H.2-8.

(5) Provision of Farm Funds

LBP and CDA are the support agencies for farm funds. Before financing activities, the cooperative members need to receive training in cooperative management and improvement of their knowledge for application of farming loan from LBP and CDA and others.

(6) Development of Markets

Provincial CDA and DTI shall support development of markets for cooperative through introduction of buyers, price information, guidance for engaging in the supply of production inputs and sale of products.

(7) Strengthening of Farmers Organization

The NGO, CDA and LBP shall support strengthening of the cooperative through the above training.

8) Agricultural Credit System Plan

For the project to produce additional agricultural production and income at the rate of return shown in paragraph of 9.5.1 "Economic Justification," it is estimated that about 4.434 million pesos will be required as loanable fund to the ARBs at Marangog.

Among the various measures toward mobilizing enough funds to meet the aforementioned credit demand, the following are proposed;

- All credit institutions with available outreach branches in or near the Project Area should be contacted and invited to participate and consider providing production and marketing loans to the ARBs,

- While the present policy of the government and LBP to promote viable and bankable people's organizations will be duly observed, LBP and other

banks should at lease consider providing loans to the good members of the cooperatives earlier blacklisted by them,

- DAR, DENR or other related agencies should look for a special fund for providing interest-free loans to ARBs agreeing to grow forest trees which either do not provide them enough financial returns (kakawate, flemingia), or take long years to do so (bagras, bagalunga, gmelina, mahogany),

- People's fund mobilization efforts should be motivated and assisted, and

- Selected informal creditors in the Project Area may be invited to provide low-interest credits to the ARBs under the technical assistance of DAR and other related departments.

9.2.5 Water Resources Development Plan

1) Development of Surface Water Resources

As described in paragraph 9.1.5 "Irrigation Water Resources", the Marangog creek, which is located outside of the Area, has abundant run-off discharge even during dry season. Therefore, the Marangog creek water will be used and diverted to the Project Area.

The conveyed water will be distributed through tank irrigation system depending on the slope of the topography.

2) Development of Groundwater Resources

Due to high elevation and hilly and undulating topography, the groundwater development is not considered in the Area.

9.2.6 Irrigation and Drainage Plan

1) Irrigation Plan

Marangog Areas is located in gentle sloping topography with scarce water resources for irrigation, so that a large-scale irrigation plan could not be expected in the Area. However, the Marangog creek located outside the Project Area has a relatively large quantity of run-off discharges. The creek water will be used for the Project Area for irrigation purposes. An irrigation plan tapping the resources is formulated paying due attention to low investment cost. The diverted water would be distributed by pipe system so called "Tank Irrigation System."

a) Calculation of Irrigation Water Requirement

(1) Proposed Cropping Pattern

The proposed cropping pattern is one of the basic data for the calculation of irrigation water requirement for the Area. The proposed cropping pattern is prepared, after considering the prevailing condition in the Area, such as climate, topography, soil, marketability of crop, etc.;

Paddy Rice + Squash

The detailed description of the proposed cropping pattern is referred to in paragraph 9.2.4, "Farming and Institutional Development Plan."

(2) Calculation of Reference Crop Evapotranspiration(ETo)

Calculation Methods

The reference crop evapotranspiration (ETo), generally recognized as fairly reliable index in calculating consumptive use, can be determined by a number of methods. These are the evaporation measurement with evaporation pan and the application of empirical formula based on the climatological data. Since the ETo values used by NIA, however, has been calculated applying Modified Penman method, the same method is applied for the Project.

Modified Penman method is the complete theoretical approach, showing that consumptive use is inseparably connected to incoming solar energy. The formula representing the ETo is shown below:

$$ETo = C \times [W \times Rn + (1-W) \times f(u) \times (ea-ed)]$$

where;

ETo	=	reference crop evapotranspiration (mm/day)
Rn	=	net radiation in equivalent evaporation (mm/day)
(ea -ed)	=	difference between saturation vapor pressure at mean air temperature and mean actual vapor pressure of the air (mbar)
C	=	adjustment factor to compensate for the effect of day and night weather conditions.

Necessary Data and Calculation of ETo

As the basic data for calculation of the ETo, the following climatological data were collected on the monthly basis;

- Mean temperature (°C)
- Mean relative humidity (%)
- Wind speed (km/day)

- Dewpoint (°C)
- Cloudiness
- Uday/Unight

Detailed calculation procedure of the ETo is based on NIAs' Guidebook for the calculation of ETo. Table J.2-1(3) shows the calculated ETo for the Marangog Area.

(3) Calculation of Crop Evapotranspiration (ETcrop)

The crop evapotranspiration (ETcrop) is calculated by multiplying the estimated ETo value by the crop coefficient (Kc), which expresses the relation between reference and actual evapotranspiration during distinct vegetative stage of the crop.

The crop coefficient (Kc) of paddy rice is assumed to be one (1) throughout the growing season. Since the Kc values of uplands are generally not available, the values are estimated at 10-day interval according to NIA's Guidebook. Table J.2-2(3) shows the procedures to obtain the Kc values of the proposed upland crops for the Area.

(4) Calculation of Irrigation Water Requirement

Two types of irrigation water requirement are estimated: irrigation water requirement without effective rainfall and with effective rainfall. The maximum water requirement in the former case will be used for the design of irrigation facilities such as canal and it's related structures. The latter, being equivalent to actual water demand will be used for reservoir operation study mentioned subsequently.

In the estimating of irrigation water requirement at 10 day interval, the following are taken into account:

- Effective rainfall
- Percolation in paddy field
- Crop water requirement
- Irrigation water requirement
- Diversion water requirement

Effective Rainfall

As a first step of the estimation of effective rainfall, the design rainfall is selected based on 34 years annual rainfall data (1961-1994) observed at the Tacloban station in Leyte Province. In the Project, design rainfall with return period of 1/2-year is adopted considering size of area, topography and scarce water resources.

As a result, two year rainfalls equivalent to about a return period of 1/2-year, 1987 with 2,252.3 mm and 1994 with 2,227.8 mm are selected. About 80 percent of the selected two years average rainfall is assumed to be the effective rainfall for the crops.

Percolation of Paddy Field

The percolation rate of paddy field is assumed at 1.0 mm/day.

Crop Water Requirement

The crop water requirement is estimated by adding percolation rates to the crop evapotranspiration (ETcrop) mentioned above.

Irrigation Water Requirement

The irrigation water requirement is estimated by subtracting the effective rainfall from the estimated crop water requirement (ETcrop).

Diversion Water Requirement

The diversion water requirement is estimated by dividing irrigation water requirement by irrigation efficiencies. The irrigation efficiencies are determined according to the "FAO Irrigation and Drainage Paper 24." Especially, conveyance efficiency is decided at 90 percent because irrigation canal will be made by concrete flume.

In the Project, the following irrigation efficiencies are adopted:

Irrigation Efficiency

Irrigation Efficiency	Paddy Field	Upland Crops
	(%)	(%)
Application Efficiency	70	60
Conveyance Efficiency	90	90
Operation Efficiency	90	90
Overall Efficiency	56.7	48.6

Table J.2-3(3) and Table J.2-4(3) show the estimated irrigation water requirements in cases of without and with effective rainfalls. As is seen in Table J.2-3(3), the maximum diversion water requirement is calculated at q = 1.16 lit./sec./ha.

b) Water Management Plan

The irrigation water distribution method is generally decided according to available water resources, size of rotation area, cropping pattern, growing stage of

crops, crop water requirement, and irrigation facilities in the systems. However, in the case of marginal area project, rotational irrigation method should be practiced even at the growing stage due to scarce water resources.

These water management works will be undertaken by the water user's association to be established in the Area. Major works of the water user's association are as follows:

- Decision of proposed crops and their cropping areas, and preparation of irrigation schedule,
- Preparation of water distribution ways at farm level under the rotational irrigation methods,
- Operation of diversion and distribution gates for water management, and
- Maintenance of irrigation and drainage facilities, and collection of necessary water charges for management of the water user's association.

2) Drainage Plan for Paddy Fields

The existing paddy fields located in low-lying and flat topographical areas, especially lower parts of the existing paddy fields are periodically inundated during the wet season. This result to low agricultural crop production and occurrence of water-born diseases such as diarrhea and malaria.

For the Area, a drainage improvement plan is formulated in the Project.

a) Drainage Modulus for Paddy Fields

Design Rainfall

Before the formulation of the drainage plan, the design rainfall needed to analyze the drainage discharge is determined based on the daily maximum rainfall data observed at Tacloban station for 34 years, 1961 to 1994.

The design rainfall with a return period of 1/5-year (one in five year) is determined by probability analysis as shown below:

Design Rainfall for Drainage Plan

Return Period	Design Rainfall (mm/day)
1/2	127.3
1/5	158.4
1/10	177.8
1/20	195.7
1/50	218.2

Design Drainage Modulus

The design drainage modulus for Marangog Area is determined on the assumption that the design rainfall will be drained within two days. Its modulus is calculated at q = 7.2 lit./sec./ha (2.6 mm/hr) as shown below:

$q = R_{max} \times C / (24 \text{ hr} \times 2 \text{ days})$
where; C = run-off coefficient, 0.8

$q = 158.4 \text{ mm/day} \times 0.8 \times 1.0 \text{ ha} \times 10^4 / (24 \text{ hr} \times 3{,}600 \text{ sec} \times 2 \text{ days})$
$= 7.2 \text{ lit/sec./ha}$

9.3 Physical Plan and Cost Estimate

9.3.1 Agriculture and Social Infrastructure Plan

1) Agricultural Infrastructure Plan

a) Irrigation Plan

The physical features of the designs of the irrigation proposed in the Project Area are as follows:

- Creek intake
- Transmission pipeline
- Concrete water tank
- Distribution pipeline

In the proposed irrigation system, water will be taken from two creeks located outside the Project Area, e.g. Latay creek and its tributary. Water will be transmitted by pipeline to a head tank (refer to Figure 9.3-1). From the head tank, irrigation water is delivered to the Project Area by gravity pipeline method. Twelve small concrete water tanks are planned. The irrigation service areas are located around the tanks. On-farm irrigation shall be practiced taking water from the tanks using polyethylene pipes to be prepared by farmers themselves.

