

**ANNEX G**

*Agricultural Credit,  
Marketing and Post-harvest Practices*

**THE STUDY ON JALAU R IRRIGATION SYSTEMS  
AND RURAL AREA DEVELOPMENT PROJECT**

**ANNEX G**

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## 1. AGRICULTURAL CREDIT

### 1.1 Policies

Agricultural credit has always been used by the government as a tool to increase agricultural production. To achieve this goal, the government has maintained agricultural credit as accessible as possible to the small farmers and ensured the availability of loanable funds. The policies that support the above instruments could be summarized as follows: (1) imposition of market interest rates following free market forces; (2) liberalized bank branching; (3) utilization of institutional borrowers (e.g. farmers' cooperatives) as retailer of agricultural credit; and (4) implementation of agricultural credit through the banking system. With these as policies, the government essentially removed subsidies and allowed competition among the various suppliers of agricultural credit. The intent was to reduce transaction cost of administering agricultural credit. For instance, the policy of the government to course its lending to farmers' cooperatives rather than to individual farmers is meant to decrease transaction cost. In addition, the government's plan of sourcing concessional official development assistance (ODA) to increase loanable fund for onward lending to farmers' cooperatives is intended to cushion the nominal interest rate being charged to institutional fund retailers.

Of late, the government has shifted its agricultural lending program from commodity-specific to a portfolio-based approach. The latter approach affords flexibility in terms of utilization because it considers the totality of credit requirement based on the need of a farm enterprise. The Land Bank of the Philippines (LBP) uses this approach in its so-called "Todo Unlad" (meaning total development) lending program for agriculture and the local government units (LGUs). In essence, one can argue that supply of agricultural credit is not really a concern in the Philippine agriculture.

In the case of rice production, the government re-implemented individual lending to rice farmers under its "Gintong Ani" (Gold harvest) program 2 years ago through the LBP. This special credit scheme was pursued under a scheme where the LBP provided a counterpart fund equal to the amount deposited by the Department of Agriculture (DA) to the former. The program provided only a temporary relief to the rice farmers as it was again terminated due to the prohibitive cost of administering credit to individual farmers.

### 1.2 General loan demand

According to the result of the socio-economic survey of 186 farmers in the Jalaur proper and Suague areas by the study team, 61% of the respondents used credit last year. The remaining 39% did not use credit as shown in the following table.

Number of Farms Loaned and Not-loaned in 1996

	Cases	(%)
No loan in 1996	73	39
Loaned in 1996	113	61
Total	186	100

Credit cooperatives and traders are the two most important sources for the farmers providing 33% and 24% of the needed credit, respectively. An average loan amount per farm was 20,810 pesos in 1996.

### 1.3 Supply of Credit

The supply of credit in the project area is met by formal and informal sources. Among the formal sources are the commercial bank, rural bank, credit cooperative (LBP) and NGOs, and the informal sources are input suppliers and traders.

#### 1.3.1 Credit cooperatives and Land Bank of the Philippines (LBP)

Credit cooperatives are the retail banks of the LBP, which is the sole government bank that provides financing to the agriculture sector. The bank was established primarily to finance the acquisition of land transfer under the Comprehensive Agrarian Reform Program (CARP). While the LBP was established for this purpose, it functioned as a commercial bank essentially to support its operations in the agrarian sector. Recently, however, both its commercial and agrarian operations have been combined and thus the bank's field and commercial branches have been put under one roof. The bank maintains its presence in almost all provinces and cities nationwide.

As a commercial bank, it provides financing to agriculture only as a wholesaler, primarily to the farmers' cooperatives. Individual farmers, particularly paddy farmers can not transact business directly with the LBP, but only through their respective juridical organizations such as cooperatives which can negotiate loans with the bank.

Short-term and crop production loans of the LBP carry an annual interest rate of 14%. This effective interest rate is passed on to the farmers' cooperatives. Medium-term loans for the acquisition of agricultural machinery and equipment, about 3 to 5 years maturity, carry an annual effective interest rate of about 18%. For both types of loans, the nominal interest rates are 12% and 16% for short and medium-term loans, respectively. The 2% is considered service fee. On the whole, the interest rate being applied by the bank is rather concessional. While this is so, the LBP sets a rigid screening and selection process for its cooperative borrowers.

The importance of the LBP as a major institutional supplier of agricultural credit in the study area can not be overemphasized. There are 15 farmers' cooperatives that have received credit lines from the LBP in the project area. Out of these 15 cooperatives, 9 or 60% have been reported to be inactive. The average past due loan (arrears) of a farmer-member has been estimated at about P5,000 as of end 1995. Over the past 4 years, the total agricultural loans granted by the LBP in Iloilo province stood from P58 million in 1993 to about P21 million in 1996 as shown in the next table. What is alarming to note, however, is the declining number of active cooperative borrowers, including the deteriorating repayment performance of the farmers' cooperatives. This reflects the poor credit discipline among the farmers. Most cooperatives including farmers' cooperatives do not demand collaterals and guarantors when issuing loans. Cooperative's credit conditions are 3% to 3.33% monthly interest rate, 10,000 maximum loan amount, 6 month grace period and 12 month loan period. A next season's loan can be applied only after the repayment of the first loan is completed.

Agricultural Loans by LBP for Iloilo Province

LBP Loans	Unit(x P1000)			
	1993	1994	1995	1996
1. Paddy	54,641	31,150	20,480	20,478
2. Corn	640	88	0	0
3. Sugarcane	330	916	0	0
4. Cotton	710	0	647	0
5. Garlic	2,000	0	100	0
6. Watermelon	0	80	0	0
Total	58,321	32,234	21,227	20,478

Source: LBP, Iloilo

## Rehabilitation Program on LBP-Assisted Cooperatives

Financial information on active cooperatives in the project area would tend to indicate that they can still be rehabilitated as shown in the next table. The average networth is about P0.5 million with a current ratio of about 1.89. Total assets are about P2 million. The cooperatives have a net profit margin of 69%. Largely, they are not that bad at all. On the other hand, the cooperatives are heavily leveraged, meaning that their long-term liabilities are almost equal to their total assets. This also implies that the cooperatives are financing their current operation through long-term borrowings. This financial weakness is compounded by small membership of the cooperatives with an average size of 38 members. Given the current accreditation and eligibility criteria of the LBP (Table G.1.1), a number of these barangay-based cooperatives would have to be consolidated and professionally managed to be able to raise the required membership and financial resources.

Financial Conditions of a Typical Active Cooperative in the Project Area

<u>Indicators</u>	
1. Average size of members	38
2. Financial	In Pesos
a. Networth	520,230
b. Authorized capital	90,000
c. Paid-up capital	7,000
d. Members Equity	450,000
e. Operating Income	270,000
3. Financial Ratios	
a. Current ratio	1.89
b. Debt to equity ratio	1.31
c. Total assets to long-term liabilities	0.86
d. Net profit margin	69%

Source: CDA, Iloilo

The LBP received an OECF loan in the amount \$ 60 million in 1996 under the 21<sup>st</sup> Yen Credit. This loan is intended to augment its loanable funds for onward lending to farmers' cooperatives including cooperatives organized under the Department of Agrarian Reform's (DAR) agrarian reform communities. On top of the loanable funds, the OECF Rural Finance Project included a package of technical support to assist the LBP in credit delivery, screening and evaluation. The assistance to the bank-assisted cooperatives would include monitoring and improvement of the managerial, technical and financial capacities of the cooperatives. Disbursement of the loan portion has begun in mid-1996 while the technical assistance to the cooperatives would start in late 1997. This project is expected to be completed in 5 years.

### **1.3.2 Rural Banks**

Every municipality in the project area has a rural bank. Their presence makes it accessible for farmers to get financing. The rural banks are privately owned normally capitalized by the businessmen and big landowners in the municipality. A typical rural bank studied in the project area<sup>1</sup> has an average asset of about P22 million, a saving of P4 million and a loan portfolio of about P17 million. The rural banks are under the supervision of the Central Bank and thus their operations are well monitored. Most of their loanable funds are internally generated through the savings program.

<sup>1</sup> Municipality of Pototan

The studied rural bank provides an average interest rate of 5%/annum for savings. Its loans are mostly agricultural and commercial. Commercial loans are mostly availed of by vendors and small businessmen within and adjacent municipalities. The effective interest rate on agricultural and commercial loans is pegged at 25%/annum, which is the prevailing market interest rate as of November 1997. Rural banks are very prudent, and all their loans are hedged with collateral. The most common type of collateral is real estate. The bank also grants loan on the basis of available savings deposited. For every peso deposited, a borrower can avail of that same amount.

### **1.3.3 Non-Government Organizations (NGOs)**

The NGOs have become active in providing partly agricultural credit in the project area. A prominent NGO based in Iloilo city<sup>2</sup> reported to have a total loan exposure of about P585,000 in the municipality of Pototan. However, this NGO reported that its main borrowers are the women. About 95% of the total loan exposures are given to the women. Production loans have a ceiling of P4,000 per ha and the average interest rate being charged is 30%/annum. This NGO gets its funds either from the government or from international NGOs. Its cost of funds, i.e. funds borrowed from the government, is about 12%/annum.

The most important criterion being considered by this NGO in granting loans is that the borrowers should belong to the poorest of the poor. It is highly segmented and limited to the ultra-poor. Given as such, the use of NGOs as conduit for crop production loans is very restricted.

### **1.3.4 Input Suppliers and Traders**

The input suppliers and traders have become a dominant informal source of agricultural credit in the project area. The traders have taken advantage of the profit opportunities in the area as a result of increased agricultural production brought about by the construction of the irrigation systems. As such, they have integrated lending in their operations. The IA members have rated the input suppliers and traders as their first choice of credit mainly because of convenience and flexibility<sup>3</sup>. They get the inputs on credit and in return a ready market for their produce. One can also surmise that the traders have actually filled up the service-gap brought about by the dormant and non-viable IAs and farmers' cooperatives. Supposedly, the integration of lending cum provision of inputs and purchase of paddy is viewed among the members as a vital service that should have been performed by their organizations. However, this is not being undertaken because of the several technical, structural and financial problems being currently encountered by the farmers' cooperatives.

The input suppliers and traders are expected to provide mostly the credit needs of the IAs unless their respective organizations can offer a service as convenient as what the former can offer. Traders and input dealers interviewed in the project area provide loans at an average interest rate of 30% to 100%/annum depending on the credit needs.

### **1.3.5 Moneylenders**

The moneylenders are individuals who are by far the most readily accessible but also the most exploitative among the informal sources. Effective interest rates being charged by them range from 90% to 1000%/annum. The common practice among these lenders is the so-called "five-six." For every P5.00 being borrowed, the borrower has to return P6.00 regardless of maturity.

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<sup>2</sup> Taytay sa Kauswagan Inc.

<sup>3</sup> One-on-One Interview and PRA Session

### 1.3.6 Source of credit in the Project area

Average loan amounts per farm loaned from commercial bank, rural bank and credit cooperative are 57,967 pesos, 25,333 pesos and 14,144 pesos, respectively as shown in the next table. Commercial banks and rural banks provide relatively larger loans than cooperatives and traders.

Sources of Credit

Source	No. of Farms (%)	Amount/Farm Loaned (Peso)
<b>Non-institutional</b>		
Money lender	9	18,250
Friend/relative	15	6,916
Traders	24	10,001
Others	4	3,467
<b>Institutional</b>		
Commercial bank	11	57,962
Rural bank	14	25,333
Credit cooperative	33	14,144
NGO	1	60,000
Other sources	1	40,000
<b>Total Loans/Farm</b>		<b>20,810</b>

Source: Socio-economic survey by the JICA study team, 1997

Among the informal sources, the traders and friends/relatives are the dominant source of loans. About 24% and 15% of farmers in the project area get loans from traders and friends/relatives, respectively. The traders provide loans at interest rates ranging from 30% to 100% per annum depending on the type of credit obtained. Friends/relatives lend loans without interests or nominal rates. Despite this prohibitive cost of credit, the traders have become convenient and flexible source of credit. The farmers get their inputs on credit from traders. In return, the farmers sell their paddy at the fields or bring their produce to the traders' warehouses or buying stations, as payment for their loans.

### 1.4 Credit Demands

Majority of the credits (i.e. 87%), particularly those from commercial banks, cooperatives and traders, are used for the agricultural purposes such as farm inputs for crops, implements/equipment and animal.

Actual Use of Credit

Purposes	Distribution by Cases (%)
Input for crops	80
Implement/equipment	5
Animal	2
Foods	3
Social obligation	2
Children's education	6
Debt repayment	-
Land purchase	1
Trade	1
Others	0
<b>Total</b>	<b>100</b>

Source: Socio-economic survey by the JICA study team, 1997

The second most important uses of credits are the children's education.



Use of Loans by Source of Loan

Purposes	(% of cases)						
	Money Lender (%)	Friend/Relative (%)	Trader (%)	Commercial Bank (%)	Rural Bank (%)	Credit Cooperative (%)	NGO (%)
1. Input for crops	70	65	88	100	78	87	33
2. Implement/equipment			4		11	5	33
3. Animal					6	3	
4. Foods	10	18					
5. Social obligation	10				6		34
6. Children's education	10	12	8			3	
7. Debt repayment		2					
8. Land purchase		2					
9. Trade						3	
10. Others							
Total	100	100	100	100	100	100	100

Source: Socio economic survey by the JICA study team, 1997

### 1.5 Problems

It can be inferred that the supply of agricultural credit in the project area is not all a concern. There are various credit sources, formal as well as informal, including the availability of loanable funds. There are three main problems on the demand side, i.e., the low repayment rates of credit, the low rates of use of formal credit, and divergent use of the formal credit.