A summary of the irrigation system is as noted below. The details are presented in Annex-M.

- Creek intake : 2 places
- Transmission pipeline : L= 2.05km(PE pipe ø 100mm)
- Delivery pipeline : L= 4.42m (PE pipe ø 100mm - ø 38mm)
- Concrete water tank : 13 places

b) Drainage Plan

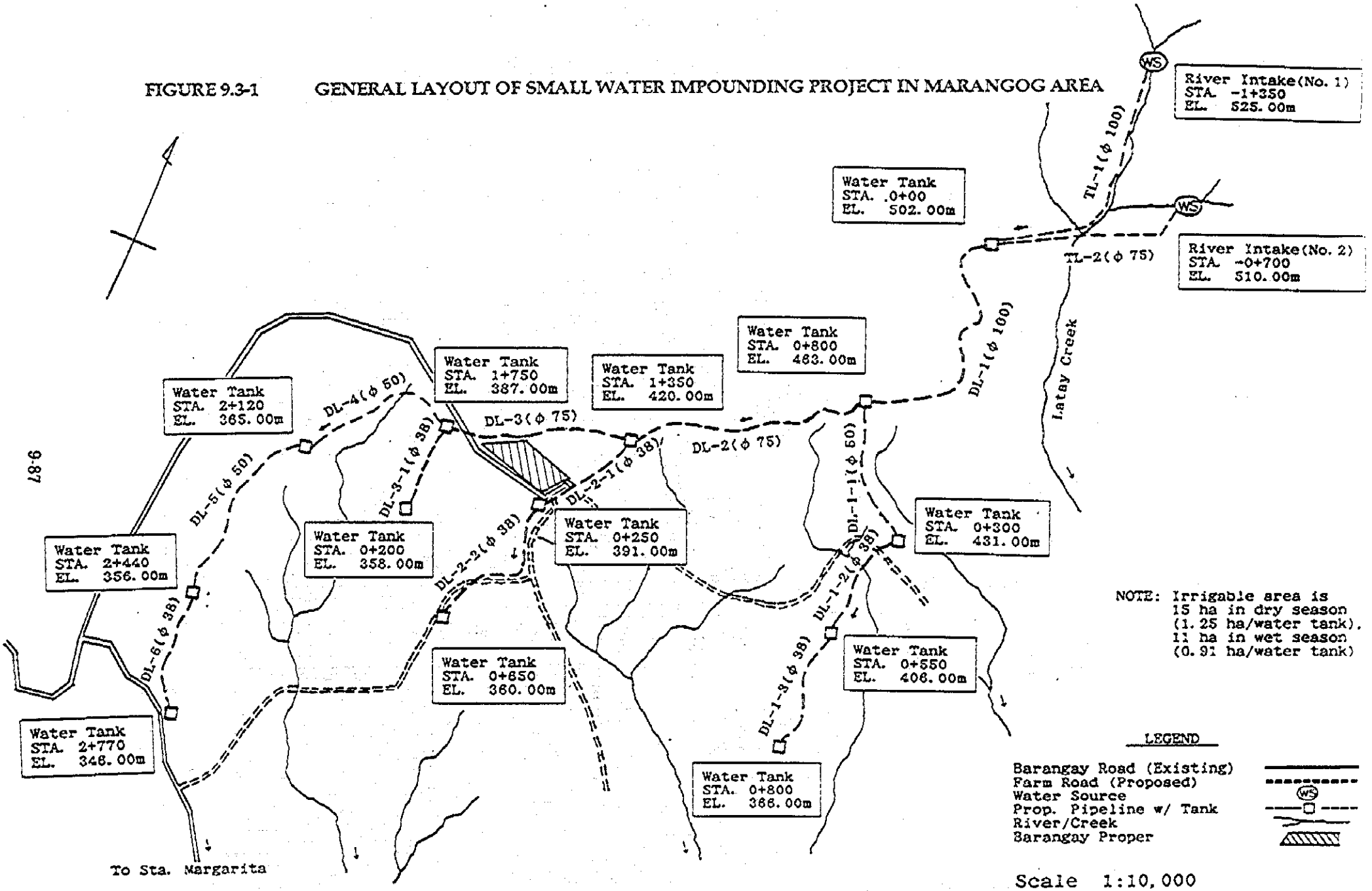
Since tank irrigation system using pipe water for upland crops, as vegetables and trees particularly in the dry season are planned in the Area, excess water must be minimum. Therefore, particular drainage plan is not made in this Project Area.

c) Farm Road Plan

To improve accessibility from sitio/household to the farm land, farm roads are planned in the following sections:

- Barangay proper -- Sta. Margarita road junction : L= 1.30 km
  (0.85 km w/ gravel and 0.45 km w/ concrete surface)

FIGURE 9.3-1 GENERAL LAYOUT OF SMALL WATER IMPOUNDING PROJECT IN MARANGOG AREA



- Barangay proper -- interior area : L= 1.90 km
  (1.10 km w/ gravel and 0.80 km w/ concrete surface)

Road surfacing materials are gravel in the normal section and concrete in the steep section more than eight percent gradient. Side road ditch with grouted riprap is the most necessary structure to minimize road erosion by rain water. The standard cross section is presented in Annex-M.

2) Social Infrastructure Plan

a) Rural Road and Transportation Plan

Existing barangay road shall be improved/upgraded to function as a farm-to-market road and to secure access to barangay proper and/or other barangays at the following sections:

- Bagumbayan -- Sta. Margarita road
  3.00 km (2.70 km w/ gravel and 0.30 km w/ concrete surface)
- Sta. Margarita -- Tagnate road junction
  2.50 km (1.70 km w/ gravel and 0.80 km w/ concrete surface)
- Part of Conception -- Tagnate road
  1.00 km (0.70 km w/ gravel and 0.30 km w/ concrete surface)
- Tagnate -- Marangog proper road
  3.10 km (2.80 km w/ gravel and 0.30 km w/ concrete surface)

The steep sections over eight percent gradients are planned with concrete surface. Side road ditch with grouted riprap is also important structure to protect the roads from erosion by rain water. Spillway type river crossings are planned at two sites across the Tagbauto river. This will be located at Conception (200m long) and at Sta. Margarita (100m long). The standard cross section of barangay road is presented in Annex-M

Besides road improvement/upgrading, supply of road maintenance equipment such as dump truck, motor grader, road roller, pay loader, etc. to the municipal government is planned to encourage road operation and maintenance activities.

Besides the above, transport vehicles shall be provided to the barangay unit for the establishment of public transport system. Such vehicles shall be operated and managed by the transport cooperative that is to be organized by barangay unit with strong support from the municipal government.

b) Rural Water Supply Plan

Existing level-II water supply system is planned to be improved and expanded. A summary of the improved rural water supply is as noted below. The details are presented in Annex-M.

- Spring box : 1 places
- Water tank : 2 places (V= 3.60 cu. m each)
- Supply pipeline : L= 4.59 km (G.I. pipe ø63mm-ø19mm)
- Communal faucet : 13 place (ø 13mmx2 faucets each)

Facility designs of the spring box and water supply system are made based on the Design Guidelines Criteria and Standards issued by DPWH. Drawings and details are presented in Annex-M.

c) Social Infrastructure Plan

The marginal area development to be successful must also include provisions for rural and social infrastructures to make small farmers productive and prosperous. It is vital to improve the lives and prospects of the rural population and make their environment favorable. Thus, building the human capital is a key factor in improving living conditions. It is, therefore, essential to give emphasis on the development of the basic social services and other social structures to build the human capital. This can be facilitated by providing and/or improving primary health care and basic education and other facilities and services that would help the farmer in its integration and participation in community work and endeavor.

For the building of the human capital, one important factor is the improvement of the access to educational facilities. Also important factor is the provision of at least a primary school in areas where it is not available. For most of the areas, elementary school buildings will have to be expanded for lack of classrooms, with reinforce concrete structures and/or rehabilitated. The construction programs must be supported by improvements on teachers, particularly preparedness for multi-grade teaching (a necessity in areas where school children populations are limited), materials (books, desks, instructional materials, etc.) and curriculum. In addition, complimentary health and nutrition services should be provided to improve the health and well being of the children.

Primary health care services are provided by the barangay health stations and rural health units that are usually located in center of the barangays or poblacions. It is, therefore, essential that health programs and services be also concentrated at this level. The establishment of additional barangay health stations, the construction of new ones where facilities are not available and the improvement of existing facilities will allow health facilities to be used more extensively. Improved quality of health services would require not only construction and improvement of the infrastructure but must also consider provision of basic and necessary equipment, materials and supplies including pharmaceuticals, selection and continuos training of health workers and supervision and support of the municipal health officer.

Another important social infrastructure that is proposed to be provided to the Areas is the multi-purpose center for the use of the beneficiaries for social,

training and education purposes and other functions. This facility will be useful in promoting camaraderie, unity and understanding in the community. For areas with existing barangay halls and/or multi-purpose centers, upgrading and rehabilitation activities shall be undertaken including provision of additional space and facilities

For the Marangog Area, the following other social infrastructure plans proposed are: construction of barangay health center; provision of paramedical supplies/equipment for the health center, expansion of barangay hall to multi-purpose center and provision of necessary facilities for the multi-purpose center.

9.3.2 Cost Estimate and Disbursement Schedule

1) Conditions of Cost Estimate

Construction unit costs are determined based on the September 1996 prices and is divided into the foreign and local currency portions. The construction costs shall be then estimated on a contract basis for all sectoral project plans.