#### (a) Low repayment rates of the credit

This is the main problem of the farmer-borrowers. The existing arrears of a farmer-borrower has been estimated at P5,000. This has unduly deprived good paying members to renew their loans with their cooperatives. As such, the farmer-borrowers have turned to the input traders and suppliers as their immediate source of credit. The main causes of the low repayment rates are the lack of the intention to repay, calamities such as drought and floods, the lack or shortage of collateral or guarantor, the lack of effort to recover loans, the lack of monitoring system for loans, the shortage of information on high risk loanees, and the shortage of supporting services for the production and marketing by loaners.

#### (b) Low rates of use of formal credit

In the project area, no more than 33% of the farms use credits from cooperatives. While, as much as 24% of the farms lend money from traders and millers at high interest rates. Causes of these situations are the lack of active credit cooperatives near farms, the limited capability of loanees to plan and to implement viable projects, complicated long procedures to get loans, the lack of collateral, and limitation of cooperative credit to agricultural purposes, etc. It is estimated that only 20% to 40% of the existing cooperatives are active. However, less than 20% of these cooperatives are able to deliver the credit needs of their members. Most of the farmer loanees are unable to make loan application forms by themselves due to low educational background. Complicated loan application procedures demand group arrangement of loan documents within a certain period. Landless farm workers, who occupy 29.5% of farmers do not have viable assets for collateral. Most of the farmers' cooperatives deal with only agricultural credit. The non-flexibility of the farmers' cooperatives to extend variety of loans make the farmer-borrowers to go to the input suppliers and traders as source of credit. It should be noted that aside from the agricultural loans that the farmer needs, other credit demands for education and hospital are equally important as mentioned in the PRA sessions.

(c) Divergent use of the formal credit

According to the informal information of ADB, agricultural loans are sometimes diverted to non-agricultural purposes such as leasures, trading, industry, education and medical treatments due partly to non-monitoring of loan usage. The agricultural credit sometimes become a good alternative finance source to commercial banks because the agricultural credit is given without collateral and no persistent claim to arrears.

## 2. AGRICULTURAL CREDIT DEVELOPMENT PLAN

The agricultural credit plan is envisaged to address the problems in the preceding section. The counter measures against each problem are as follows.

<u>Problems</u>	<u>Counter Measures</u>
<u>Low repayment rates</u>	
1. Lack of intention to repay	<ul style="list-style-type: none"><li>- Selective loaning</li><li>- Establishment of data base of high risk loanees</li><li>- Securing of collateral and guarantors</li><li>- Payoff of bad loans by attachment or sales of bad loans</li></ul>
2. Lack of collateral and guarantors or the shortage of them	<ul style="list-style-type: none"><li>- Securing of collateral and guarantors</li><li>- Group guarantee</li></ul>
3. Lack of monitoring system of loans	<ul style="list-style-type: none"><li>- Establishment of monitoring system in the field of organization and data base</li><li>- Organization of loanees for mutual watching</li></ul>
4. Lack of effort to recover loans	<ul style="list-style-type: none"><li>- Payoff of bad loans by attachment or sales of bad loans</li><li>- Strengthening of a legal section</li><li>- Introduction of frequent small repayment</li></ul>
5. Shortage of high risk loanees	<ul style="list-style-type: none"><li>- Establishment of data base of high risk loanees among cooperatives, and opening of them</li><li>- Opening of LBP loan information</li></ul>
6. Shortage of supporting services for production and marketing	<ul style="list-style-type: none"><li>- Strengthening of technical training and guidance</li><li>- Commitment of loaners in individual loan projects</li></ul>
7. Calamity	<ul style="list-style-type: none"><li>- Encouragement of the contract of agricultural security, particularly for small farms</li></ul>
<u>Low use rates of formal credit</u>	
1. Lack of active credit cooperatives near farms,	<ul style="list-style-type: none"><li>- Rescheduling of bad loans and reopening of non-active cooperatives</li><li>- Repayment of bad loans</li><li>- Introduction of the irrigation services development fund sponsored by NIA</li><li>- Revitalization of existing farmers' cooperatives</li><li>- Establishment of women cooperatives</li><li>- Re-start of credit services</li></ul>
2. Limited capability of loanees to plan and to implement viable projects,	<ul style="list-style-type: none"><li>- Strengthening of training and guidance in LBP and cooperatives</li><li>- Strengthening of technical and marketing services</li><li>- Encouragement of small business such as vegetable growing, animal husbandry and vending</li></ul>
3. Complicated long procedures to get loans	<ul style="list-style-type: none"><li>- Simplification of loan application forms by group guarantee</li><li>- Establishment and strengthening of saving and loan groups</li></ul>
4. Lack of collateral	<ul style="list-style-type: none"><li>- Introduction of group guarantee</li></ul>
5. Limitation of cooperative credits to agricultural purposes,	<ul style="list-style-type: none"><li>- Diversification of loan usage to education and medical treatments</li><li>- Introduction of micro-credit</li></ul>

### Divergent use of the formal credit

- |   |   |
|---|---|
| 1. Subsidized interest rates for farmers' cooperatives (12%/year) | - Application of market rates   |
| 2. No monitoring of loan usage                                    | - Establishment of monitoring system (section and data base)<br>- Organization of loanees for mutual watching |

The agricultural credit program will be implemented mainly through the farmers' cooperatives and include the rescheduling of bad loans of the IAs members and the re-start of credit services, the establishment of women service cooperatives (WSCs) and the strengthening of loan services of the cooperatives (farmers' cooperatives and WSCs).

## **2.1 Loan rescheduling and re-start of credit services**

The farmer-borrowers who have past due loans are proposed to have a loan rescheduling program mutually agreeable between the LBP and farmers' cooperatives. The loan rescheduling would be planned to consider a modified loan amortization of past due loans while at the same time allowing the farmer-borrowers to renew their loans for new production activities. It is estimated that 60% of the IA members belonging to the existing farmers' cooperatives have past due accounts. Non-IA members are likewise having past due loans. Before restart of credit services, the possibility of repayment of bad loans will be studied based on assessment of assets, life style of bad loanees. Hopeless loanees will be abandoned. Hopeful loanees will make loan reschedules, repay bad loans and re-start new credit services after the successful repayment. The loan rescheduling is foreseen as the first step to settle the arrears of the members of the farmers' cooperatives.

## **2.2 Strengthening of credit operation**

In parallel to the loan rescheduling program, the strengthening of credit operation will be done through the diversification of capital sources, the improvement in the rules of crediting, the improvement of loan monitoring system and the strengthening of loan support services.

The diversification of capital sources will be implemented through the mobilization of capital and the introduction of the irrigators' association development fund (IADF). The capital will be accumulated by saving at least 60 pesos/member in each wet and dry season (120 pesos/year) or 10 pesos per month. The capital will be used as working funds for the members and cooperatives.

### Irrigators Association Development Fund (IADF)

The IADF is envisaged as a twin mechanism for facilitating the release of agricultural credit at the same time a continuous source of financial assistance for institutional activities under the Project (Figure G.2.1). The IADF is essential to allow the IA members through their respective farmers' cooperatives to access credit from the LBP. Under the new accreditation and lending criteria of the LBP, the accessing farmers' cooperatives must hurdle the stringent eligibility criteria to be entitled for loans. Without the IADF, access to the LBP lending window would be limited. Only those cooperatives whose members are in good credit standing would be eligible for loan availment.

Since loan rescheduling and institutional strengthening would be simultaneously undertaken, the IADF would be deposited to the LBP as a guarantee cover (a minimum

of one crop production cycle) for the renewed loans of the IA members including those who are restructuring their arrears. While the IADF is deposited to the LBP, the interest earnings would be used to fund institutional activities, especially training for the new responsibilities of the IAs.

The transfer of the IADF account from the NIA to the LBP would be covered by a memorandum of agreement between the two institutions. Such agreement would include terms of loan amortization of the IAs for restructuring account and interest earnings that should be regularly remitted to the NIA to fund the institutional activities of the Project.

The IADF is estimated at around P 8.2 million. This amount is expected to provide earnings enough to cover the annual expenditures for institutional activities and guarantee for arrears of the IA members. The estimation of the financial requirement of the IADF was based on two factors: (a) annual budgetary requirement for institutional activities proposed under the Project estimated at around P2 million per year; and (b) amount of guarantee to cover the arrears of the IA members. The number of IA members who are believed to be in default of their loans is estimated at 60% of the IA active members numbering about 2,400. To be able to estimate such fund, the cost of the LBP's wholesale lending is also considered. This is taken at 7% per year for 5 years. The 5-year period is the timetable of the Project implementation. Capitalizing the P2 million budget for institutional strengthening at 7% for 5 years (using the capital recovery factor) will yield a principal sum of P8.2 million.

The improvement in the rules of crediting will include the suspension of subsidized interests which are the hot beds of unscrupulous acts, the utilization of data base on high risk loanees, the selection of viable loanees by effective screening criteria, the securing of collateral and guarantors, the simplification of loan application forms by introduction of group guarantee replacing inefficient individual loan management, the introduction of micro-credits, the diversification of loan objectives such as education and medical treatments, and encouragement of contracts of agricultural security for small farmers in particular.

Masaganan 99 is a good project to draw lessons. The reasons why Masaganan 99 credit programme failed were because of inadequate preparation of institutional capabilities of farmers' cooperatives, subsidized interests, lack of monitoring system, etc., not the group guarantee system itself. The group guarantee system works well in a micro-credit programme in Iloilo, and was adopted in the Rural Microenterprise Finance Project by ADB since 1996.

The improvement of loan monitoring system will consist of the establishment of loan monitoring system, the establishment of data base on high risk loanees, the payoff of bad loans including attachment and sale of bad loans, the strengthening of a legal section, and the introduction of frequent small repayment. The monitoring will be done by the groups and its survey items will be utilization of loans, profitability of loan projects, repayment, etc. The main purpose of the high risk loanee database has been utilized successfully in risky consumer credits in Japan and would be effective in the Philippines.

The strengthening of loan support services will include the strengthening of technical capability of farmers and cooperative members through training and guidance by lecturers from LBP and IDOs from NIA etc., the strengthening of marketing services such as joint purchase and selling, the commitment of cooperatives in individual loan project aside from credit services, and encouragement of micro business.

### 3. AGRICULTURAL MARKETING AND POST-HARVEST PRACTICES

#### 3.1 Paddy

##### (a) Production

Panay island has been said to be the rice bowl of the Visayas, but its contribution to the regional supply of rice is decreasing. Rice shipment from Western Visayas has decreased from 43,500 tons in 1990 to 14,000 tons in 1994 according to the information from NFA Region VI. It was reported that Western Visayas brought rice from Mindanao in 1994. However, rice is still the most important crop economically and socially in the region.

The production of paddy in the project area is significant to the total paddy production of Iloilo. It is estimated at about 25% of the total paddy production in Iloilo. The incremental production from the project is expected to stabilize the dwindling paddy production in Iloilo estimated to be growing at an annual rate of only 2% during the periods 1992 and 1996. The projected growth of consumption of rice in Iloilo is about 3.2% per year.

Several varieties of paddy are available in the project area, the most common being IR-64 and IR-36 varieties. IR-64 is the most preferred because it is high-yielding (about 5.3 tons/ha in favorable conditions) and pest resistant. Moreover, it has good eating quality (i.e. soft and can be digested easily). The peak harvest used to commence in August but is now from September to October, which also corresponds to the peak trading months. December is a peak trading month. Traders thus store enough paddy from the first and second croppings to ensure supply during lean production months. The marketed paddy from a rice farmer is estimated at 70% based upon the farm socio-economic survey by the study team. Paddy farmers are seemingly obliged to sell their paddy to get quickly cash even at low prices for repayment of loans, foods, etc.

##### (b) Post-harvest practices

Mechanical threshing and manual drying are prevalent in the project area<sup>4</sup>. Seventy four percent of paddy farmers thresh their paddy mechanically. Most of the paddy farmers (i.e. 98%) dry their produce manually using bamboo mats when they keep their produce in their house. Distribution of drying places is 59% for courtyard, 39% for roadside and 2% for brickfloor in wet season; and 35% for courtyard, 30% for roadside and 1% for brickfloor in dry season.

Marketing ratio of paddy is rather high due to cash shortage of farmers. Seventy percent of the paddy produced are marketed<sup>5</sup>. Sixty three percents of farmers sell their paddy to traders, 23% to local markets and 4% to NFA. Most of the paddy farmers sell their paddy at lower prices immediately after threshing and cleaning to settle their loans and to get cash for education and other expenses.

Proper storage facilities for paddy are sufficient. Sixty three (63) percent of the paddy farmers have storage facilities, while 37% have no storage facilities. Distribution of the storage facilities is 5% for warehouse, 84% for Kamalig (bamboo shed) and 11% for makeshift storage.

<sup>4</sup> Post-harvest practices of Paddy in Western Visayas, Bureau of Agricultural statistics, 1990

<sup>5</sup> Farm survey by the Present Study Team, 1997

Manual transportation of paddy is prevalent in the fields. Transportation means of paddy from the threshing floor to drying place is 75% by hand, 14% by sled, 4% by cart and 6% by vehicle, while from drying place to storage is 60% by sled and 40% by hand. Seventy two percent of the paddy farmers transport their produce from farm to market by vehicle.

Post-harvest losses in the project area do not seem to be a big problem nowadays. Manual threshing has been gradually replaced by mechanical threshing, which reduces threshing losses to minimum level, and mobile rice mills with relatively high recovery rate of about 65%, have been replacing the Kiskisan type rice mills which have high milling losses. Rice is stored generally in the form of paddy which suffers minimum storage losses.

In the above context, the study team estimate the losses at 9%, which is the lower side of the estimate by the National Post-Harvest Institute for Research and Extension (NAPHIRE) with the following breakdown.