2) Associated Costs

As the associated costs, five percent of the construction cost is adapted for the pre-engineering cost, and ten percent for the administration cost. The consulting service costs are estimated considering the project features. Furthermore, ten percent of the construction cost is assumed as the physical contingency. The costs for institutional capability building and social preparation are included in the administration costs. The costs for land acquisition are also estimated.

3) Project Costs and Disbursement Schedule

The project costs consist of two categories; that is construction costs and community development and support services costs. These costs are composed of the following items according to the sectoral plans:

Construction Costs

- Agricultural development
- Agricultural infrastructure development
- Rural infrastructure development
- Post-harvest and agro-industry development
- Institutional development

Community Development and Support Services Costs

- Agricultural support services
- Institutional development

The total project cost is estimated at 75.9 million pesos. These costs are classified into responsible implementing agencies concerned depending on the project components, as shown in Table 9.3-1.

Furthermore, the estimated project costs will be disbursed based on the implementation schedule of the Project as described in paragraph 9.4.2 "Facility construction and Equipment Supply" (refer to Table N.2-21).

Table 9.3-1 Summary of project Cost for Marangog Area

(unit : '000)

Description	Total Project Costs			Related Implementing Agencies								
	F/C	L/C	Total	DAR	DA	DPWH	NIA	DTI	DOH	PCC	LGU	ARC
1. Construction Cost												
a. Agricultural Development	139	812	951		481					340	100	30
b. Agricultural Infrastructure Development	7,259	5,998	13,257				6,859				6,398	
c. Rural Infrastructure Development	24,139	10,322	34,461			18,732			280		15,450	
d. Post-Harvest Development	516	1,170	1,686		58			1,630				
e. Institutional Development	470	200	670								670	
Sub-total	32,523	18,502	51,025		539	18,732	6,859	1,630	280	340	22,618	30
2. Community Development & Support Service Cost												
a. Agricultural Support Services	0	2,047	2,047		2,047							
b. Institutional Development	0	1,795	1,795	898			897					
Sub-total	0	3,842	3,842	898	2,047		897					
3. Associated Cost												
a. Pre-Engineering Cost (5% of 1)	1,626	925	2,551		53	1,829	670					
b. Administration Cost (10% of 1 & 2)	3,252	2,234	5,486	90	259	1,873	776	163	28	34	2,262	3
c. Consulting Services (refer to Table N.2-16)	2,799	4,305	7,104	7,104								
Sub-total	7,677	7,464	15,142	7,194	312	3,702	1,446	163	28	34	2,262	3
4. Land Acquisition Cost	0	366	366	366								
5. Physical Contingency (10%)	3,252	2,234	5,487	90	259	1,873	776	163	28	34	2,262	3
Total Project Cost (1 - 5)	43,453	32,409	75,861	8,548	3,156	24,307	9,977	1,956	336	408	27,142	36

Note : Detailed estimation is given in Table N.2-16.

9.4 Project Implementation and Operation and Maintenance Plan

Implementation of the Project shall be divided into following four stages, and implementation schedule of the Project is given in Figure 9.4-1.

- Social preparation (SP) stage
- Support services stage for capability building-up
- Facility construction and equipment supply stage, and
- Community development and operation and maintenance stage.

9.4.1 Function of Multi-purpose Cooperatives

The multi-purpose cooperative will organize committee such as education and training, operation and maintenance, post-harvest, production and marketing, consumer goods and credit lending and assistance, as shown in Figure 9.4-2 (refer to paragraph 9.1.8 and 9.2.2).

9.4.2 Support Services for Implemented Plans

1) Support Services for Capability Build-Up

Before the implementation of the Project, there is a need to prepare not only the beneficiaries but also the support agencies who will play important roles in the implementation and sustainability of the Project. An intensive institutional capability building-up of support agencies will have to be undertaken simultaneously with the social preparation of the beneficiary community.

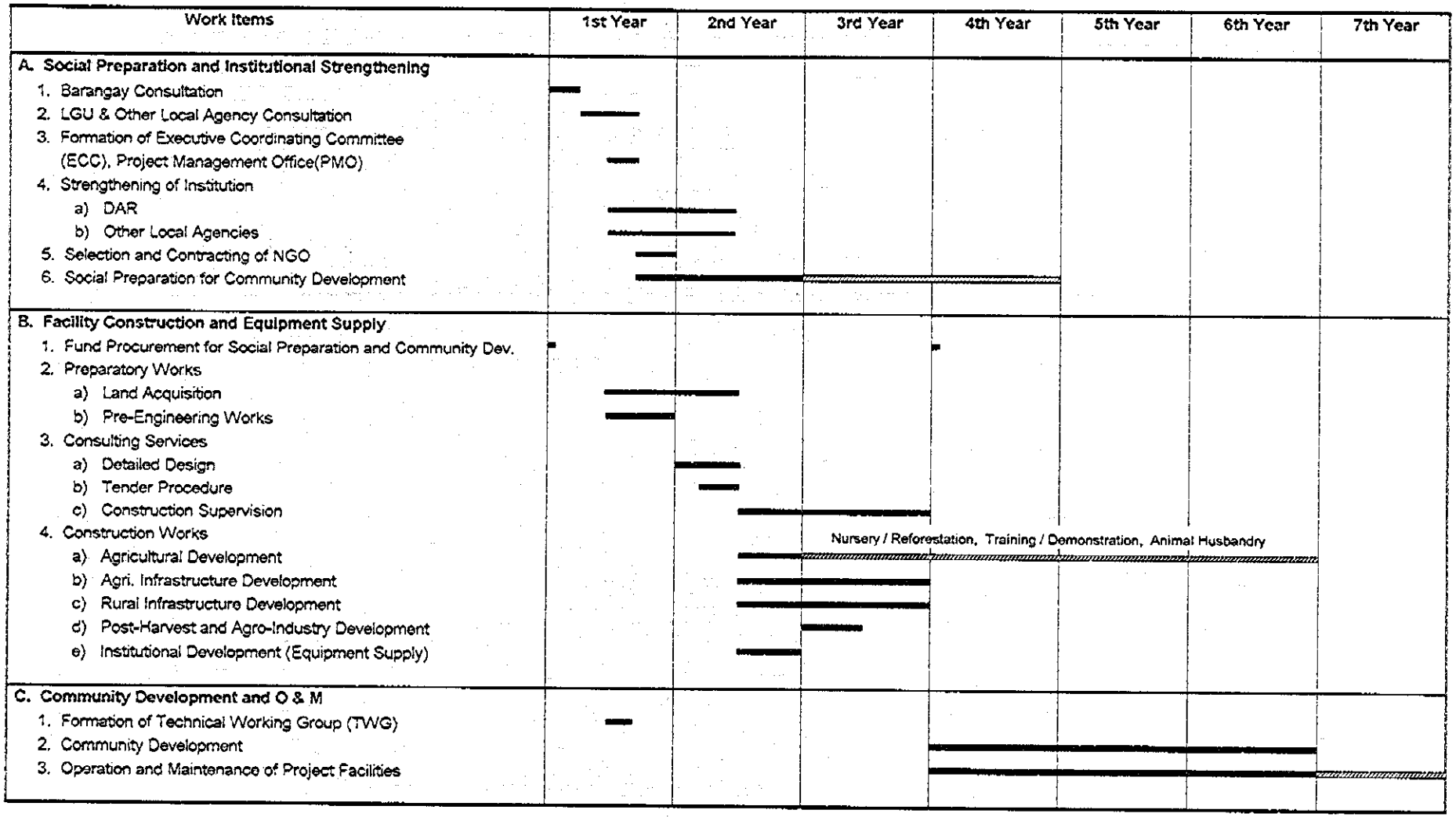
Initially, local government and local agency consultations should be undertaken to complete program implementation, support and commitments to the Project. The DAR as a lead implementing agency will spearhead the consultation process. The related support agencies and NGO will also undertake the support survives for capability build-up as social preparation and institutional strengthening of the Project.

The capability building of the DAR field offices shall be prepared and programmed by the Bureau of Agrarian Reform Beneficiaries Development (BARBD) in DAR. The BARBD will be assisted by the Bureau of Agrarian Reform Information and Education (BARIE) and the DAR Regional Office.

The strengthening of the LGUs will be the responsibility of the Department of Interior and Local Government (DILG) and other support national agencies with providing necessary skills and competence to help support project implementation.

The Local Technical Working Group (LTWG) should be organized for the social preparation of beneficiary community. It will also act as the lead person of

FIGURE 9.4-1 IMPLEMENTATION SCHEDULE FOR MARANGOG AREA



the agency or organization to support the Project. This LTWG will be working closely with the Provincial Project Management Office (PPMO). The chairman of the LTWG will be the Municipal Agrarian Reform Officer in DAR (DAR-MARO).

The responsibility of providing and/or coordinating the capability building-up and additional technical training of the LTWG is the main responsibility of DAR Central and Regional Office. The DAR shall assist and coordinate in facilitating the required technical assistance to be provided to the LTWG.

The general roles and responsibilities of the support agencies in the implemented plans are as follows:

- Department of Agrarian Reform (DAR), specifically the PDMS, BARBD, BARIE and the regional offices for DAR personnel directly involved in the Project on matters related to the proposed projects and programs,

- Department of Agriculture (DA), local government, provincial and municipal agricultural officers and technologist on all aspects related to agriculture,

- Department of Environment and Natural Resources (DENR) for the local government, provincial and municipal agricultural officers and technologist on all aspects related to agro-forestry and environmental conservation,

- Department of Interior and Local Government (DILG), particularly the Local Government Academy for the local government units, and

- Other institutions, such as the local state colleges and universities, particularly the Visayas State College of Agriculture in Baybay, Leyte.

For the effective and smooth implementation of the support service during the preparation stage, Consultants will be hired preferably through international tendering. The detailed consulting services to be required for the Project are shown in Table N.2-13 and Figure N.2-1.

Regarding the required periods of the main support services such as institutional capability build-up and social preparation works, two years will be needed as indicated in Figure 9.4-1.

2) Related Agencies for Support Services to ARBs

- Training courses and research on crop production, livestock raising and fisheries, including courses on integrated pest management and setting-up/management of small-scale agri-based income generating activities:
  - Department of Agriculture (DA)
  - Eastern Visayas Integrated Agricultural Research Center (EVIARC)

- Department of Environmental and Natural Resources (DENR)
- National Post-harvest Institute for Research and Extension (NAPHIRE)
- Philippine Rice Research Institute (Phil Rice)
- Provincial Agricultural Office (PAO)
- Municipal Agricultural Office (MAO)

- Extension services, crop technology, production and distribution of seedlings and planting materials:
  - Bureau of Plant Industry (BPI)
  - Provincial Agriculture Office (PAO)
  - Municipal Agriculture Office (MAO)
  - Provincial Environment and Natural Resources Office (PENRO)
  - Research Outreach Center (ROC)

- Community development and organization, cooperative training, value formation:
  - Department of Agrarian Reform (DAR)
  - Cooperative Development Authority (CDA)
  - Land Bank of the Philippines (LBP)
  - Municipal Social Welfare Development Office (MSDO)
  - Local or Barangay Schools
  - Non-Government Organization (NGO)

- Basic skills' development, industrial and entrepreneurial training:
  - Department of Trade and Industry (DTI)
  - Municipal Social Welfare and Development Office (MSWDO)
  - Department of Science and Technology (DOST)

- Credit and employment assistance:
  - Land Bank of the Philippines (LBP)
  - Cooperative Development Authority (CDA)
  - Department of Trade and Industry (DTI)
  - Municipal Social Welfare Development Office (MSWDO)
  - Local Government Units (LGUs)
  - QUEDAN COR

- Market support, post-harvest support and other institutional support:
  - Department of Agriculture (DA)
  - National Food Authority (NFA)
  - Local Government Units (LGUs)

9.4.3 Facility Construction and Equipment Supply

1) Implementing and Supervising Agencies of the Project

The Project shall be a joint undertaking of the national, the concerned provincial and local governments and the private sector located in the Project Area. As indicated in Figure 9.4-2, the lead implementing agency for the implementation of the Project is the Department of Agrarian Reform (DAR).

The implementation of project components will adopt the CARP institutional arrangements where the agencies involved will implement the sub-components according to their competence.

The existing organizational structure mechanisms for CARP projects already operating in DAR will be adopted for the Project. Agencies concerned will mobilize it's CARP Implementing Units and taps the other regular units of their respective agencies.

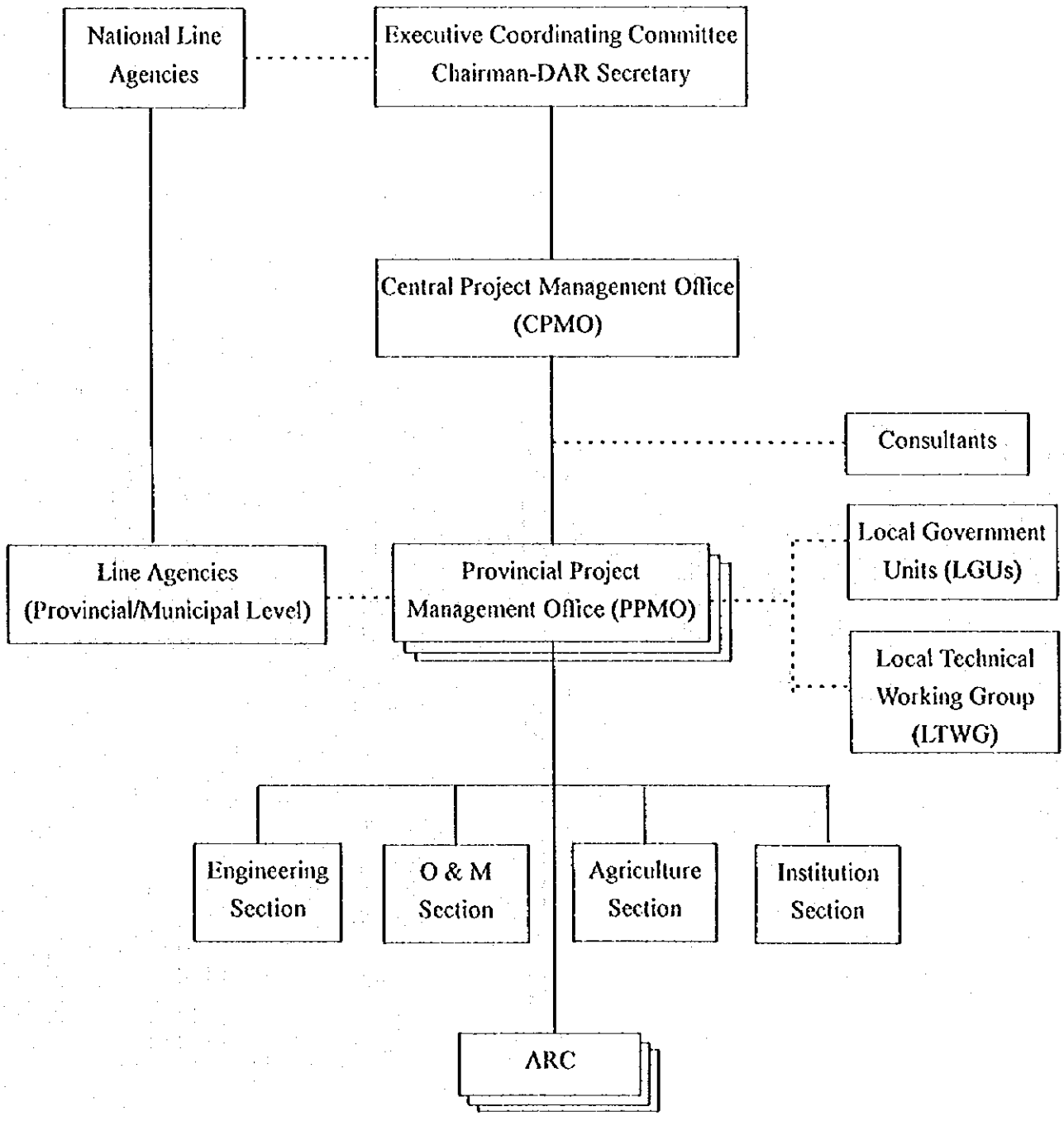
The highest policy making body for the Project shall be the Executive Coordination Committee (ECC), which shall be organized with DAR Secretary as the chairman. The ECC provides overall policy, direction and support, and shall also undertake linking and networking with other national and international agencies for the resources and technical assistance requirement of the Project. The other members of the ECC shall be the other concerned agencies, such as DA, DENR, NIA, DPWH, etc.

The ECC shall be supported by a Central Project Management Office (CPMO) composed of a Project Manager and other staff from DAR Central Office. The Project Manager shall be appointed by the Secretary of DAR. The responsibility of the CPMO is the overall supervision and coordination of the Project Areas. It shall also provide support and direction to project implementation and undertake linking and networking at the national level.

At the provincial level, the Provincial Project Management Office (PPMO) shall be organized composed of DAR (regional, provincial, municipal), LGUs, and representatives of other line agencies. The PPMO shall be chaired by the Provincial Agrarian Reform Officer (PARO). The PPMO shall be responsible for the operation and management of the Project. The PPMO shall be supported by technical group/staff composed of the Engineering, O&M, Agricultural and Institutional Sections. The responsibility of the support staff is to assist the PPMO in the implementation of the Project. The support staff shall be selected from the regular technical staff pool of the regional, provincial, or municipal DAR and other agency offices.

A Local Technical Working Group (LTWG) at the provincial/municipal level shall be organized. The members of the LTWG shall be composed of the designated senior LGU officials and technical staff of designated line agencies. The

FIGURE 9.4-2 PROPOSED ORGANIZATION CHART FOR PROJECT IMPLEMENTATION



LTWG shall assist in the social preparation of the community, provide technical assistance to the PPMO and shall also serve as the project focal persons in their respective municipalities and provinces for coordination mechanisms.

2) Implementation Mode for Facility Construction

Implementation mode for facility constructions shall be on contract basis, therefore general contractor(s) will be selected preferably through international tendering.

3) Administration Office

The PPMO mentioned above shall be the administration office of the actual project implementation.

4) Preparatory Works

Major preparatory works for facility construction to be conducted before the commencement of the detailed design are as follows:

- Land acquisition for facilities such as nursery, demonstration farm, animal breeding center, irrigation pipeline, farm roads, rural water supply system, various social facilities, etc.,
- Topographic survey for major facilities, and
- Route survey for roads and canals.

5) Consulting Services

Consulting services to be hired in the same manners as the support service stage shall be required for the detailed design, preparation of the tender documents and supervision of the construction works.

6) Land Acquisition and Compensation

The land acquisition and compensation for facility construction, that will be made before to the commencement of the detailed design, are always key factors for smooth implementation. Intense efforts on land acquisition shall be made by the DAR-PPMO.

7) Implementation Schedule

All facility constructions and procurement of equipment formulated under the Project can be completed within two years inclusive of the detailed design, as indicated in Figure 9.4-1.

9.4.4 Community Development and O & M Plans of the Project

1) Community Development Plan

In parallel with the works during facility construction and equipment supply stage mentioned above, community development for agricultural support services and institutional development shall be made by LGUs and NGOs. In the Project, four years inclusive of social preparation are proposed as indicated in Figure 9.4-1.

2) Operation and Maintenance Plan

a) Operation and Maintenance Organization

Operation and maintenance of the implemented project facilities will be conducted by the Provincial Project Management Office (PPMO. The PPMO will be in charge of planning and management for the implemented project. The local government units (LGUs) and farmers' organizations/cooperatives to be also established or strengthened shall carry out the actual operation and maintenance works under the jurisdiction of the PPMO. The PPMO shall also execute the monitoring and evaluation works as well as operation and maintenance of the implemented project. As the people's organization, farmer's organization, multi-purpose cooperatives, and water user's association (WUA) will be established.