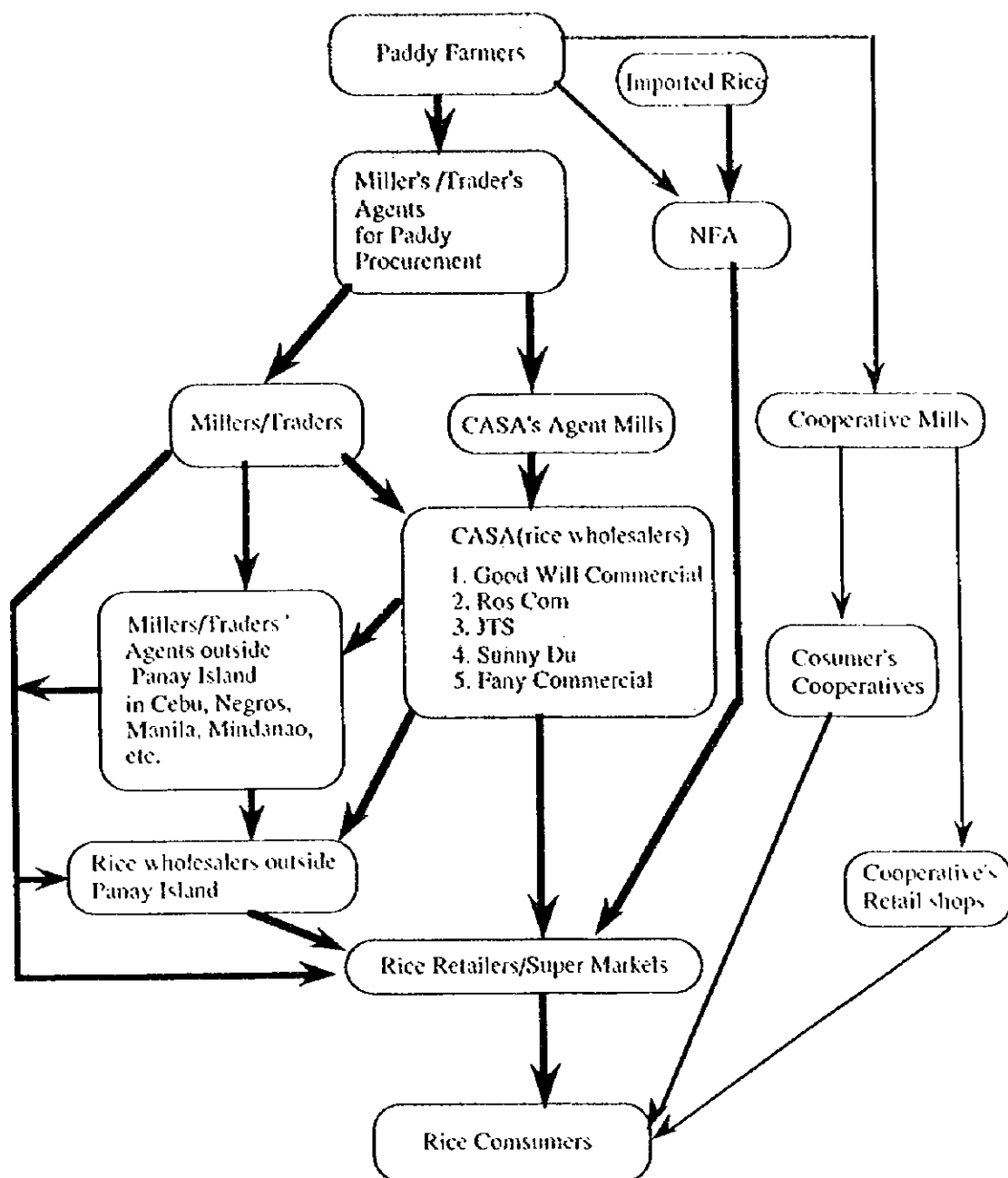
Activities	Losses (%)
Threshing	2
Drying	1
Storage	2
Handling (transport and bagging)	2
Milling	2
Total	9

Qualitative post-harvest losses in the wet season paddy are the substantial problems. Prices of milled rice from the wet season paddy are about 5% lower than that from the dry season paddy, because of lower quality such as darker colour and inferior taste caused by quality deterioration with high moisture contents during storage and milling.

(c) Marketing Practices

There are several marketing organizations dealing with paddy/rice in the project area, namely, paddy farmers, rice millers/traders, paddy procurement agent of millers/traders, NFA, rice wholesalers in Iloilo, cooperatives, rice retailers/super-markets, millers/traders agents outside of Panay island, rice wholesalers outside of Panay island and rice consumers. Marketing channel of paddy/rice is shown in the following figure. The most dominant marketing channel is the darkened part in the figure.

## Paddy/Rice Marketing Channel in Iloilo Province



Source: Socio-economic survey by the JICA study team, 1997

The paddy/rice marketing in the project area is characterized by rice cartel under the dominant rice wholesaler's group called "CASA" consisting of major five major rice wholesalers. They seem to have abundant capital to control the marketing of paddy/rice. There are many agents dealing with paddy and rice financed by CASA. Most agents are given 100,000 pesos per season to purchase paddy. Paddy and rice prices are determined frequently referring to CASA's directions by most millers/traders except cooperatives and NFA. Other non-agent rice millers/traders also determine their prices referring to CASA. If they do not follow the directions, they would meet difficulty in marketing their produce because marketing channels are under the influence of CASA. Therefore, competition in pricing virtually does not exist. Price difference in paddy price in a given time is only 0.1 peso/kg.



Miller/traders dominance in paddy marketing was confirmed by the farm interview survey by the present study team. According to the survey, the most important market outlet of agricultural produce in the study area is private middlemen (agent of traders/millers) followed by local markets as shown in the next table. Cooperatives and government agencies such as NFA have minor roles in the marketing of raw agricultural produce in the project area. NFA has a mandate to intervene in the paddy/rice market to stabilize the prices by buying paddy from cooperatives and selling rice at subsidized prices. Threshold of intervening paddy price set in 1997 season is 8 peso/kg of dried paddy for farmers. Market prices of paddy have been lower than the threshold price and there has been no NFA intervention in the paddy market in Hoilo province since January 1997. NFA is the sole rice importing agency having an great influence on the retail price releasing imported rice to lower heated rice prices.

The Most Important Market Outlet of Produce

Outlet	Cases	Distribution (%)
Private middlemen	123	63
Government agency	7	4
Local market	45	23
Large market I a city	4	2
Cooperative	5	3
Processing company	7	4
Others	3	1
Total	194	100

Source: Socio-economic survey by the JICA study team, 1997

The farmers and IA members are selling their paddy to the private traders because they are indebted to them. It should be noted that the farmers get practically their crop production loans from the traders. Their paddy oftentimes serves as payment for their crop loans. This relationship perpetuates individual selling among the farmers.

#### (d) Price Support System

##### NFA

There is a price support for paddy being implemented by the government. The National Food Authority (NFA), a government controlled corporation, is mandated to enforce such price support policy nationwide. The current support price for paddy ranges from P8.00 to P8.50 per kilogram. The P8.00/kg support price is the price that farmers receive when they sell their paddy individually to the NFA. On the other hand, the P8.50/kg is the price that the farmers receive when their respective farmers' cooperatives sell their paddy to the NFA. The P0.50 price differential is actually an incentive given to cooperatives known as cooperative development incentive fee (CDIF). This fee is supposed to pay for crop insurance premiums of farmers who may be affected by natural calamities such as drought and pest.

While it is true that there is the NFA, its role in the marketing is restricted to what is known as a "buyer and seller of last resort". As a buyer of paddy, it will purchase only when there is a sudden drop in the prices of paddy, normally during bumper harvest. It does not compete with the private sector and practically allows the price of paddy to seek its true market value. As a seller of last resort, the NFA unloads its stock of rice if there is an abrupt increase in the prices of commercial rice. The other limiting factor for the NFA is its restricted budget for paddy buying. The government allows the NFA to buy paddy at only 10% of the marketable surplus (production less consumption). Over the past 10 years, the NFA was able to buy only 3% of the marketable surplus nationwide.

If the farmers in the Project area have not taken advantage of this program, it is also a question of the poor quality of paddy that the farmers have. The NFA normally imposes less than 14% moisture content in its paddy procurement program.

### Quedan Inventory Financing

This is a loaning program where eligible applicants can store agricultural products in a bonded warehouse in exchange for a *quedan* (warehouse receipt) which can be used as collateral for a loan. This financing program is being offered to farmers' cooperatives or private traders and millers that are trading in paddy. The government institutions that is implementing this program is Quedancor.

Most of the grains inventory financing of Quedancor are the private traders and millers. This situation underscores the need to instill sound and financial management among the farmers' cooperatives and IAs. It is important that these institutions should be able to internally mobilize capital build-up among the members so that they can take advantage of the profit opportunities in paddy marketing.

#### (e) Farmgate Prices

Price difference by rice quality is small in Iloilo. Across rice types, a price difference of only P0.50-P1.00 per kilogram of white rice exists. Paddy prices are inversely proportional to supply. Prices normally decline as the harvest begins to peak and vice versa. Rice prices, nonetheless, remain stable. During lean production months namely July and August, rice prices surge and fluctuate regularly. A P0.6-P2.0 price difference per kg occurs between wet and dry paddy. This is largely due to the moisture content (15-20%) of paddy. Paddy is packed in sacks averaging 40-42 kilograms each.

Farmgate prices of quality paddy in Iloilo market have been generally stable over the past 21 months. The farmgate prices of paddy also follow the movement of the wholesale and retail prices of rice. In Iloilo, the mean farmgate price ranged from a low of P8.11/kg to a high of P9.58/kg during the past 21 months. In region 6, meanwhile, the mean farmgate price stood at a low of P8.30/kg to a high of P9.29/kg. For both areas, the average farmgate prices have been over and above the current support price of P8.00/kg. The farmgate prices were higher by about 1% to as high as 20% over the support price of P8.00/kg.

#### (f) Post-Harvest Facilities

There is seemingly a saturation of rice mill capacity. The municipalities covering the project area have an estimated excess capacity of 26,887 tons of paddy. As a whole, the total excess capacity in Iloilo province is about 250,000 tons. In addition, the proliferation of portable and movable rice mills have made it convenient for farmers to mill their paddy right in front of their respective houses.

	Production	Milling Capacity	Balance (ton)
Iloilo province	614,873	865,505	253,632
Related municipality	167,508	184,395	26,887
Project area, present	67,776	176,538	108,762
Project area, future	43,224*	103,762	65,538

\* Incremental Production

Source: National Food Authority, Iloilo  
Interview Survey with IA Officers  
Bureau of Agricultural Statistics, Iloilo

The existing capacity of warehouses in the municipalities covering the project area is about 34,000 tons. The province of Iloilo has an existing capacity of 154,000 tons. The existing capacities of the warehouses in the project area is about 12,000 tons.

Mechanical dryers are normally owned by the rice millers. Some cooperatives have acquired this facility through the assistance of the Department of Agriculture (DA). The price difference between dried paddy (moisture content of around 14%) and wet paddy (moisture content of around 25%) is 0.89 peso/kg of dried paddy. While, the cost of drying wet paddy is 0.4 peso/kg. So, the advantages of mechanical drying can normally compensate for its cost. The available mechanical dryers in the project area has an estimated capacity of 22,000 tons per year. Over and above these dryers are solar dryers which are commonly used by farmers who want to get better prices for their paddy. The annual capacity of solar dryers in the project area is estimated at 55,680 tons. Thus, total drying capacity is calculated at 77,680 ton/year. As the expected paddy production in the Project area is 111,000 tons, the shortage of the drying capacity is calculated at 33,320 tons.

	Paddy production	Dryer Capacity	(Metric ton) Shortage
1. Mechanical			
Hoilo province		48,600	
Related municipality		21,600	
Project area	111,000	22,000	33,320
2. Solar (project area)		55,680	

Source: National Food Authority, Hoilo  
Interview Survey with IA Officers

#### (g) Problems

There are three major problems faced by the farmers in the marketing of paddy. First is related to market mechanism. Second is related to post-harvest practices. Third is the non-integration between production and processing as a result of individual selling.

##### (A) Artificial low paddy prices due to lack of pricing competition

According to the socio-economic farm survey by the study team, the most important problem in the agricultural marketing in the study area is the low prices of the produce (paddy) as shown in the next table. This phenomenon reflects the lower price control of paddy by the cartel.

The Most Important Market Problem in the Village

Problem	Cases	Distribution (%)
Poor road condition	9	5
Lack of transportation vehicles	8	4
Low market prices	144	79
Others	21	12
Total	182	100

Source: Socio-economic survey by the JICA study team, 1997

Cartel of wholesalers and traders/mills, and limited outlets of paddy for farmers restrict competition in paddy pricing resulting in low farm gate prices. Cartel will be broken when alternative market channels from paddy farmers to consumers is constructed and sufficient volume of rice is traded through these channels. Development of farmers' cooperatives is one of the important means to construct alternative market channel. But, cooperatives have not yet sufficiently developed in the project area, particularly those dealing with rice milling, wholesaling and retailing.

(B) Improper post-harvest handling

One of the reasons for the low prices received among farmers is the relatively low quality of paddy. A number of the improper post-harvest handling practices are noticeable in the project area. First is the practice of selling wet paddy immediately after threshing. This condition prevails because of the tight cash flow experienced by the farmers. As such farmers normally lost 10% to 20% of the premium price for paddy. Second is the misconception about mechanical drying. The additional cost of about 5% of the purchase price is traditionally viewed by farmers as excessive. In reality, however, the advantages of mechanical drying far outweigh its costs. These include high milling recovery, less broken and longer storage efficiency.

(C) Non-integration of production cum processing

This situation is happening among the farmers because of the following: (a) fragmented selling and handling of paddy; (b) absence of processing thus foregoing additional value-added; and (c) poor linkage with market information. It is actually the private traders and millers that are taking advantage of the profit opportunities created by the integration of paddy production and milling. This is because of their ability to mobilize financial resources coupled with adequate rice mill, warehouse and hauling facilities.

### 3.2 Corn

Variety is an important consideration in corn trading. There are three types of corn: yellow corn, white corn and red corn (locally called ati). Yellow and red corn are used as feeds while white corn is taken for human consumption. Trading is by sack with a minimum wholesale volume each of one-half sack. The unit of measure for retail selling is kilogram, which is also the minimum transaction volume. The trading centers for paddy/rice are also the trading centers for corn. However, Sara, Passi and Janiway are more important trading centers because they are also major corn producers. Corn grains are packed in sacks weighing 60-70 kilograms.

The peak production months of corn in the project area are August to October and then March to April. Lean months prevail from November to February. The peak demand for corn, however, does not necessarily correspond to the production months. December to March are peak demand months but production is minimal, causing corn prices to soar to as much as 7 to 9 pesos per kilogram.

The following marketing participants are observed for different levels of corn trading.

<u>Level</u>	<u>Marketing Participants</u>
Supply Level	Farmer Barangay trader Commission agent
Trading/market center level	Municipal trader Provincial trader
Regional trader	Retailer
Demand Level	Consumer Poultry and hog raisers (local) Traders outside Iloilo and Guimaras

From the trading centers, corn is transported by land to Iloilo City CASA buyers (who distribute the commodity locally) and to Manila, Cebu, Cagayan de Oro, Bacolod

and Zamboanga. Shipments to these places are by bargeload or by several 20-footer container vans.

Corn grain prices differ across varieties and classifications. Yellow corn commands a higher price than white corn by as much as P0.20-P0.80 per kilogram. Likewise, there is a price difference of P0.50-P1.00 per kilogram between dry and wet corn. For traders who classify corn as semi-dry a price difference of P0.10-P0.20 per kilogram from that of dry corn is common.

During normal conditions, wholesale buying price of corn ranges from P3.50-P4.00 per kilogram. During lean production months, corn prices normally soar to as much as P6.00 per kilogram. Price fluctuations are common particularly during lean production months. Price formation at the trading/market center level is based on the prevailing prices of the CASA who set prices in the grains sector. Daily price monitoring is the norm. Factors taken into account include transportation, handling, risk and profit. Big traders at the trading/market center charge a mark-up of P0.20-P0.30 to cover trucking expenses. Others make their buying prices competitive and make up for this in the classification and deductions imposed. This is fairly common among agents. CASA traders usually base their prices on the prevailing prices in Manila and Cebu.

### 3.3 Mung Beans

Mung beans are utilized for hopia (a bun with a bean-jam filling), butse-butse (a bun made of rice or cassava flour with a bean-jam filling), sotanghon (bean-starch vermicelli), halo-halo (bean mixed sweet juice), bean sprout vegetable dishes, piaya (a hard bun with a bean-jam filling), poultry feed, etc. Succulent tops of mung bean plant is suitable for green manure.

Most common varieties in the study area are the Native and Imelda varieties. The latter grain is smaller than the first. Peak production season of the mung beans is from February to May. Main producing municipalities in Iloilo province are Potolan, Mina, Sta. Barbara and Barotac Nuevo. Capiz province markets their mung beans to Iloilo. Iloilo sometimes markets mung beans to Capiz, Antique and Aklan provinces according to market situation.

Farmers sell their mung beans to traders or wholesalers in the city or to retailers and consumers in the municipality. Traders or agents of wholesalers deliver mung beans to big traders (CASA) in Iloilo city, small traders in Iloilo Terminal Market or retailers and consumers outside of Iloilo province. Mung beans are handled in 50-60 kg sacks from farms and 60 kg sacks from traders.

Price makers of mung beans in Iloilo are CASA traders who determine prices based on demand and supply forecasts. Price making forces of mung beans in Divisoria Market in Manila have tumbled since the open importation of mung beans from Asian countries. In 1995 the Philippines imported 24,000 ton of mung beans from Southeast countries such as China, Australia at a price of 7 peso/kg. In the same year, the Philippines exported 14,900 ton of mung beans to Guam, etc. at a price of 37.7 peso/kg. Prices of green mung beans in Iloilo in December 1996 were 22.61 peso/kg for farm gate, 25.44 peso/kg for wholesaling and 42.35 peso/kg for retailing. Productivity of mung beans in the Philippines is so low as to compete with the imported ones. According to a information from a mung bean wholesaler in Iloilo city, a large amount of imported green mung beans as well as mung beans from Cotabato, where climate is more suitable than Panay are sold.

### 3.4 Tomato

Farmers sow tomato seeds in seedbeds or boxes. Furrowing is followed by transplanting, usually 25 to 35 days from sowing. Tomato farmers also fertilize their crop and spray pesticide to control pest infestation. Tomato requires warm weather and plenty of sunshine over a relatively long season to produce good yields. Harvesting occurs 75 to 80 days from transplanting. Tomatoes are harvested four to six times over two and one-half months, depending on yield and management. Farmers hire additional labor during harvest time at P40.00 to P50.00 per day, inclusive of meals.

Wholesale buying and selling specifications of tomatoes are the same. Varieties available in Iloilo for wholesale trading are native and Pope. Native varieties, also called pidada, baybay or Imelda, are squash-like with pronounced ridges, round with thin and smooth skin, available year-round. Pope tomatoes are elongated, ridge-free and thin skinned. Both varieties come in assorted sizes and vary by degree of ripeness.

There are many packaging types for different varieties.

Variety	Manner of trading	Container/size	Weight
Native	Wholesale buying/selling	Kaing (bamboo basket)	20-25 kg. 50-70 kg.
Pope	Wholesale buying/selling (The minimum transaction volume is one bukag, kaing or crate)	Kaing/Crates	22-25kg.
Native	Retail selling	Tumpok	(mound) Kilogram
Pope	Retail selling (The minimum retail volume is one kilogram)	Tumpok	Kilogram

The native tomato variety is available year-round in Iloilo, reaching the peak production from January to April. Lean production is prevalent from May to December, requiring inflows from other areas.

Housewives and restaurants use tomatoes daily in preparing dishes. Demand is heightened during the holiday season (December) when lavish food preparations accompany merry-making and reunions. Local demand is also enchanted by outside demand. The presence of a sardine processing plant in Bacolod creates a demand for tomatoes. During lean production, stocks are sourced largely from Cagayan de Oro, and occasionally from Davao City, to augment local tomato supply.

Marketing participants for each marketing level are as follows.

Level	Marketing Participant
Supply level	<ol style="list-style-type: none"> <li>1. Farmer</li> <li>2. Barangay assembler/medium distributor</li> <li>3. Traders from Cagayan de Oro and Davao</li> </ol>
Trading center level	<ol style="list-style-type: none"> <li>1. Municipal assembler/medium distributor</li> <li>2. Retailer</li> <li>3. Consumer</li> </ol>
Market center level	<ol style="list-style-type: none"> <li>1. Regional assembler/medium distributor</li> <li>2. Medium distributor</li> <li>3. Small distributor</li> <li>4. Retailer</li> <li>5. Processor (Bacolod)</li> </ol>
Demand level	<ol style="list-style-type: none"> <li>1. Consumer</li> <li>2. Traders outside Iloilo</li> </ol>

Farmers and traders at the satellite centers take their cue from the prices set by the regional assembler/medium distributor and small distributor. They compute their selling prices based on those price quotations and add the transportation and handling costs. The actual price of tomato, however, depends on supply and demand factors. During the peak supply months, tomato prices plunge by as much as P130.00 per kaing. However, if the supply is low and the demand is high, prices soar to at least P250.00 per kaing. Across varieties, the Pope variety commands a higher price of P1.00-P2.00 per kilogram.

### 3.5 Mango

Mango is one of the fast-growing and important fruit crops in the country. Annual growth rate in planted area was 5.6% between 1985 and 1992. Export of fresh mango increased in terms of volume by 300% from 1985 to 1993. Carabao variety which is said to be the best variety in the world is the predominant variety of mango in the Western Visayas occupying about 95% of the total area planted to mangoes. There are two types of mango growers in the area, the first is the backyard growers who cultivate a maximum of 10 fruit-bearing trees, and the second is the commercial growers who cultivate more than 50 fruit-bearing trees. About 80% of the mango production is derived from this type of growers.

There are 8 kinds of market participants in mango trading, i.e. (a) growers, (b) sprayers, (c) traders, (d) cooperatives, (e) transporters, (f) exporters, (g) processors and (h) institutional buyers. Growers may be owners or temporary owners of mango trees over a certain period of time who either spray mango trees or hire sprayers. Sprayers spray insecticides, flower inducers or fertilizers to mango trees, and get a sharing of 60-70% of the total income after deduction of production costs. Traders are the main players in mango trading and include contract buyers, spray traders, wholesalers, wholesaler/retailers, retailers and supermarkets. Cooperatives provide marketing services to their members and may have marketing connection with several Manila exporters. There are no farmer cooperatives actually involved in the marketing of mangoes in the study area. Transporters provide transport services and documenting services for the export of fresh and processed mangoes. Processors process fresh mangoes into mango juice, mango puree, dried mango, etc. for domestic and export markets. Institutional buyers include hotels, restaurants and hospitals. In case of carabao mangoes in Guimaras, outlets of fresh mango from growers are 54% to processors, 23% to exporters, 12% to contract buyers and the rest to wholesalers/retailers, sprayer/traders and cooperatives. About 90% of the main season crop is harvested from March to May. There is a mango processing factory in Guimaras but is not operating due to lack of raw material from Panay island. Strict quarantine regulation against the Oriental fruitfully considerably limits the inflow of fresh mango to Guimaras island.

According to information from the Foundation for Resource Linkage and Development, the following marketing problems were identified in the mango trading.

- Low loading priority given by transporters to mango for Davao, Davao Del Sur and Cebu.
- Limited supply of good quality mangoes in terms of peel quality, size and taste.
- Stiff competition with other ASEAN fresh mango exporters who offer lower prices than those of Philippine mango.
- Limited air cargo space and prohibitive transport rates for delivery to the foreign markets such as Hongkong and Singapore.
- High prices of imported processing machines and equipment. Unavailability of cheap locally fabricated equipment. Spread of manual processing.

### 3.6 Watermelon

The following three varieties of watermelon are available in the project area.

- \* Sakata: small high-yielding
- \* Niagara: squash-like with green and white stripes
- \* Bilimorine: oblong

Annual watermelon production in Iloilo province ranges from 13,800 tons to 28,600 tons. Oton is the main production area of watermelon in Iloilo province. Farmers usually plant watermelon as a second crop after harvesting paddy on an area of 2-3 ha. The peak harvesting season is from January to May. The lean supply months are from June to December, which coincide with the main paddy growing season. Farmers grow watermelon in furrows. Main insect pests are beetles, leaf bugs and aphids. These are controlled by spraying pesticides.

At the farm level, watermelon is classified according to the size as follows.

- \* Large: more than 6 kg/piece
- \* Medium: 4-6 kg/piece
- \* Small: less than 4 kg/piece

As the watermelon is a bulky and heavy crop, farmers sell their produce in the field directly to traders. Medium and large size watermelons are sold mostly to buyers from outside of Iloilo. Assorted watermelons are sold to traders and retailers in Iloilo province. Farmers near Iloilo Terminal Market sometimes bring their produce to traders in the market.

Large traders in Iloilo Terminal Market are the price makers of watermelon in Iloilo province. Farmgate prices of watermelon changes drastically. In 1996 farm gate prices were 6.4 peso/kg in January, 1.4 peso/kg in February, 3.8 peso/kg in March and 1.7 peso/kg in April. On the other hand the wholesale prices are stable. In 1996, wholesale prices were 8.9 peso/kg in February, 10.32 peso/kg in March, 8.82 peso/kg in April and 7.68 peso/kg in May. Retail prices in 1996 were 32.8 peso/kg in January, 13.8 peso/kg in February, 13.1 peso/kg in March, 20.8 peso/kg in April and 15.6 peso/kg in May.



### 3.7 Fertilizers

Fertilizer market is very open in the country and there is no tariff nor quota. Hence, market seems to be efficient. In Iloilo, imported fertilizers directly arrive at Iloilo port and fertilizer wholesalers distribute fertilizers to retailers.

Fertilizer is a major input in the cultivation of paddy. The price of fertilizer can drastically influence the cost of production. The movement on the wholesale price of fertilizers in Iloilo market has been generally stable for the 21-month period beginning January 1996 to September 1997. Compared with the mean wholesale price last year, the mean prices during the three quarters of 1997 have slightly increased. With the exception of urea, all other types of fertilizers increased by about 1% to 3% over last year's price. This was mainly brought about by the increase in the prices of oil products and devaluation of the peso. It should be remembered that fertilizers are oil-based product.

Mean Wholesale Price By Type of Fertilizer (P/kg)	High	Low
1. Urea		
(a) Jan/96 - Dec/96	7.39	7.08
(b) Jan/97 - Sep/97	7.09	6.48
2. 21 - 0 - 0		
(a) Jan/96 - Dec/96	4.28	3.90
(b) Jan/97 - Sep/97	4.29	3.97
3. 16 - 20 - 0		
(a) Jan/96 - Dec/96	6.43	6.20
(b) Jan/97 - Sep/97	6.61	6.35
4. 14 - 14 - 14		
(a) Jan/96 - Dec/96	6.53	6.30
(b) Jan/97 - Sep/97	6.73	6.47

Source: Bureau of Agricultural Statistics, Iloilo

Farmers and IA members in the project area have complained about the increase in the retail price of fertilizer. This is exacerbated by the transport and handling costs added by retailers in the area.