Furthermore, the Local Technical Working Group (LTWG), organized during the preparation stage will also function as operation and maintenance organization. The proposed operation and maintenance organization chart is shown in Figure 9.4-3.

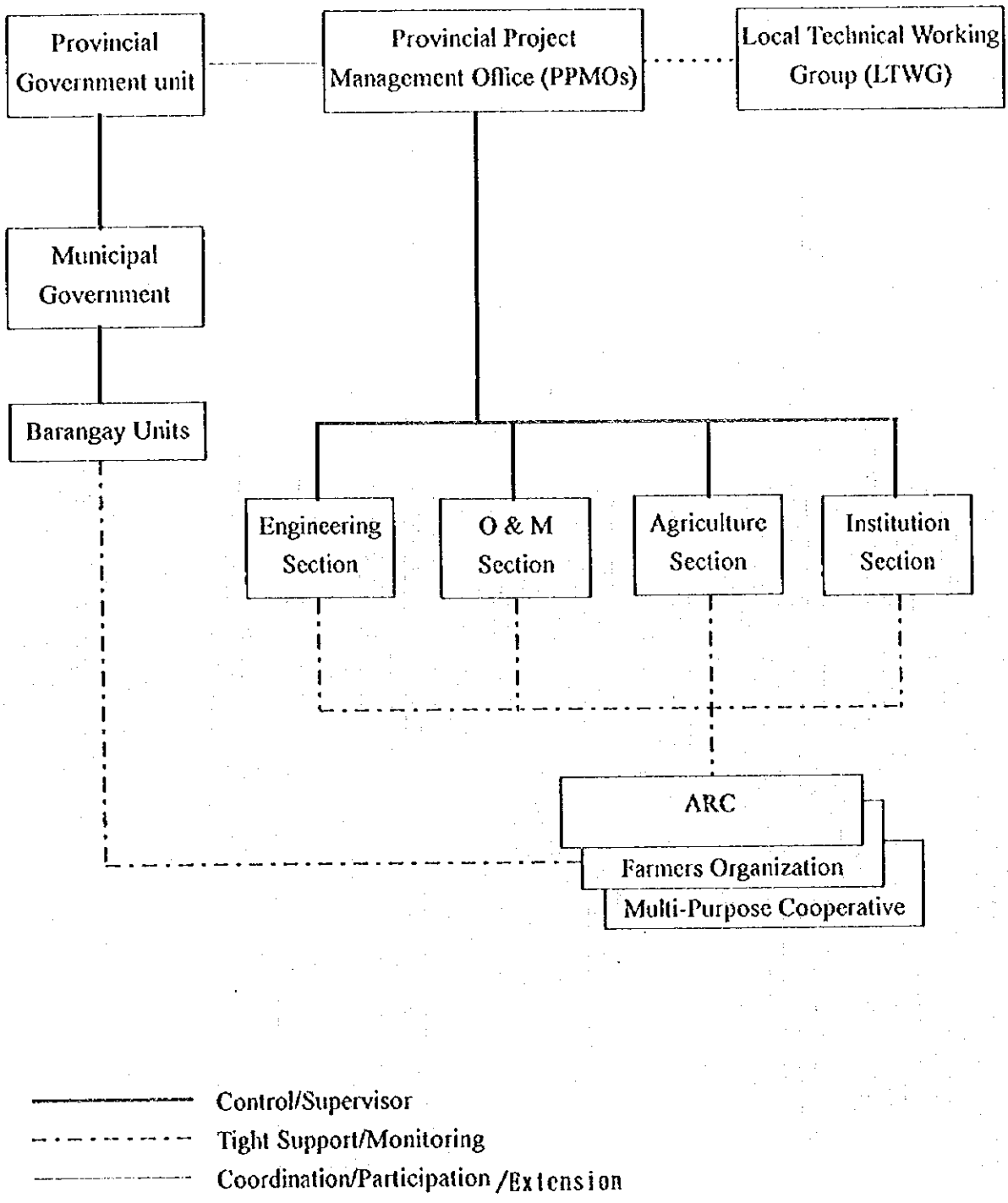
The general roles and responsibilities for the operation and maintenance of the implemented facilities as well as community development works are as follows:

<u>Related Agencies for O & M of Infrastructure Facilitates</u>

- Rural roads and bridges, barangay roads and farm-to-market roads
  - Department of Public Works and Highways (DPWH)
  - Provincial Engineering Office (PEO)
  - Municipal Engineering Office (MEO)

- Agricultural infrastructure facilities like a small-scale irrigation system, and a water impounding dam
  - National Irrigation Administration (NIA)
  - Provincial Irrigation Office (PIO)
  - Department of Agriculture (DA)

FIGURE 9.4-3 PROPOSED ORGANIZATION CHART FOR OPERATION AND MAINTENANCE



- Rural water supply, school buildings, barangay health stations and other social infrastructures
  - Department of Public Works and Highways (DPWH)
  - Local Government Units (LGUs)
  - Municipal Health Office (MHO)
  - Department of Education, Culture and Sports (DECS)

b) Operation and Maintenance Plan of the Project

The actual operation and maintenance of the project facilities will be undertaken by the LGUs and farmers' cooperatives with the participation of beneficial farmers under the jurisdiction of the Provincial Project Management Office (PPMO).

Agriculture Development

- Nursery

A nursery station will be established to improve the rate of the planted seedlings at the barangay level. It will be operated and managed by the farmers' organization. Development Workers will be assigned by cooperatives/organization to manage the nursery station. The LTWG, the MAO and CENRO will assist in the development of the nursery. During the project implementation stage, the nursery shall supply adequate seedlings according to the established schedule of fruit tree-based farms and production/protection of forest.

- Demonstration Farm

To demonstrate a set of technology at the farm level, one demonstration farm will be proposed. This demonstration farm will be composed of almost contiguous plots for improvement of existing farming system and introduction of new farming system as fruit tree-based farming as well as production/protection forest. The farm lots may belong to the above mentioned Development Workers. It will be operated and maintained mainly by these farmers under the technical assistance provided by the working group, including the municipal agricultural office (MAO) and CENRO.

- Livestock and Poultry

Dispersal of pregnant carabao will be undertaken to increase qualified carabaos under the Project. The respondent farmers will be provided with necessary technical services on breeding and reproduction of carabao. Also, a mini-carabao bull camp will be placed. This mini-carabao bull camp shall be operated and maintained by the beneficiaries' organization, especially development worker for livestock and poultry. The mini-incubators for the hatching of native chicks will be installed among cooperative farmers who will

be assigned by the beneficiaries' organization. The operation and maintenance of the incubators will also be made by the organization.

Agricultural Infrastructures

- Irrigation Systems

The irrigation canal systems will be operated and maintained by the water users' association (WUA) to be established by the beneficial farmers. The WUA will be organized by DAR - PPMO after irrigable boundary and its areas are clearly defined. The training program for the WUA, particularly key persons in various aspects like leadership training, water management, operation and maintenance, gate operation, etc., will be started before the implementation of the Project. The NIA will be tapped by DAR in the development of the WUA, since NIA has enough experience to establish and develop such water user' association.

The WUA will operate and maintain the irrigation facilities, supervise the equitable distribution of water to farmers, and collect the necessary irrigation fees or charge.

- Farm Roads

Farm roads categorized into barangay roads will be periodically maintained by the beneficiary cooperatives in the Area after the construction of roads, which will be implemented under the supervision of LGUs. However, when heavy equipment will be needed to repair the roads, the beneficiary cooperatives can avail equipment from the municipal office by paying necessary charges.

- Farm Land Conservation

Most of the seeds and seedling or cutting to be used for the contour planting to protect soil erosion can be propagated from seeds or branch cutting by farmers themselves. However, some original seeds and seedling should be introduced at the nursery station provided at the barangay. The seeds and seedling mentioned above will be propagated in this nursery. Necessary technical assistance on the selection of the species and propagation will be provided by DA and DENR.

Also, adequate farm drains along and across the contour lines to collect and convey excess rain water at fields will be essential to prevent soil erosion. The maintenance works of these drains will also be undertaken by farmers themselves. A small-scale silting basin will be provided at the terminal of the drain systems.

Rural Infrastructures

- Rural Roads

  Rural roads will be improved in the Project. The operation and maintenance of these rural roads will be under the responsibility of provincial DPWH.

- Rural Water Supply

  Rural water users' association (WUA) will be established among households to be directly benefited by the rural water supply. The association will be organized by DAR-PPMO at the construction stage with an assistance of Local Water Works and Utilities Administration (LWUA) and/or LGUs. The WUA will operate and maintain the systems, collect the necessary water dues, and to prepare the plan for the upgrading of the water supply systems.

- Rural Infrastructures

  The social and other rural facilities such as, barangay school, barangay health center, barangay center, etc. shall be maintained by the community through the initiative of the barangay officers/council. For general maintenance work like cleaning and clearing, the community as a whole and some specific associations and/or organizations shall be tapped to do work on a regular basis to instill participatory work and responsibility among members of the community. Contributions for maintenance works may be for materials, equipment or tools, labor and food. For major rehabilitation and/or repair works, the LGU and/or other governmental agencies shall be tapped to undertake work. Examples of operation and maintenance work that can be applied to the Project Area are as follows:

- Elementary school:

Major rehabilitation/construction	- DECS/DPWH
Repair/rehabilitation work	- LGU, CDF
Repair works w/o major replacement	- Barangay IRA fund for materials and barangay community for labor and food
Regular maintenance like minor repairs, cleaning and clearing	- PTA , barangay council

- Health Station/Center:

Major rehabilitation/construction	- MOH/DPWH
Repair/rehabilitation work	- LGU, CDF
Repair works w/o major replacement	- Barangay IRA fund for materials and barangay community for labor and food

Regular maintenance like minor repairs, cleaning and clearing	- Barangay council, midwife, barangay health worker
- Barangay Center/Multi-Purpose Center	
Major rehabilitation/construction	- LGU, CDF
Repair/rehabilitation work	- LGU, Barangay IRA
Repair work w/o major replacement	- Barangay IRA fund for materials and barangay community for labor and food
Regular maintenance like minor repairs, cleaning and clearing	- Barangay council, barangay community, youth or women's group.