This again emphasizes the need for strong organization among farmers and IA members. Were it not for the weak farmers' cooperatives, the retail prices of fertilizers could have been somewhat tempered. This is possible if the cooperatives can purchase in bulk volume to avail of discounts normally offered by fertilizer manufacturers.

#### 4. POST-HARVEST PRACTICES AND MARKETING PLAN

##### 4.1 Group Buying and Selling

The marketing plan envisages group buying/selling and processing of paddy to be performed through revitalization of the existing farmers' cooperatives and establishment of the WSCs. Group buying will eventually become an integrated rice enterprise of the cooperatives (farmers' cooperatives and WSCs). This plan is envisioned to be implemented gradually consistent with the institutional development plan. The gradual implementation is essential in order to give ample time for the cooperatives to develop their skills in marketing and acquiring the necessary financial resources.

To be able to achieve the above plan, the following are essential:

(a) Access to adequate post-harvest facilities and trucking fleet

Integrated rice mill complex is essential to be able to control production and selling. However, the issue of ownership and acquisition by the farmers' cooperatives or WSCs organizations should be decided only when they are ready to operate and maintain such facilities. Leasing and renting existing facilities are financially advantageous in view of the excess capacity of rice mills and warehouses in the project area. Over the medium to long-term, however, investments in post-harvest facilities would have to be studied to replace inferior and obsolete facilities.

It should also be noted that financial requirements for post-harvest facilities of the cooperatives will have to be estimated for the project regardless of the future ownership. The estimation, however, will be based on the requirement of the additional paddy production from the Project less the capacities of existing facilities.

At full project development, the following capacities and investments in post-harvest facilities are estimated:

	Jolaur Proper RIS		Suague RIS	
	Capacity	Investment	Capacity	Investment
Warehouse	20,500	39,981	1,103	2,043
Mech. Dryers	27,282 annum	5,681 annum	6,037	1,258

Unit: Capacity :Ton, Investment:PI,000, operation of dryer: 3000 hrs, price of dryer; 500,000 peso including house

It should be emphasized that the above investments will be part of the long-term loans to be secured by the coopeatives. They will be strictly private investments.

(b) Provision of working capital

The provision of working capital is necessary to be able to procure paddy. The release of this loan should form part of the loan restructuring program envisaged under the credit plan.

(c) Intensified capability building

The farmers' cooperatives including WSCs or IA members should be equipped with the necessary skills on markets, pricing, inventory and distribution channels. The cooperatives will have to price their paddy at market rates to be able to stay competitively in the business dominated by traders and millers. Such capability building will form part of the institutional strengthening program.

## 4.2 Operationalizing Group Buying and Selling

Under the plan, a two-stage approach is envisaged (Figure G.4.1). The first stage is to give option for the the cooperatives and IA members to buy and sell paddy by initially postponing the acquisition of new facilities, notably rice mills. The deferment of putting up of new facilities is being emphasized to avoid excessive loan exposure in fixed assets. As earlier documented, there are existing private rice millers whose facilities can be leased or rented.

The existing farmers' cooperatives in the project area, numbering about 15 can be rehabilitated to initially form the core group to do either paddy trading cum drying or milling. In the area without the existing farmers' cooperatives, the WSCs can serve as buying agents and as volume of procured paddy becomes big. They can enter agreement with the NFA for storage and drying. The advantage of using the NFA as market outlet for well dried paddy is the additional incentive of P0.50/kg, i.e. over and above the support price, given to the cooperatives as payment for crop insurance premium. While the paddy are in the NFA warehouses, the cooperatives can request for quedan financing so that it can pay immediately the members mostly composed by IA members. Quedan financing is important even if the cooperatives decide to mill the paddy, so that the cash flow of individual IA members will not be impaired. Farmers will still prefer to receive payment for their paddy immediately upon selling.

The final stage is where the cooperatives (farmers' cooperatives and WSCs) completely control the operations of an integrated production and milling. This is the stage where the cooperatives will manage and operate the rice mill complex. It is envisaged that at this stage the cooperatives have pooled their financial resources and skills and are ready to compete with the private traders and millers. The time frame to achieve this plan is well espoused in the institutional development plan.

## **Tables**

**Table G.1.1 Cooperative Accreditation Criteria By the LBP**

**A. Pre-Qualification Requirement for Newly Accessing Cooperative**

Basic Requirements	Rationale
1. CDA Requirement (1) Articles of Cooperation (2) Duly organized set of Board of directors and committees (3) Certificate of good standing	1. LBP will transact business only with organizations with juridical personality
2. Membership of at least 60	2. LBP's study shows a threshold level of more than 50 members and paid-up capital of P30,000 as acceptable to access LBP loans
3. Minimum paid-up capital of P30,000	
4. All members have undergone pre-membership education seminar	3. To make the members aware of their duties and responsibilities and benefits that can be derived from cooperatives
5. Updated and audited financial statements	4. To instill proper accountability and provide information on loan absorptive capacity
6. Core Management Team- Qualified, duly designated part/full-time manager, bonded part/full-time cashier and full-time bookkeeper	5. To equip cooperatives with necessary competence

**B. Requirements for Newly Accessing and Existing LBP-Assisted Cooperatives**

Indicators	Minimum Requirements		Standard Requirements (Class A)
	Newly Accessing Coops	Existing LBP Coops (Class D)	
1. Membership (1) Size (2) Patronage of business	60 members 90% of total members	100 members 90% of total members	>500 members 100% of total membership
2. Capital Build-Up (CBU) and Savings Mobilization (SM) (1) Av. CBU/member/year (2) Av. savings/member/year	P500 P500	P500 P500	>P1,500 >P1,500
3. Leadership and Management (1) Board of Directors (1.1) Monthly meeting (1.2) Patronage of business (2) Core Management Team	6 meetings 90% of members Complete	6 meetings 90% of members Complete	12 meetings 100% of members Complete with back-up manager and bookkeeper
(3) Coop Policies and System	Basic policies on record keeping and savings installed	Basic policies on record keeping and savings installed	Minimum requirement plus installed policies on CBU, budget, audit, personnel and funds management
(4) Plans and Programs	Basic written plans and programs	Basic written plans and programs	Written operational and continuously refined with action and annual budget
(5) Internal Performance Review	Monthly review by Board	Monthly review by Board	Monthly review by Board and regular review by management committees
4. Book of Accounts	With installed general ledgers and journals	With installed general ledgers and journals	Computerized book of accounts
5. Business Operations (1) Livelihood Enterprise (2) Provident Service	Production At least 1 member	Relending for crop production With initiative to start-up	Highly diversified Institutionalized, built-in community service
6. Financial Performance (1) LBP Obligations (2) Profitability (ROE) (3) Debt/Equity ratio (4) Liquidity ratio	Break-even 6 is to 1 1 is to 1	90% Break-even 6 is to 1 1 is to 1	100% 10% and better 2:1 and better 2.5:1 and better
7. Affiliation in federation cluster/chamber organization		Willingness to be a member of coop organization	Active member of regional national-based organization

Source: LBP Iloilo City

# Figures



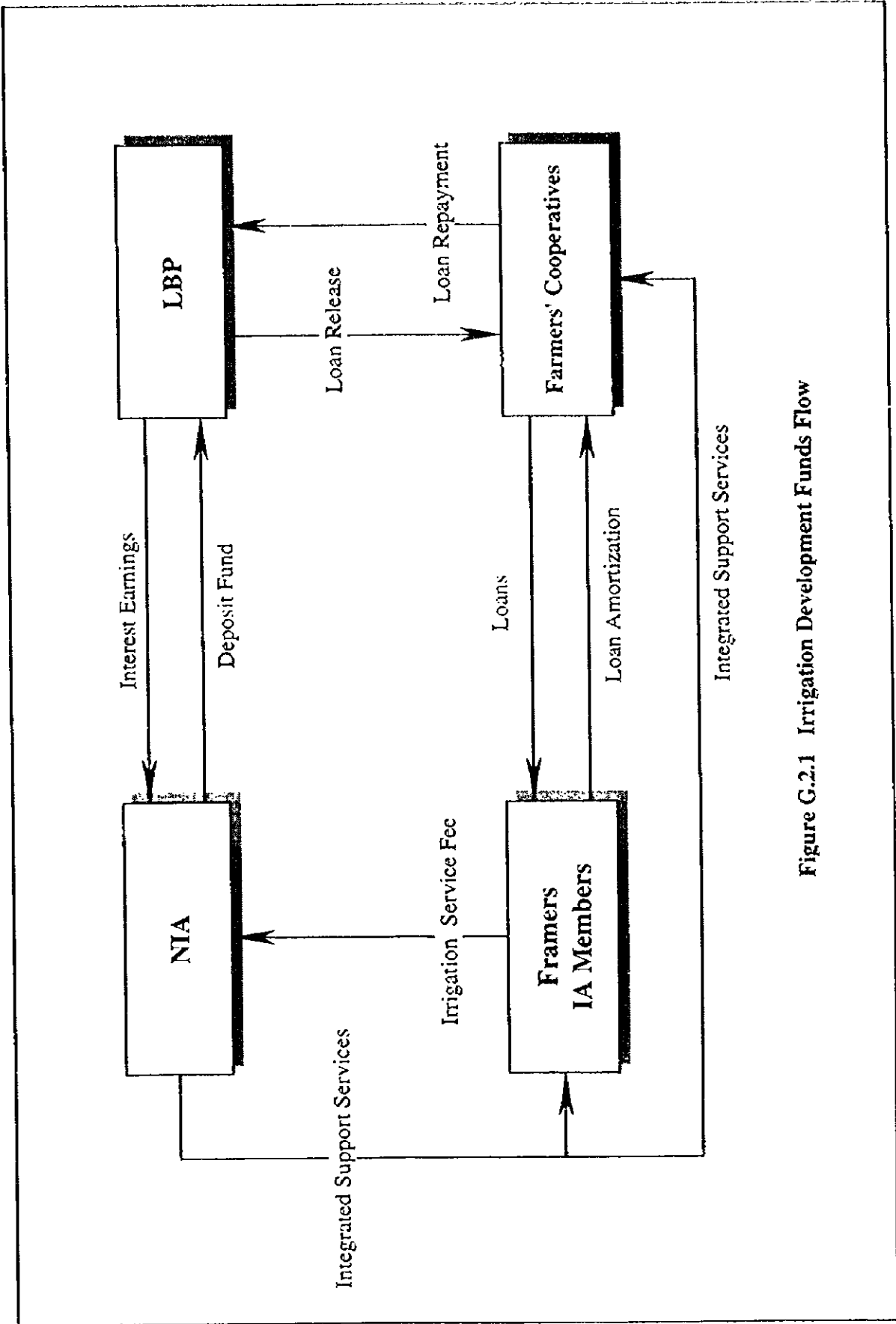
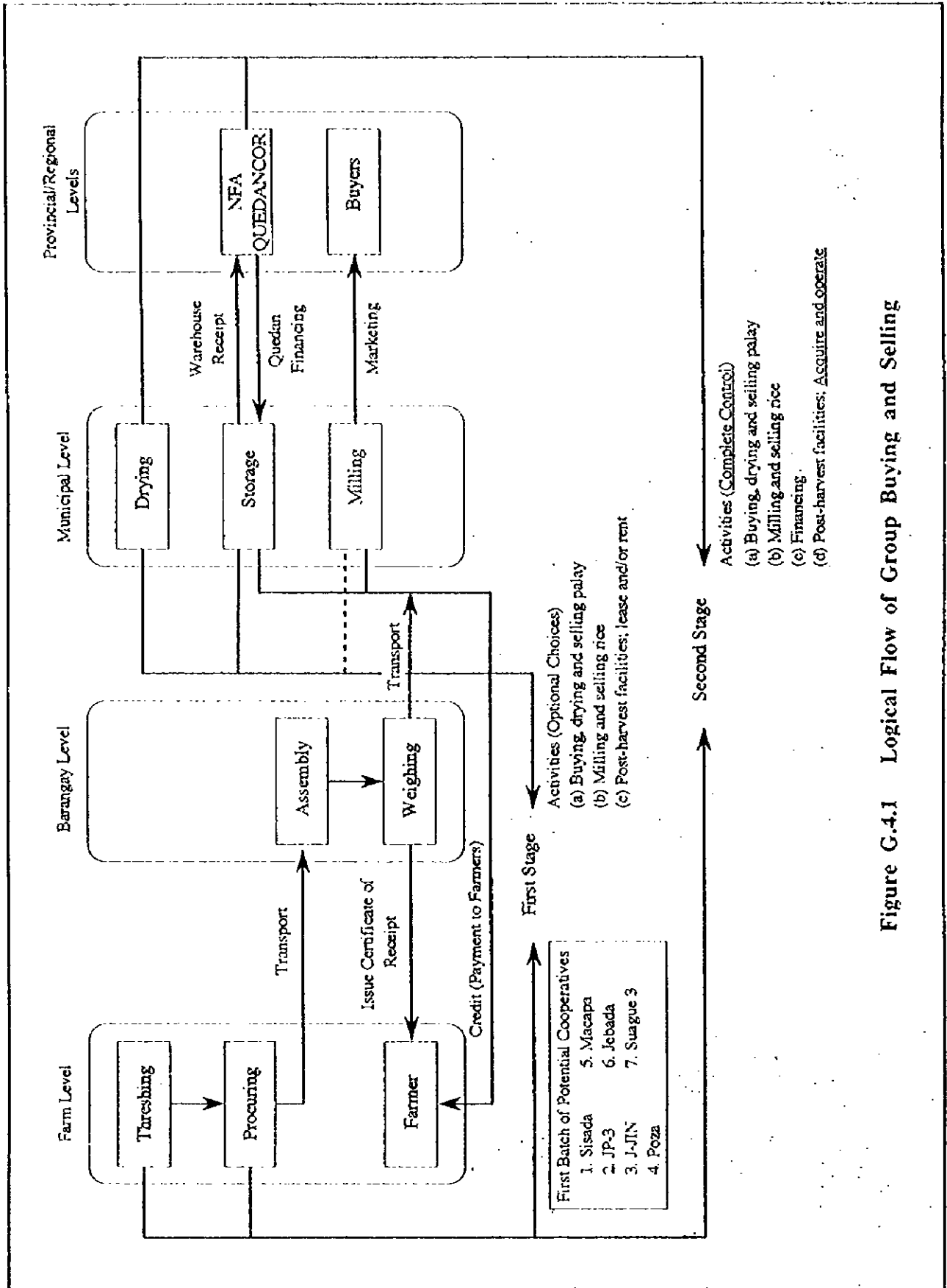


Figure G.2.1 Irrigation Development Funds Flow





***ANNEX H***

***Watershed Management***



**THE STUDY ON JALAUH IRRIGATION SYSTEMS  
AND RURAL AREA DEVELOPMENT PROJECT**

**ANNEX H  
Watershed Management**

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## 1. INTRODUCTION

### 1.1 General Situation of Watersheds in Iloilo Province

#### 1.1.1 Status of Land Classification

For the management of forests and watersheds, the lands in the Philippines are legally classified into two broad categories, namely "Alienable and Disposal Lands" and "Forest Lands", according to the Revised Forestry Code of 1975. The lands with slopes of less than 18% are classified into the Alienable and Disposal Lands (A&D Lands), which can be utilized for other purposes than forestry within the criteria set by law. Practically, individuals have the right to own land, to lease it to others, and to determine the way to use land.

The lands with slopes of 18% or over are principally categorized into Forest Lands which refer to the lands of public domain regardless of whether the lands have forest cover or not. The Department of Environment and Natural Resources (DENR) is responsible for controlling and defining land use in Forest Lands, such as watershed management. The Forest Lands are sub-classified into the following categories, declared as needed for specific purposes by the Government.

- |                      |                           |
|----------------------|---------------------------|
| i) Primary forest    | iv) Brushland             |
| ii) Massy forest     | v) Open / Cultivated land |
| iii) Residual forest |                           |

The status of land classification as of December 1995 is shown for Philippines, Region VI and Iloilo province in Table H.1.1 and summarized below;

Category	(Unit: 1,000 ha)		
	Total Land	Alienable & Disposal Land	Forest Land
Philippines	30,000.0 (100%)	14,117.2 (47%)	15,882.8 (53%)
Region VI	2,022.3 (100%)	1,408.8 (70%)	613.5 (30%)
Iloilo Province	532.4 (100%)	396.1 (74%)	136.3 (26%)

Source: 1996 Philippine Statistical Yearbook, National Statistical Coordination Board.

The status of land classification at the national level shows that 47% of the total land are A&D Lands, and the remaining 53% are Forest Lands. As for the Iloilo province, the Forest Lands are limited to 136,300 ha or 26% of the province, and Alienable & Disposable Lands cover 396,000 ha or 74% of the province. This is due to (1) topographic condition peculiar to the province, and (2) higher population density in the province than the national average. The area by slope classes in the province are presented in Tables H.1.2 and summarized below:

Slope Class	Iloilo Province			Region VI		Philippines
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
less than 18%	287,200	(54%)	1,002,500	(50%)	-	-
18% to 30%	132,200	(25%)	418,800	(21%)	-	-
30% to 50%	65,400	(12%)	274,000	(14%)	-	-
50% and over	47,600	(9%)	327,000	(16%)	-	-
Total	532,400	(100%)	2,022,300	(100%)	30,000,000	(100%)

Source: Slope map of Region VI prepared by Bureau of Soil & Water Management in Aug. 1990

The above table shows that, in the Iloilo province, the land less than 18% gradient extends over 54% of total area, and this is principally classified as Alienable & Disposal Lands. Another 20% of Alienable & Disposal Lands are located in the steeper slopes of over 18%. Hence, 74% of the land fall into the category of Alienable and Disposable Lands in the province.

The population density of the province has been far higher than the national average since the Population Census of 1948 up to date, and this indicates that the high population



pressure has been accelerating the encroachment of the steeper lands and its intensive use. The population density in the province is presented in Table H.1.3, and summarized below:

	(person/ sq. km)		
	Iloilo Province	Region VI	Philippines
Population Census 1960	181.4	152.2	90.3
Population Census 1970	219.4	178.9	122.3
Population Census 1980	269.3	223.8	160.2
Population Census 1990	331.5	266.7	202.3
Population Census 1995	352.4	285.7	228.7

Source: 1996 Philippine Statistical Yearbook, National Statistical Coordination Board.

The past status of land classification in the Iloilo province during the period of 1981 to 1997 is given in Table H.1.4. In 1984, legal land classification by DENR was completed over the province, and no updating has been taken since 1988. Out of 532,400 ha of total land, the Forest Lands are 136,300 ha or 27.6% of the total land, composed of 41,800 ha (7.8% of total land) of forest reserve, 85,500 ha (16.1%) of timber land, 900 ha (0.2%) of national parks and 8,100 ha (1.5%) of fish pond development. Fish pond development is classified into forest land because the area was originally derived from mangrove forest.

### 1.1.2 Status of Forest Land in Iloilo Province

Two forest inventory surveys conducted in the past are the source of information on the forest resources. The first nationwide forest inventory was carried out from 1965 to 1972, and the forest resources condition maps (FRCMs) at the scale of 1:50,000 and data on timber volumes were prepared in order to assess timber permit applications. The FRCMs include the following forest condition classes : (1) virgin dipterocarp forest, (2) logged-over or residual forest, (3) non-productive forest, (4) mossy forest, (5) un-logged mangrove forest, (6) logged-over mangrove, (7) brush mangrove, (8) brush land forest, and (9) others.

The second inventory covering the whole country was made by Forest Management Bureau for Regions X and XI during the period from 1979 to 1982 under the assistance of FAO, and for the rest of the country from 1982 to 1988 under the Philippine-German Forest Resources Inventory Project. For estimating timber volume of dipterocarp and pine forest, interpretation of aerial photography was employed for 80% of forest land and the remaining 20% was mapped using satellite imagery, together with the timber sampling. In this survey, Forest Lands were defined at 129,100 ha, less than statistical data of 136,300 ha. Thus, the total land of 532,400 ha in Iloilo province was composed of 129,100 ha of Forest Lands and 403,300 ha of A&D Lands. Within the Forest Lands of Iloilo province as well as Region VI, the land use and forest type derived from the forest inventory are shown in Table 1.1.5 and summarized below;

	(Unit : ha)						
	Dipterocarp forest	Mangrove	Mossy forest	Forest Sub-total	Brush land	Others	Forest Lands Total
<b>Region VI</b>							
1969	129,500	14,200	63,300	<u>207,000</u>	149,600	418,200	<u>774,800</u>
1987	59,800	4,400	36,400	<u>100,600</u>	81,100	593,100	<u>774,800</u>
Increment	-69,700	-9,800	-26,900	<u>-106,400</u>	-68,500	174,900	<u>±0</u>
<b>Iloilo</b>							
1969	8,400	1,600	6,000	<u>16,000</u>	26,700	86,400	<u>129,100</u>
1987	4,800	0	2,100	<u>6,900</u>	9,000	113,200	<u>129,100</u>
Increment	-3,600	-1,600	-3,900	<u>-9,100</u>	-17,700	26,800	<u>±0</u>

Note: Mossy forest includes submarginal forest (non-productive forest in low altitudes), Others includes open, cultivated, inland water bodies, marshland, pasture land, and all excluding woody vegetation.

Source: Forest Resource of Region VI & VII, Philippine-German Forest Resources Inventory Project, 1988.

The above table shows that the forest area in the Forest Lands has considerably diminished in Iloilo province and Region VI during the period from 1969 to 1987. The forest area in Iloilo province has been reduced from 16,000 ha to 6,900 ha, and brush land also decreased from 26,700 ha to 9,000 ha. On the other hand, other forest lands excluding woody vegetation have increased by 26,800 ha from 86,400 to 113,800 ha during the same period. The forest area, excluding brush land, covered only 6,900 ha or 5.3% of the classified Forest Land, and 87.7% of which have no more forest cover.

## **1.2 Cause of Watershed Degradation and Government's Policies Applied**

### **1.2.1 Cause of Forest Destruction and Watershed Degradation**

The forest and watershed area have been degraded since the second world war. Forest and watershed degradation in the watersheds have been caused by various reasons. Timber logging and collection fuelwood to supply sugarcane mills were the main causes in the past. These two activities are not serious at present, since timber logging is generally prohibited and sugarcane mills use bagasse as the main fuel source. The population pressure in the watershed area is considered as the most serious threat at present. Upland farming including slash and burn cultivation in the sloping land without soil conservation measures are widely conducted more intensively than the past, in order to produce more food and products necessary to sustain the increase people. There are some other causes such charcoal production, forest fire and illegal timber logging. However, these activities are seemed minor compared with upland farming. Table H.1.6 shows the changes of the watershed condition for the last three decades.

### **1.2.2 Effect of Watershed Degradation**

The forest destruction and watershed degradation have exacerbated soil erosion from the slopes and decrease of natural capacity to hold water resource in the upstream area. Soil erosion and decrease of holding capacity of water resources have brought deleterious effects such as increased suspended load, flush flooding, and unstable river flow in the downstream areas. As a result, siltation and sedimentation in the intake dams and canal as well as severe shortage of water for irrigation use in the dry season in the RISs have become apparent.

### **1.2.3 Legal Framework for the Forest Management in Country Wide**

On this situation, the Government of Philippines proclaimed P.D. 705 (Forestry Law) in 1975, which consisted of the restriction of logging activities for timber export; promotion of forest development; establishment of reserve area; etc. Since the proclamation of P.D. 705, several forestry programs had been undertaken for recovery of forest area, however, the progress of watershed rehabilitation was not that had been expected due to lack of a detailed action plan and increasing population pressure. In 1986, the National Forestation Program (NFP) was prepared. It contains the concrete target of national reforestation program by 2000 and its procedures to attain the target. The following items are listed as the procedures in NFP.

- Reforestation conducted by private sector as a subcontracted work.
- Reforestation conducted by DENR itself
- Reforestation conducted by other agencies
- Improvement and maintenance of existing forest
- Rehabilitation of forest through agro-forestry based on the Integrated Social Forestry (ISF) Program

After that period, the Master Plan for Forestry Development (MPFD) was formulated in 1990 under a framework of the Philippine Strategy for Sustainable Development (PSSD) formulated in 1989. The main goal of MPFD is to ensure that all forest resources are under efficient and equitable management or active conservation. The following objectives were set

up in MPFD.

- a complete ban on logging in old-growth forest
- restricting commercial harvests of timber from the production of 2.5 million ha
- reduction in the deforestation rate from 100,000 ha in 1990 to 4,000 ha by 2015 through improved land tenure and greater involvement of local community in active forest management and utilization
- increase in the total area of forest to 9 million ha
- making reforestation a self-sustaining effort through the establishment of reforestation fund

## 2. PRESENT WATERSHED CONDITION IN THE STUDY AREA

### 2.1 Location and Administration

The watersheds of the rivers of Aganan, Tigum, Suague and Jalaur are extending over the area of 104 km<sup>2</sup>, 193 km<sup>2</sup>, 181 km<sup>2</sup> and 1,065 km<sup>2</sup>, respectively. These areas cover the upstream from each intake dam site (ref. Figure II.2.1). The administrative location of four (4) watersheds are shown in the following table.

Watershed	Area (km <sup>2</sup> )	Municipality (Area : km <sup>2</sup> )
Aganan	104	<b>Alimodian (144km<sup>2</sup>)</b>
Tigum	193	<b>Maasin (156km<sup>2</sup>)</b> , Cabatuan
Suague	181	<b>Januay (179km<sup>2</sup>)</b> , Badiangan
Jalaur	1,065	<b>Lambuano (247km<sup>2</sup>)</b> , Duenas, <b>Calinog (233km<sup>2</sup>)</b> , <b>San Enrique (88km<sup>2</sup>)</b> , <b>Passi (251km<sup>2</sup>)</b> , Dingle, Bingwan, San Rafael

Note : Municipalities of thick letters are the dominant municipality in the watershed area.

The boundaries of each watershed in hill side are basically the same as the boundary of the municipalities. Hence, the social characteristics of dominant municipality can be representative of these the watershed area in this report.

### 2.2 Status of Land Category

The status of the land categories in the watershed areas are summarized as follows :

Watershed	Public Forest Land		A & D land		Total	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
Aganan	3,290	32	7,110	68	10,400	100
Tigum	7,960	42	11,140	55	19,100	100
Suague	5,220	29	13,080	71	18,300	100
Jalaur	41,130	39	65,370	61	106,500	100

Source : DENR, Region VI

In Aganan and Suague watersheds, about 30 % of area are classified into Forest land, while about 40 % of area in Tigum and Jalaur watersheds, are set up as Forest land. These reflect possibility of rehabilitation of forest by the government activities. Since about 70 % in Suague are classified into A&D Lands, only 30 % of the land in the watersheds can be recovered for forest purposes by only DENR.

### 2.3 Physical Condition

#### 2.3.1 Climate

Meteorological data collected from PAGASA Iloilo is represented for the watershed areas. Climatological conditions such as rainfall, temperatures are shown below :

Project areas	Jan	Feb.	Mar	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Rainfall (mm)	39.4	23.9	29.6	50.9	118.2	303.8	340.4	383.6	285.6	268.3	176.2	84.6	2104.5
Rain days (days)	8	5	5	5	10	19	20	20	19	18	14	11	154
Temperature (°C)													
Max.	29.8	30.4	31.7	33.1	33.2	31.6	30.7	30.5	30.8	31.1	30.9	30.2	31.2
Min.	22.7	22.8	23.4	24.6	25.1	24.7	24.4	24.5	24.3	24.2	24.0	23.3	24.0
Mean	26.2	26.6	27.6	28.9	29.1	28.2	27.6	27.5	27.6	27.6	27.5	26.8	27.6

Remarks : Available period for data are for 30 years of 1961 to 1995.