Post-Harvest and Agro-Industry

The actual operation and maintenance of post-harvest and agro-industry facilities will be conducted by municipal LGUs. However, the beneficial farmers' cooperatives will be requested to do daily and periodic care for provided equipment and facilities. Since operation and maintenance of equipment and facilities differ, it is necessary to make a practical operation schedule to expect effective operation or to employ an operator nearby or to be done by the beneficiary members themselves with ample experience for operation and maintenance.

Operation fee will be collected from the users of the equipment. The operators' pay will be paid from these sources. Management of this fee collection and payment will be conducted by the PPMO.

3) Operation and Maintenance Costs

The operation and maintenance costs for the implemented projects involve the following items; i) agricultural development, ii) agricultural infrastructure development, iii) rural infrastructure development, iv) post- harvest development, and v) institutional development.

Total operation and maintenance costs are estimated to be about 525 thousand pesos per annum, as shown below:

Annual O&M Costs

Items	O & M Costs (peso/year)
- Agricultural Development	9,510
- Agricultural Infrastructure Development	132,570
- Rural Infrastructure Development	344,610
- Post-Harvest and Rural Industry Dev.	31,100
- Institutional Development	6,700
Total	524,490

The detailed estimation of O&M costs classified into the related implementing line agencies are given in Table N.2-25. According to the estimation, the required O&M costs for the LGU is 226 thousand pesos. This is equivalent to 1.3 percent of annual budget of 17.8 million pesos for the municipality of Hilongos in 1996.

9.5 Project Evaluation

9.5.1. Economic Justification

1) Method of Economic Evaluation

The Project is evaluated or analyzed in two dimensions, the financial analysis and the economic analysis. The financial analysis is conducted to arrive at the financial internal rate of return (FIRR) for the project beneficiaries of the entire ARC. The economic analysis, on the other hand, is conducted to arrive at the economic internal rate of return (EIRR) which is meant to measure the project viability for the Philippines Economy as a whole.

In either case, incremental benefits or the cash flows which are the streams of differences between the Net Production Values (NPV) of the With-Project case and NPV of the Without-Project case are derived before applying the discount factors to arrive at the net present values of the cash flows and hence, the FIRR and EIRR.

2) Prices of Commodities

In the financial analysis, farmgate prices collected from both the primary and secondary sources relating to each project are used.

In the economic analysis, shadow prices are used through their derivation in the following manners:

- All values of foreign costs are multiplied by the factor of 1.20 to reflect the shadow foreign exchange rate that is believed to be 1.2 times of the official exchange rate (OER), and

- All values of unskilled labor are discounted by 0.60 to reflect the shadow wage rates that are believed to be much lower than the market wage rates. All others remained unchanged are multiplied by the factor of 1.0.

The financial prices and economic prices used in the financial and the economic analyses of the project are as shown in Tables 9.5-1 and 9.5-2 below.

Table 9.5-1 Financial and Economic Prices of Output for Marangog Area

Crop	Product	Unit	Financial Price		Economic Price	
			Marangog	Average	SCF	Peso/unit
Field Crops						
Paddy		kg	8.75	8.26	1.0	8.75
Corn		kg	7.50	6.20	1.0	7.50
Peanut		kg	14.75	13.89	1.0	14.75
Mungbean		kg	18.94	20.74	1.0	18.94
Sweet Potato		kg	5.94	5.35	1.0	5.94
Garlic		kg		60.00	1.0	
Squash		kg	5.50	5.27	1.0	5.50
Cassava		kg		2.58	1.0	
Fruit Trees						
Coconut	Copra	kg	6.92	8.99	1.0	6.92
	Charcoal	kg	2.50	2.50	1.0	2.50
Mango		kg	15.00	13.93	1.0	15.00
Banana		kg	3.32	3.32	1.0	3.32
Abaca		kg	20.56	21.22	1.0	20.56
Cashew		kg	18.00	18.00	1.0	18.00
Rambutan		kg	17.00	15.91	1.0	17.00
Durian		kg	32.30	30.22	1.0	32.30
Jackfruit		kg	5.00	5.00	1.0	5.00
Forest Products						
Fuelwood	All	cu.m	85	80.00	1.0	85
Poles	All	cu.m	1,018	1069.00	1.0	1,018
Pulpwood	Falcata	cu.m	2,371	2064.00	1.0	2,371
Sawlog	Bagalunga	cu.m	1,453	1265.00	1.0	1,453
Sawlog	Bagras	cu.m	1,609	1401.00	1.0	1,609
Sawlog	Gmelina	cu.m	2,943	2562.00	1.0	2,943
Sawlog	Mahogany	cu.m	4,252	3701.50	1.0	4,252
Livestock						
Carabao	Milk		35	35.00	1.0	35
	Cow/Bull	ea	7,200	6710.00	1.0	7,200
Chicken	Meat	ea	50	62.95	1.0	50
	Eggs	ea	2.89	2.89	1.0	2.89

SCF : Standard Conversion Factor

Table 9.5-2 Financial and Economic Prices of Inputs for Marangog Area

Inputs		Unit	Financial Prices		Economic Prices	
			Marangog	Average	SER	Peso
Seed/Planting Material						
Rice		kg	8.50	8.50	1.00	8.50
Corn	Hybrid	kg	60.00	60.00	1.00	60.00
Corn	OPV	kg	20.00	20.00	1.00	20.00
Peanut		kg	40.00	40.00	1.00	40.00
Mungbean		kg	30.00	30.00	1.00	30.00
Squash		kg	300.00	300.00	1.00	300.00
Fruit Tree Seedlings						
Coconut		ea	12.00	12.00	1.00	12.00
Mango		ea	20.00	20.00	1.00	20.00
Banana		ea	2.00	2.00	1.00	2.00
Abaca		ea	3.00	3.00	1.00	3.00
Cashew		ea	2.50	2.50	1.00	2.50
Rambutan		ea	30.00	30.00	1.00	30.00
Durian		ea	30.00	30.00	1.00	30.00
Jackfruit		ea	30.00	30.00	1.00	30.00
Forest Tree Seedlings						
Any		each	2.50	2.50	1.00	2.50
Animal Stock						
Carabao	Cow	each	15,000	15,000	1.00	15,000
	Bull	each	13,000	13,000	1.00	13,000
Chicken	Fert-egg		2.00	2.89	1.00	2.00
Fertilizer						
Urea (46-0-0)		kg	8.20	7.75	1.20	9.84
Muriate of Potash (0-0-60)		kg	4.90	4.63	1.20	5.88
Ammophos (16-20-0)-kg		kg	6.60	6.68	1.20	7.92
Complete (14-14-14) - kg		kg	6.80	6.84	1.20	8.16
Zinc Phosphate		kg	6.67	6.67	1.20	8.00
Pesticides						
Basudin 400EC		L1.0 lt.	278	279.90	1.20	333.60
Furadan 3G		G 34g	60	60.00	1.20	72.00
Decis		L1.0 lt.	476	447.25	1.20	571.20
Azodrin 202R		L3.0 lt.	335	315.00	1.20	402.00
Lannate EC		L1.0 lt.	400	411.25	1.20	480.00
Malathion		L2.0 lt.	242	248.29	1.20	290.40
Trigograamma		card	1.50	1.50	1.20	1.80
Herbicides						
2.4D-Amine EC		L2.0 lt.	450	462.69	1.20	540
Labor						
Land Preparation		mad	120	130.00	0.60	72
Others		md	60	65.00	0.60	36

SER : Shadow Exchange Rate

3) Project Benefits

The major project benefits to be incorporated into the analysis are the increased production of crops and livestock proposed to be produced in the Project, measured in terms of their financial and economic values. In arriving at the benefits, alternative plan for land use for the Project Area is developed.. All technical and economic parameters are considered in modeling the alternative plan. The technical parameters include altitudes, land topography, soil structure, availability of inputs, yields, historical production, soil conservation as well as the social consideration of environmental protection. Five cases are modeled from which one is selected for the derivation of the overall financial and economic returns. These five cases are modeled from the base case with all enterprises included at the same time from the first year of the project. Case-1 excludes all the contour farming. Case-4 covers only the land with 18 percent slop and below. The remaining three cases divide the planting areas of selected crops during the first three years of the project. Finally, only Case-3 is selected for the overall analysis based on the judgement of the Study Team as most relevant to the actual situation.

The direct benefits from the selected Case-3 in the forms of incremental agricultural production and employment in the Project are summarized below:

- 212 tons per year of incremental field crop production from paddy, corn, peanut, mungbean, squash and sweet potato,
- 156 tons per year of incremental production from abaca, banana, coconut and mango,
- 5,585 cu.m of forestry products including firewood, pulpwood, poles, and sawlog for a period of 25 years,
- 18.9 tons of caramilk, 126 heads of young carabulls/caracows, 0.5 million dozens of native chicken eggs and 88 tons of chicken meat for a period of 25 years,
- 30,998 mandays of incremental employment of family labor in crop production

Other benefits included in the analysis are the value of tilapia production and labor saved from long travelling and hauling due to the presence of the rural roads, rural water and post-harvest including agro-industry components of the project.

Considering the above modelling of the land use plan, financial analysis is conducted for all the five cases while economic analysis is only made for the selected Case-3. The major outputs of the analysis are the economic viability of the Project with it's FIRR and EIRR.

Details of inputs, outputs, costs and benefits of individual crop and livestock enterprises included in the financial and economic analysis of the Project Area are shown in Annex O.2.

Besides the direct benefits there are also a number of non-quantifiable benefits worthy of mentioning, though not included in the analysis due to the lack of data and appropriate analytical methodology at present.

The non-quantifiable benefits from the project exist in both indirect and intangible forms. Examples are the improved environments as a result of contour farming and agro-forestry production recommended in the selected case of the land use plan. These benefits are savings of costs on fertilizers from less occurrence of soil erosions; savings of irrigation costs due to more soil moisture and regular rainfalls; savings of road repairing costs resulting from fewer landslides, etc..

All the above together with the indirect and intangible benefits from improved incomes and more household expenditures on education, health and other social reforms of the people in the Project Areas, do exist and could make the rate of return to the project much higher than that presently shown, if included.

4) Economic Project Costs

The project costs used in the analysis are of different forms. First is the production costs of the various agricultural enterprises included in the land use plan for the Project Area. Next the net value of production of the Without Project Case that represents the value of land used for agricultural production. Project development costs and their close associated operation and maintenance (O&M) costs and physical contingencies are the major cost items incurred from project implementation.

Also, cost of capital (money) is automatically taken cared of in the process of analysis that values all economic items in terms of their present values. The conventional depreciation costs of capital items are also automatically taken cared of by their present values. Inflation is also assumed considering that it would equally affect both the benefit and cost streams of the project.

What are not shown as direct costs to the Project are those related to the suggested growing of forest trees that either accrue some income in only a few years against yearly expenses, or do not provide any nominal income other than its environmental protection values. Kakawate and Flemingia are the two forest tree productions of the latter case. Their negative financial benefits may be regarded as costs to all other agricultural production, as well as other economic and social activities that benefit from the protected environment caused by planting the said forest trees. Considering this reasoning, it is suggested that interest-free loans be provided to all ARBs who agree to plant any forest trees in the Project Area.

The production costs of each crop and livestock of the Without-Project and With-Project Cases; as well as the project development and O&M costs at Marangog Area are given in Annex O.2.

5) Financial and Economic Internal Rates of Return

FIRR and EIRR are calculated for both individual enterprises included in the land use plan and for the entire project of Marangog itself. The results of analysis are summarized in Table 9.5-3 and Table 9.5-4.

The analysis indicates an FIRR of 12 percent and an EIRR of nine percent for the Project.

6) Sensitivity Analysis

To cope with the negative outcomes due to uncontrollable variations in any physical, economic and social factors that reduce the rate of return of the project through increasing its costs or reduction of its benefits, both the FIRR and EIRR of the Project are analyzed in terms of their sensitivity to the said variations. A summary of the analysis is shown below:

Summary of A Sensitivity Test

Reduction in Agr. Income (%)	Increase in Agr. Costs (%)	FIRR (%)	EIRR (%)
0	0	12	9
10	0	10	7
20	0	8	6
0	10	12	8
0	20	11	7
10	10	10	7
Switching Values(15%)			
Income	(-)	-	-
Costs	(+)	-	-

Table 9.5-3 Financial Analysis for Marangog Area

Table 9.5-3 Financial Analysis : MARANGOG

Enterprise	Type Product	Area (ha)	Production (Cost) Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Paddy 3	Irr-W	11	130.5	189.0	216.0	243.1	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2	270.2
Paddy 5	RF-WD	21	116.2	173.3	209.3	245.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4	281.4
Corn-W		42	90.2	307.4	368.9	435.0	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4	496.4
		2	0.0	4.3	14.6	17.6	20.7	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
		2	0.0	0.0	4.3	14.6	17.6	20.7	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
Squash		11	-6.2	32.2	45.0	57.9	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8
Sw_Potato	Up-wet	11	177.3	245.9	280.5	315.1	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7	349.7
Peanut	Up-dry	21	-34.6	21.0	469.4	535.5	601.6	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7	667.7
		1	0.0	-1.6	1.0	22.4	25.5	28.6	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8
		1	0.0	0.0	-1.6	1.0	22.4	25.5	28.6	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8
Mungbean		1	7.7	10.6	12.1	13.6	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
		1	0.0	7.7	10.6	12.1	13.6	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
		1	0.0	0.0	7.7	10.6	12.1	13.6	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
Fruit Trees																											
Banana		21	-469.2	354.1	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8	423.8
Abaca		26	-346.1	182.4	527.2	527.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2	501.2
Coconut-S		34	104.5	117.0	146.8	144.5	157.8	189.0	185.9	185.9	185.9	185.9	185.9	185.9	185.9	163.1	163.1	163.1	163.1	163.1	163.1	163.1	163.1	163.1	163.1	163.1	163.1
Coconut-N		52	-460.6	-139.2	-130.2	-135.4	-193.1	79.4	299.6	545.3	791.0	984.7	1036.7	1036.7	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8	937.8
Jackfruit		5	-62.7	-11.9	-9.8	-10.2	-15.5	67.2	77.3	77.3	77.3	72.3	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4
		5	0.0	-62.7	-11.9	-9.8	-10.2	-15.5	67.2	77.3	77.3	77.3	72.3	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4
		4	0.0	0.0	-50.2	-9.5	-7.9	-8.1	-12.4	53.8	61.9	61.9	61.9	57.9	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3
Forest Tree																											
Falcata		1	-5.4	-1.1	-1.0	-1.1	-1.1	46.3	-1.1	-1.1	-1.1	112.7	-0.8	-0.8	-0.8	-0.8	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1	0.0	-5.4	-1.1	-1.0	-1.1	-1.1	46.3	-1.1	-1.1	-1.1	112.7	-0.8	-0.8	-0.8	-0.8	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1	0.0	0.0	-5.4	-1.1	-1.0	-1.1	-1.1	46.3	-1.1	-1.1	-1.1	112.7	-0.8	-0.8	-0.8	-0.8	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mahogany		10	-83.3	-19.0	-7.8	-11.4	-11.4	-5.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	72.1	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	3299.3
		10	0.0	-83.3	-19.0	-7.8	-11.4	-11.4	-5.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	72.1	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4
		9	0.0	0.0	-75.0	-17.1	-7.0	-10.2	-10.2	-4.9	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	64.9	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-11.4
Degalunga		10	-83.3	-19.0	-10.2	-11.4	-11.4	157.6	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	566.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		10	0.0	-83.3	-19.0	-10.2	-11.4	-11.4	157.6	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	566.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		9	0.0	0.0	-75.0	-17.1	-9.1	-10.2	-10.2	-10.2	141.9	-10.2	-10.2	-10.2	-10.2	-10.2	509.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gmelina		1	-8.3	-1.9	-1.0	-1.1	-1.1	-1.1	-0.2	-1.1	-1.1	20.0	-1.1	-1.1	-1.1	-1.1	151.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1	0.0	-8.3	-1.9	-1.0	-1.1	-1.1	-1.1	-0.2	-1.1	-1.1	20.0	-1.1	-1.1	-1.1	-1.1	151.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flemingia		2	-8.8	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Livestock																											
Carabao	1		0	-145.2	207.9	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0	196.8	447.0
Chicken	50		0	126.4	292.7	384.3	384.3	384.3	126.4	292.7	384.3	384.3	384.3	126.4	292.7	384.3	384.3	384.3	126.4	292.7	384.3	384.3	384.3	126.4	292.7	384.3	384.3
Others																											
Rural Roads			0	0	0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0	2461.0
Rural Water			0	0	0	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4	453.4
Fish Culture			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Harvest & Agro-Forestry			0	0	270.8	270.8	270.8	213.2	270.8	198.0	270.8	270.8	69.3	270.8	270.8	270.8	198.0	270.8	270.8	270.8	270.8	270.8	69.3	198.0	270.8	270.8	270.8
NPV-With			-939	1188	3088	6540	7002	7206	7742	7910	8508	8429	8613	8370	8622	8463	9454	9290	9077	8409	8751	8501	8549	8170	8659	8301	12060
NPV-W/O			157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157
Cash Flow less project costs			-1096	1031	2931	6383	6845	7049	7585	7753	8351	8272	8456	8213	8465	8306	9297	9133	8920	8252	8594	8344	8392	8013	8502	8144	11903
Project Investment			3361	17446	29189	2071	2072	2072																			
Annual O&M			370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
Financial cashflow			-4827	-16785	-26628	3942	4403	4607	7215	7383	7980	7902	8086	7843	8094	7936	8927	8763	8550	7882	8224	7973	8022	7643	8132	7773	11533

FIRR = 12%
NPV_15 = 6,710

Table 9.5-4 Economic Analysis for Marangog Area

Table 9.5-4 Economic Analysis: MARANGOG (using SCS)