Source : PAGASA, Iloilo

About 90 % of annual rainfall is observed during wet season (May to November). Even during the driest month, the study area receives a few days of rainfall which facilitates crop cultivation to a large extent.

### 2.3.2 Hydrology and Sub-watershed Classification

The drainage condition in the watershed area is presented in Figure II.2.1. The main rivers and the tributaries in each watershed are as shown below.

Watershed	Main river	Tributaries	Catchment (km <sup>2</sup> )
Aganan	Aganan	- ditto -	104
Tigun	Maasin	- ditto -	191
Suague	Suague	Magapa river	65
		Suague river	118
Jalaur	Jalaur	Panay river	118
		Jalaur river	128
		Asisig river	74
		Alibunan river	79
		Tagbacan river	137
		Ulian river	150
		Lumunan river	320
		Tambunac river	59

As shown in above table, Suague watershed is composed of two (2) sub-watershed and Jalaur watershed is done of eight (8) sub-watershed area.

### 2.3.3 Soil

Based on the Soil Survey Report (1947), prepared by Bureau of Soil and Water Quality, the soil condition of the watershed areas are identified. The following table shows soil types and its extent in the watershed areas.

(Unit : km<sup>2</sup>)

Soil types	Texture	Depth <1	Permeability	Aganan	S.Barbara	Suague	Jalaur
Alimodian clay loam	clay loam	+2	good	69	113	103	592
Alimodian silt loam	silty loam	+2	fair	-	4	9	-
Alimodian soils, undifferentiated	N.D.	+1 - +2	N.D.	22	17	17	241
Alimodian-Barotic complex	loam	+1 - +2	fair	-	-	-	86
Bantog clay loam and loam	loam	+1 - +2	fair	-	-	-	25
Faraon clay	clay	+1 - +2	poor	-	-	5	32
Luisiana loam	loam	+3	good	-	-	-	25
Sta. Rita clay	clay	+3	poor	2	19	23	4
Umingan fine sandy loam	sandy loam	+2 - +3	good	11	40	25	62
<b>Total</b>				<b>104</b>	<b>193</b>	<b>181</b>	<b>1,065</b>

Remarks : <1 +3 : deep, +2 : moderate, +1 : shallow

Source : Soil Survey of Hoilo Province, Bureau of Soil and Water Quality (1947)

Alimodian clay loam is a dominant type which covers about 60% of the areas, following Alimodian undifferentiated soils, and Umingan fine sandy loam. These soils have a high infiltration rate and slightly to moderately developed structure. Therefore, it is assumed that the most of soils in the watershed areas have a moderate to high resistance for erosion considering the properties of soil material. Soil map of the watershed area is presented in Figure H.2.2.

#### 2.3.4 Land Use and Vegetation

Present land use condition was grasped based on the "Land Cover Maps" at the scale of 1/250,000, prepared by using 1987 SPOT Satellite images. Table H.2.1 and Figure H.2.3 shows the present land use condition in the watershed area, and its summary are shown as follows:

	Forest <1		Brush land & Grassland <2		Agricultural land <3				Built-up area		Total	
					Paddy <3		Other crops					
	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)
Aganan	0	0	55	53	17	16	32	31	0	0	104	100
St. Barbara	4	2	140	73	40	21	9	5	0	0	193	100
Suague	10	6	127	70	44	24	0	0	0	0	181	100
Jalaur	76	7	680	64	308	29	0	0	100	0	1,065	100

Note : <1 Forest ; Open canopy, mature trees covering < 50%

<2 Brush & Grassland ; including cultivated area mixed with brush & grass

<3 Paddy : including sugarcane

Source : Digital data of Land Cover Maps (1/250,000), 1987, NAMRIA

About 50 to 70 % of each area are occupied by the brush and grassland, and forest remains only less than 10 % at present. Agricultural land varies from 24 % to 47 % in the watershed areas. Since the agricultural land is mainly paddy fields in three watersheds except Aganan, these area are assumed to be a suitable topographic condition from environmental view points of land conservation and water harvest. Taking into consideration the sloping condition of the watershed areas as shown in sub-section 2.3.5, it is considered that most of sloping area which is over 18 % slope is under the brush and grassland.

#### 2.3.5 Sloping Condition

The slope map is presented in Figure H.2.4, and the sloping condition of the watershed areas are summarized as follows :

Watershed	Slope										Total	
	0-3%		3-8%		8-18%		18-30%		over 30%			
	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)	(km <sup>2</sup> )	(%)
Aganan	8.3	8	10.4	10	3.1	3	35.4	34	46.8	45	104	100
St. Barbara	27.0	14	29.0	15	40.5	21	52.1	27	44.4	23	193	100
Suague	32.6	18	21.7	12	38.0	21	30.8	17	57.9	32	181	100
Jalaur	127.8	12	63.9	6	298.2	28	245.0	23	330.2	31	1,065	100

Source : Department of Environmental and Natural Resources (DENR), Region VI

20 to 45 % of each watershed area are occupied by the sloping land which has a slope of over 30 %. Further, the above table shows that the land to be managed as Forest Land covers at about 50 to 80 % of the watershed areas and significant parts of these are presently used as A&D Land, especially in Aganan watershed. The following table shows the balance between the area over 18 % of slope and present Forest Land.

Watershed	Over 18% of slope (ha)	Forest Land (ha)	Balance <1	
			(ha)	(% for total area)
Aganan	8,220	3,290	4,930	47.4
St. Barbara	9,650	7,960	1,690	8.8
Suague	8,870	5,220	3,650	19.9
Jalaur	57,520	41,140	16,380	15.4

Remark : <1 : The figure shows the area of land to be managed as Forest Land.

### 2.3.6 Soil Erosion

According to the field survey and interviews to farmers, it is speculated that the upland fields located on sloping land are the most susceptible to soil erosion because of no application of soil conservation measures. In fact, the evidences of gully erosion are observed in some areas. As an example, according to the research results at Magal and Pantabangan Watershed, a significant amount of soil loss from grassland and cultivated land was reported at average erosion rates of 91.5 ton/ha/yr. (0 - 50% sloping) and 30.6 ton/ha/yr. (0 - 15 % sloping), respectively. Areas with existing natural growth showed only 1.3 ton/ha/yr. Therefore, Aganan watershed area is assumed to have a high potential for severe soil erosion, since most of the land in these areas are under cultivation or grasslands. Apart from soil erosion, the river bank erosion was observed throughout the field survey especially in the Suague watershed area. Since severe floods have often occurred due to the watershed degradation, the river bank has also suffered serious erosion. In addition, the local gravity irrigation system, found in the watershed area, has often accelerated the river bank erosion. Certain protection measures such as tree planting, physical river bank protection, etc. are recommended to be applied as a short term solution, however, watershed management and comprehensive river management programs for control of flood occurrence are essential for sustainability.

## 2.4 Socio-economic Condition

### 2.4.1 Population Intensity of the Watershed Areas

Population of the whole of province has been increasing at the annual rate of about 2% for the last three (3) decades. The population increasing rates of the watershed areas for the last three decades range from 0.2 to 2.4 %/annual. Population density in 1995 ranges from 150 to 280 persons/km<sup>2</sup>. The data on population and number of households in 1995 in the watershed areas are shown below.

Watershed	Municipality	Population (1995)		Annual increase rate at '60-'95	Household (1995)	
		Number (1000person)	Density (P./km <sup>2</sup> )		Number (1000H.H.)	Density (H.H./km <sup>2</sup> )
Aganan	Alimodian	29	201	1.4	5.4	37.1
Tigum	Maasin	29	187	0.9	5.0	31.8
Suague	Janiuay	50	280	0.2	9.4	52.3
Jalaur	Lambuano	59	238	1.8	10.4	42.0
	Calinog	45	194	1.2	8.6	36.7
	San Enrique	26	292	2.4	4.8	54.6
	Passi	60	237	2.3	11.3	44.9
	Sub-total	189	240	1.9	35.0	42.8

Further, based on the relation between the available land (area of A&D Land) and number of households in the each municipality, the land holding size and its potential was roughly assessed. As shown in the following table, the average holding size ranges from 1.0 to 2.2 ha. It can introduce two (2) assumptions. Firstly, an equitable land allocation may have not been carried out in Aganan watershed area and therefore small farmers may have been forced to cultivate on the submarginal area. Another, since the average sizes of Calinog, Janiuay, and San Enrique are less than 1.5 ha, they have no potential for expansion of farm land and Forest Land may be used for agriculture to sustain the settler's life in near future when the population increase.

Watershed	Municipality	No. of H.H.	A&D land (ha)	Ave. size (ha/H.H.)
Aganan	Alimodian	5,400	11,940	2.2
Tigum	Maasin	5,000	8,680	1.7
Suague	Janiuay	9,400	12,460	1.3
Jalaur	Lambuano	10,400	16,150	1.6
	Calinog	8,600	8,370	1.0
	San Enrique	4,800	6,460	1.3
	Passi	11,300	21,750	1.9
	Sub-total	35,000	52,730	1.5

#### 2.4.2 Living Condition and Present Concerns

To grasp the present living condition and present concerning problems of the settlers, the interview survey was carried out in Phase-I survey. The results of this survey are, however, not represented in the watershed areas since the survey was just sampling survey. Therefore, the data are to be placed as references. In Tigum watershed area, the survey was not carried out since there was no settlers in the hill and mountainous area.

##### (1) Living condition

The annual gross cash income and expenditure (excluding own consumption), holding size, main cultivated crops, etc. are summarized as follows:



Items	results
Cash income :	23,600 - 50,000 pesos
Cash expenditures :	8,000 - 44,000 pesos
Holding size :	0.5 - 4.0 ha
Main crops :	Paddy, Maize, Vegetables, Banana, Coffee
Drinking water source:	Tube well, spring
Electricity :	Not available
Distance to p. school :	0.2 to 4.0 km
Distance to clinic :	0.2 to 4.0 km
Energy source :	firewood

(2) Present problems and development needs

Present concerning problems for sampled households were roughly grasped through the interview survey. The dominant concerning problems are summarized as follows :

Order	Aganan	Suague	Jalaur
1	- No electricity	- Poor road condition	- Shortage of food
2	- Poor road condition	- No electricity	- No irrigation water
3	- No school facility	- No school facility	- Poor drinking water
4	- No market facility	- Shortage of fertilizer	- Poor road condition
5	- No health facility	- No irrigation water	- No health facility

The settlers mainly have concerns about the improvement of rural infrastructures such as electricity, road, school, etc. The ranking of forest in the list was low. It indicates that the settlers have no complains for the present forest condition. However, they know the importance of forest for providing of safety water according to the results of interview survey. In order to make settler's needs coincide with the project objectives of watershed improvement, the following approach shall be considered.

- i) to make a discussion with settlers to notice the present condition of watershed and its conservation measures
- ii) to support settlers to fill present concerns up in order to motivate the settlers to improve the forest condition

## 2.5 Existing Government Activities

For the rehabilitation and proper management of forest area, DENR has designated several reserve areas and forest management programs in the Public Forest land. The area of existing forest management program and designated reserve in the watershed areas are presented in Table H.2.2 and summarized as follows :

Watershed	Municipality	Forest Management * 1		Designated as Reserve Area * 2		Non-classified Area		Total Timber Land	
		(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
Aganan	Alimodian	180	7	0	0	2,356	93	2,536	100
Tigum	Maasin	215	3	5,800	83	965	14	6,980	100
Suague	Janiuay	646	12	0	0	4,803	88	5,449	100
Jalaur	Lambuano	769	9	2,640	31	5,136	60	8,546	100
	Calinog	2,398	16	9,977	67	2,579	17	14,954	100
	San Enrique	1,201	52	676	29	437	19	2,314	100
	<u>Sub-total</u>	<u>5,084</u>	<u>20</u>	<u>12,578</u>	<u>49</u>	<u>8,152</u>	<u>32</u>	<u>25,814</u>	<u>100</u>

Source : Provincial Environment & Natural Resource Office (PENRO), Iloilo

Remarks : \*1 Forest Management program includes 1) Regular reforestation, 2) Contract reforestation, 3) ISFP, 4) IIP

\*2 Reserve area includes 1) National park, 2) Watershed area, 3) Civil reserve, 4) Military reserved forest, 5) Communal forest, 6) Grazing land.

Besides the above activities by DENR, Department of Agriculture (DA) has also taken fruit tree planting programs for the A&D land in the watershed area. The main programs implemented in the watershed areas by DENR are explained in the following paragraphs.

#### (1) Integrated social forest (ISF) program

The Integrated Social Forestry (ISF) program was launched in 1982 by Letter of Instruction (LOI) No. 1260. The ISF program consolidated all social forestry programs initiated in 1970s such as Forestry Occupancy Management Program (1975), Family Approach to Reforestation Program (1976), and Communal Tree Farming Program (1979). The main objectives of the ISF program are to promote the economic and social development by democratizing the use of public forest land and making equitable the distribution of benefits derived from forest. Under this program, the slash and burn farmers and other deserving forest occupants can secure land tenure (Certificate of Stewardship Contract : CSC) for an area of not more 7 ha and 25-years lease contract. As a basic rule, 20 % of land should remain as a forest land and 80 % can be used for agricultural purpose. From 1991, the responsibilities of implementing ISF program was transferred from DENR to the LGUs under the Local Government Code of 1991.