Enterprise Product	Type	Area (ha)	Net Production Value ('000 peso) Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Paddy 3	Irr-W	11	159.0	213.7	232.0	259.4	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9	286.9
Paddy 5	RF-WD	21	132.0	218.0	250.9	285.8	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7
Corn-W		42	-155.1	177.9	300.8	433.1	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9	555.9
		2		-7.4	8.5	14.3	20.6	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
		2			-7.4	8.5	14.3	20.6	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
Squash		11	21.1	54.5	67.2	79.9	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2	93.2
Sw.Potato	Cr-wet	11	198.5	264.0	298.4	332.8	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0	368.0
Peanut	Un-dry	21	0.6	50.3	67.9	85.5	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1
		1		0.0	2.4	3.2	4.1	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
		1			0.0	2.4	3.2	4.1	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Mungbean		1	9.5	12.1	13.6	15.1	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
		1	0.0	9.5	12.1	13.6	15.1	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
		1	0.0	0.0	9.5	12.1	13.6	15.1	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
Fruit Trees																											
Banana		21	-455.4	354.1	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0
Abaca		26	-330.3	208.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4	556.4
Coconut-E		34	141.4	131.7	161.5	159.1	195.2	203.7	200.6	197.1	193.3	177.8	184.6	179.5	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6	184.6
Coconut-W		52	-360.7	-67.5	-62.6	-68.8	-127.7	162.4	399.8	636.3	871.9	1054.5	1094.3	1080.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9	1083.9
Jackfruit		5	-53.3	-11.9	-9.8	-10.2	-15.5	67.2	77.3	74.9	70.5	64.6	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4
		5		-52.3	-11.9	-9.8	-10.2	-15.5	67.2	77.3	74.9	70.5	64.6	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4	160.4
		4			-42.6	-9.5	-7.9	-8.1	-12.4	53.8	61.9	60.0	56.4	51.7	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3	128.3
Forest Tree																											
Falcata		1	-4.4	-0.9	-0.8	-0.9	-0.9	46.5	-0.9	-0.9	-0.9	112.8	-0.7	-0.7	-0.7	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1		-4.4	-0.9	-0.8	-0.9	-0.9	46.5	-0.9	-0.9	-0.9	112.8	-0.7	-0.7	-0.7	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1			-4.4	-0.9	-0.8	-0.9	-0.9	46.5	-0.9	-0.9	-0.9	112.8	-0.7	-0.7	-0.7	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mahogany		10	-72.0	-18.2	-6.8	-9.0	-9.0	-3.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	74.5	-9.0	3301.7	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	3301.7
		10		-72.0	-18.2	-6.8	-9.0	-9.0	-3.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	74.5	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0
		9			-64.8	-16.4	-8.1	-8.1	-8.1	-2.7	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	67.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1
Rosalunga		10	-74.0	-18.2	-8.2	-9.0	-9.0	-9.0	160.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	568.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		10		-74.0	-18.2	-8.2	-9.0	-9.0	-9.0	160.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	568.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		9			-66.6	-16.4	-7.4	-8.1	-8.1	-8.1	144.0	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	512.1	0.0	0.0	0.0	0.0	0.0	0.0
Gmelina		1	-3.4	-1.8	-0.8	-0.9	-0.9	0.0	-0.9	-0.9	20.3	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	151.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		1		-3.4	-1.8	-0.8	-0.9	-0.9	-0.9	0.0	-0.9	-0.9	20.3	-0.9	-0.9	-0.9	-0.9	-0.9	151.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flemingia		2	-6.7	-8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Livestock																											
Carabao		1	0	-136.8	179.1	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2	158.4	394.2
Chicken		50	0	158.5	347.3	448.8	448.8	448.8	158.5	347.3	448.8	448.8	448.8	158.5	347.3	448.8	448.8	448.8	158.5	347.3	448.8	448.8	448.8	158.5	347.3	448.8	448.8
Others																											
Rural Roads			0	0	0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0	1874.0
Rural Water			0	0	0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0
Fish Culture			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-harvest & Agro-indus			0	0	79	79	79	79	79	79	10	79	-9	79	79	10	79	79	79	-9	10	79	79	79	79	10	-9	79
NPV-w/h			-857	1326	2684	5249	5844	6051	6498	6688	7257	7071	7528	7053	7380	7315	7786	7552	11139	7735	8092	7344	7580	7054	7410	7256	10891
NPV-w/o			362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Cash Flow less project cos			-1220	1014	2322	4887	5481	5689	6136	6326	6894	5708	7165	6691	7018	6952	7424	7189	10777	7372	7730	6982	7218	6692	7047	6894	10529
Project Investment			3378	19206	31747	2129	2130	2130																			
Annual O&M			370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
Economic cashflow			-5368	-18562	-29795	2487	2981	3189	5765	5955	6524	6338	6795	6321	6647	6582	7054	6819	10406	7002	7360	6612	6848	6322	6677	6524	10158

EIRR = 9%
NPV (5%) = 16,313

9.5.2 Financial Analysis of Typical Farmers

As earlier mentioned, the alternative land use plan used in the financial and economic analysis of the Project is derived and modelled based on a number of considerations and cases. The five cases simulated before arriving at the final one (Case-3), when reduced to the size of a farm are, in fact, the models for typical farmers in the Project Area.

With the view to providing agricultural land to the landless and the poor farmers so that their income disparities are minimized, what would finally be the cases in the future are farmers of approximately equal landholdings. The existence of farms of different sizes, be they large, medium or small, is not expected in the Project Area. In other words, the typical farm in the Project Area would only be of one size.

To show what would likely be the net farm income of a typical household in the Project Area, the annual and average returns to family labor and management per farm and per hectare are derived as shown in Table 9.5-5. The analysis indicates the average annual return to family labor and management of 38,743 peso per farm, and 29,575 peso per hectare, of a typical farm at Marangog having an average landholding of 1.31 ha.

9.5.3 Project Monitoring and Evaluation

The project analysis as shown above is only the beginning of the story. After the decision to launch the project, the successful implementation of the project and the attainment of its objectives are yet to be ascertained. All these require an effective and efficient process of Project Monitoring and Evaluation. For a successful implementation of the Project, a project work plan needs to be chalked out to prevent delays in implementation and cost overrun. All the concerned officers from related Departments both from the national and the LGUs, as well as NGOs and people's organizations in the Project Area will be assigned to help monitor the activities, jobs and tasks to be undertaken during project implementation. Disbursements of project funds, procurement of project inputs, realization of project outputs at the various stages of project implementation need to be properly recorded, reported and corrected.

To ascertain the attainment of project general (development, long-term) objectives and it's specific (immediate) objectives, a base-line or benchmark survey needs to be conducted before the actual start of the project implementation. This will be supplemented and compared with additional surveys conducted annually or at mid-term of the project implementation, as well as at the end and some years after project implementation. Indicators for measurements of the attainment of the project immediate objectives (effects) and development objectives (impact) will be needed.

Table 9.5-5 Net Income of Typical Farm Household in Marangog Area

Table 9.5-5 Net Income of a Typical Farm, MARANGOG

Enterprise	Type Product	Area (ha)	Net Income over Variable and Fixed Costs ('000 peso) Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Paddy_1	Irr-W	0.04	474	687	786	884	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982	982
Paddy_2	RF-WD	0.08	443	660	797	935	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072
Corn-W		0.18	344	1,171	1,405	1,657	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891	1,891
Squash		0.04	-19	117	164	211	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258
Sw.Potato	Upwel	0.04	645	896	1,020	1,146	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272
Peanut	Undry	0.08	-132	80	1,788	2,040	2,292	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544	2,544
Fruit_Trees																											
Banana		0.09	-2,011	1,518	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
Abaca		0.11	-1,464	272	2,230	2,230	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120
Coconut-F		0.14	430	482	605	595	650	778	765	765	765	765	765	765	821	671	671	671	671	671	671	671	671	671	671	671	671
Coconut-N		0.21	-1,860	-562	-626	-647	-780	321	1,210	2,205	3,195	3,977	4,187	4,187	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787	3,787
Jackfruit		0.06	-752	-143	-118	-122	-186	806	928	928	928	868	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925
Forest_Tree																											
Falcata		0.01	-54	-11	-10	-11	-11	463	-11	-11	-11	127	-8	-8	-8	-8	-8	0	0	0	0	0	0	0	0	0	0
Mahogany		0.12	-1,000	-228	-93	-136	-136	-65	-136	-136	-136	-136	-136	-136	-136	-136	866	-136	-136	-136	-136	-136	-136	-136	-136	-136	39,592
Bagalunga		0.12	-1,000	-228	-122	-136	-136	-136	1,892	-136	-136	-136	-136	-136	-136	-136	6,799	0	0	0	0	0	0	0	0	0	0
Gemelina		0.01	-83	-19	-10	-11	-11	-11	-2	-11	-11	200	-11	-11	-11	-11	1,510	0	0	0	0	0	0	0	0	0	0
Livestock																											
Chicken			0	2,527	5,053	7,685	7,685	7,685	2,527	5,053	7,685	7,685	7,685	2,527	5,053	7,685	7,685	7,685	2,527	5,053	7,685	7,685	7,685	2,527	5,053	7,685	7,685
Total_Area_(ha)		1.31																									
Net_Income_over_VC&FC			-6,040	7,716	15,585	18,235	18,777	21,797	19,127	21,409	24,233	26,305	26,226	21,068	23,900	25,702	35,190	25,888	20,730	24,056	25,888	25,888	25,888	20,730	24,056	25,888	65,616
Net_Income_with_Unpaid_Labor			35,263	47,020	54,889	57,538	58,080	61,100	58,431	60,712	63,536	65,608	65,529	60,371	63,203	65,005	74,494	65,191	60,033	63,359	65,191	65,191	65,191	60,033	63,359	65,191	104,919
Costs_of_Capital			17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078	17,078
Costs_of_Land			6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438	6,438
Return_to_Family_Labor/Management			9,348	23,104	30,973	33,623	34,164	37,184	34,515	36,796	39,620	41,692	41,613	36,455	39,288	41,120	50,578	41,275	36,117	39,443	41,275	41,275	41,275	36,117	39,443	41,275	81,003
Average_Annual_Return_per_Farm			38,743																								
Average_Annual_Return_per_ha.			29,575																								

In practice, DAR would be the most relevant agency to plan and organize project monitoring through its officers in the national and local units. Other related agencies as DA, LBP, NGOs and people's organizations in the Project Area should also be included in the monitoring process.

For the evaluation of the attainment of project's objectives, known in general as Project Evaluation, DAR should only facilitate or participate as one among other parties assigned to jointly conduct it. NEDA, being the Central Economic Planning agency of the Government should be another party involved in evaluating the project impact. Others may include representatives from any outside agencies as universities and other related institutions. Recently, efforts toward supplementing Project Evaluation with the process of Self Assessment by the implementing agency (in this case, DAR) have been experimented and found successful largely. It, therefore, may be incorporated into the Project Monitoring and Evaluation plan of the Project.