#### (2) Contract reforestation

The contract reforestation has been started in 1989. The main objective of the contract reforestation program is to involve individual households or community groups in the rehabilitation of degraded forest areas. This is done by issuing household or community reforestation contracts whereby the contractor is paid by DENR to plant and manage a forest area for 3 years. The final contract payment is done based on the survival rate of the fields after 3 years. The forest area planted under the program becomes the property of DENR. At present, this system is changed to the following CFMA system.

#### (3) Community forestry management agreement (CFMA)

The forest rehabilitated by contract reforestation program is not owned by the contractor. Settlers and/or community groups have no intention to protect the reforested area after 3 years, and the area has been often re-destroyed by accidental fires, etc. To overcome this problem, 25 years forest land management agreements for the contract reforestation area are now being issued to communities, NGOs, or other qualified parties to enable them not only to protect and maintain the trees but to benefit from them when harvested. Community Forestry Management Agreement (CFMA) is one of long term agreement, and this makes local communities enable to utilize forest products.

(4) Watershed reserve area (Watershed Rehabilitation Sub-project)

Total 119 watersheds and about 1.4 million ha in the whole of Philippine have been designated as "Watershed Reservations" through Presidential Proclamations up to now. In the watershed areas, parts of Tigum and Jalaur watershed areas are designated as "Watershed Reservations" with 5,800 ha in Tigum (Maasin municipality) and 9,230 ha in Jalaur (Calinog municipality), respectively. In addition, DENR is presently proposing to implement the rehabilitation sub-projects in both watershed areas. The Massin Watershed Sub-project was decided to be implemented under the OECF loan in 1997, and it will be started at 1998. The outlines of the sub-projects are summarized as follows :

Watershed (Municipality)	Name of project	Total area	Components
Tigum (Maasin)	Maasin Watershed Sub-project	2,685 ha	- Community Organizing - Reforestation : 1,065 ha - Agro-forestry : 1,164 ha - River bank stabilization : 60 ha - Rattan plantation : 111 ha - Bamboo plantation : 300 ha
Jalaur (Calinog)	Jalaur Watershed Rehabilitation Project	2,161 ha	- Community Organizing - Nursery Operation - Reforestation : 958 ha - Agro-forestry : 750 ha - Bamboo plantation : 143 ha - Erosion control

Besides the above sub-projects, several reforestation activities are conducted in the Maasin Watershed Sub-project area by LGUs, NGOs, private companies.

## 2.6 Evaluation of Watershed Condition

Based on the result of land use condition, slope condition, land category and the present government activities, the degree of the degradation of the watershed area was evaluated, and the result of evaluation is summarized as follows :

Watershed	Land use	Slope	Land category	Erosion	Gov. activity	Overall
Aganan	3	3	3	3	3	3
St. Barbara	2	2	2	2	1	2
Sungue	3	2	2	2-3	2 - 3	2-3
Jalaur	2	2	2	2	1 - 2	2

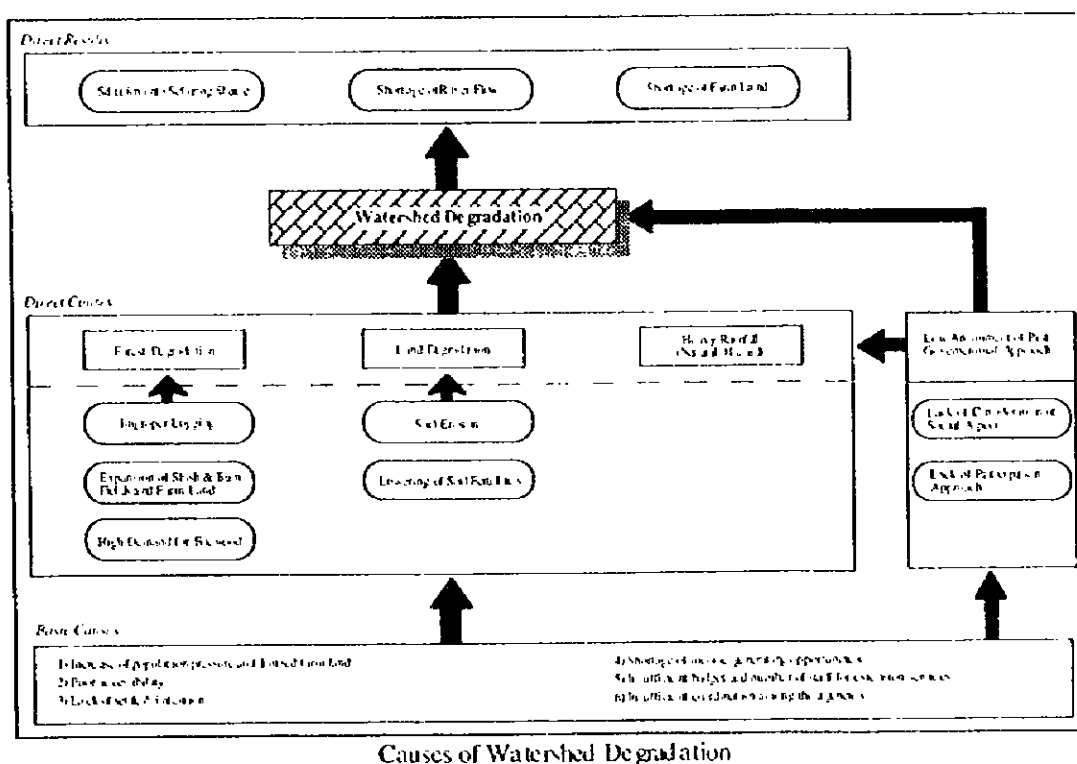
Remarks : Figures shows the degree of condition of each aspect, i.e. 1=better, 2=moderate, 3=poor.

### 3. CONSTRAINTS OF THE WATERSHED MANAGEMENT

The watershed degradation is directly resulted from forest degradation and land degradation. The inadequate past governmental approach have also accelerated the watershed degradation. The causes of each direct reasons for watershed degradation are as shown below.

Direct Causes	Sub-direct Causes
1. Forest degradation	- improper logging, - expansion of slash and burn fields and farm lands, - high demand for firewood
2. Land degradation	- soil erosion, - lowering of soil fertility
3. Inadequate past approach	- lack of consideration of social aspects, - lack of participatory approach

The following figure shows a relationship of basic causes, direct and sub-direct causes, and the direct results. Furthermore, the basic causes were analyzed by building up a problem trees. The problem trees of each direct cause are presented in Figure II.3.1. The basic causes (constraints) are explained in the following paragraphs.



#### 3.1 Physical Aspects

##### (1) Increase of population pressure and limited available land

The rapid increase of population had accelerated the degradation of watershed area in the 1970s and 1980s. The population has been increasing or stabilized at high level in the watershed areas. Because the suitable land for the lowland paddy is inadequate in the watershed areas, most of them have been obliged to operate slash and burn cultivation or upland farming on the sloping area. Further, since most of land have no applied a measures to prevent soil erosion, watershed degradation due to soil erosion has occurred in the fields.

In addition to the above reasons, a delay of the progress of land distribution may also be one reason for the shortage of farm land, especially in Aganan.

(2) Low accessibility of the watershed area

Accessibility is particularly one of the factors to be considered for the success of the forest management project, specifically in terms of project supervision and monitoring phases. Due to low accessibility, the monitoring and supervising have often been insufficient, especially in the rainy season when the roads going to the area are impassable.

### 3.2 Social Aspects

(1) Lack of settlers' intention for land conservation

As the results of interview survey have shown, land and forest conservation are far from the present settler's needs. Therefore, the normal reforestation approach and reservation program could not bring out their intention to conserve the land and forest. The approaches to be taken for watershed management should be incorporated in the integrated approach to fit their various needs.

(2) Shortage of income generating opportunities

The settlers in and around the watershed areas have no opportunities to earn cash income except from forestry and agricultural activities. If there is an industry which can absorb people for supporting their lives, they will not depend on forest and upland agriculture for their income. As a result, it will reduce the inflow of new settlers into the watershed

(3) Past governmental approach

In addition, the previous government activities lacked the following aspects.

(a) Lack of consideration of social aspect

In the past, watershed management has put too much emphasis on the assessment of what is happening rather than why it is happening. Hence, the past watershed management projects have tended to emphasize the engineering solutions (runoff control structures, gully plugs, check dam, sediment traps, etc.) and the planting of trees (agro-forestry, contract reforestation programs). Since the attention has not been directed to identifying the ultimate cause of the degradation, the fundamental problems such as poverty, limited access to improved technology, etc., have been left unattended.

(b) Lack of participatory approach

This was also one of the main reasons for the failure to reach the beneficiaries' intention. The past approach was just like a "top-down" approach. Settlers in the hill and upland areas have had limited opportunity to be involved in the development and decision making processes of watershed management project design. The results of past activities have frequently been disappointing with the lack of intention from intended beneficiaries.

As regards the matters mentioned above, the government also is trying to develop the alternative program including participatory approach with social consideration.

### **3.3 Institutional Aspects**

#### **(1) Insufficient amount of fund and number of appropriate staff**

Presently, several kinds of watershed management programs such as reforestation program and forest management program are conducted by the government agencies. However, the achieved area and size of the programs were assumed to be small as compared with the target area. The shortage of fund is considered as one of the main reasons for this result. The availability of proper technical staff is also limited. This is one of the main reasons for inefficient extension service in the watershed areas.

#### **(2) Inefficient coordination among the different agencies**

Several activities for watershed management by several agencies are found in and around the watershed area. These activities have been mainly coordinated on an area basis. Consequently, the activities were conducted just as under the independent responsibility of each agency in each area, even if they have a coordination committee for whole project area. Therefore, the efforts are sometimes assumed to have been diffused in a broad area.

#### 4. BASIC CONCEPTS OF WATERSHED MANAGEMENT

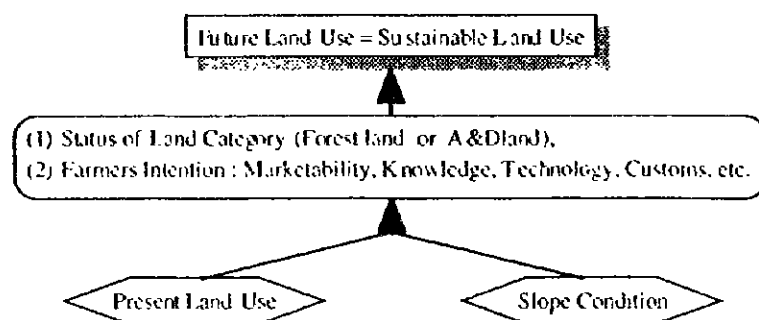
The goal of the watershed management is to achieve "sustainable land use" and "stability of rural people life". The main issue on the watershed degradation is the low concern among individual rural households and communities for its adverse impact on their welfare. This requires a development approach that considers not only the bio-physical aspect (forestry development) but also the social and cultural (rural development), and financial and economical milieu of the rural people and communities to improve their present condition and re-orient their attitudes forward proper resource use. In addition to the integrated approach, a participatory approach will also be recommended to be adopted from the planning stage. The aim of the approach is to increase settlers' intention for watershed management and to formulate a management plan by "bottom up" way.

On the other hand, the government can directly apply the rehabilitation measurements on only the area of Forest land categorized under the present regulation, as mentioned before. Therefore, the project approach also is to be divided into two ways; one is for Forest Lands and the other is for A&D Lands. As for Forest land, the watershed management shall be implemented under the government's support like as the rehabilitation project in Maasin. In this case, the main components will be; i) community development including community organizing, ii) forestry program, iii) dissemination of agro-forestry, and iv) soil erosion control. As for A&D Lands, the government will work indirectly. The extension works conducted by MAO and CENRO for dissemination of agro-forestry and upland farming practice with soil conservation measures are main works on A&D Lands. Thus, the management of A&D Lands should be considered as the long term view point, since it is difficult to project a result in the short term.

In this report, the focus is put on Forest land and the watershed management plan is formulated based on the former approach as mentioned above. The management concepts for A&D land is also recommended in order to improve the watershed condition in long term.

##### 4.1 Future Land Use Concepts

The future land use plan to be sustainable shall be basically formulated based on the present land use condition, slope condition, status of land category and land users' intention.



##### 4.1.1 Criteria for Future Land Use

###### (1) Slope condition

The future land use will be recommended based on the following criterias of the sloping condition.

Slope classification and recommended land use

<u>Terrain Classification</u>	<u>Slope (%)</u>	<u>Recommended Land Use</u>
1. Level to nearly level	0 - 3	3% slope is the maximum slope for paddy fields.
2. Gently sloping to undulating	3 - 8	8% slope is the maximum slope for upland crops
3. Moderately sloping to rolling	8 - 15	15 % is the maximum slope of the land economical for mechanized crop production.
4. Steep rolling	15 - 30	30 % is about the maximum slope of the land safe and economical for livestock production.
5. Steeply high	30 - 65	65 % is about the maximum slope of the land safe for tree planting provided the ground will be permanently covered with vegetation.
6. Mountain	> 65	Land with slope greater than 65 % should be left for timber production.

Source : Land use and slope map of the Philippine, PCARRD 1980

(2) Present land use condition

The criteria on the basis of present land use condition is considered as follows:

<u>Present land use and recommended land use</u>	
<u>Present land use</u>	<u>recommended land use</u>
Paddy fields (on flat plain)	Same as present condition
Paddy fields (on terrace)	Same as present condition
Upland fields (on gently slope)	Contour farming, Upland farming with vegetative conservation measures
Upland fields (on steep slope)	Agro-forestry, Upland farming with application of SALT system
Grassland / Open field	Agro-forestry, fruit tree plantation, Upland farming with application of SALT system, Community forest
Secondary forest	Same as present condition
Other forest	Protection forest

(3) Status of land category and land user's intention

The target of land use plan is different between the status of land category as shown below.

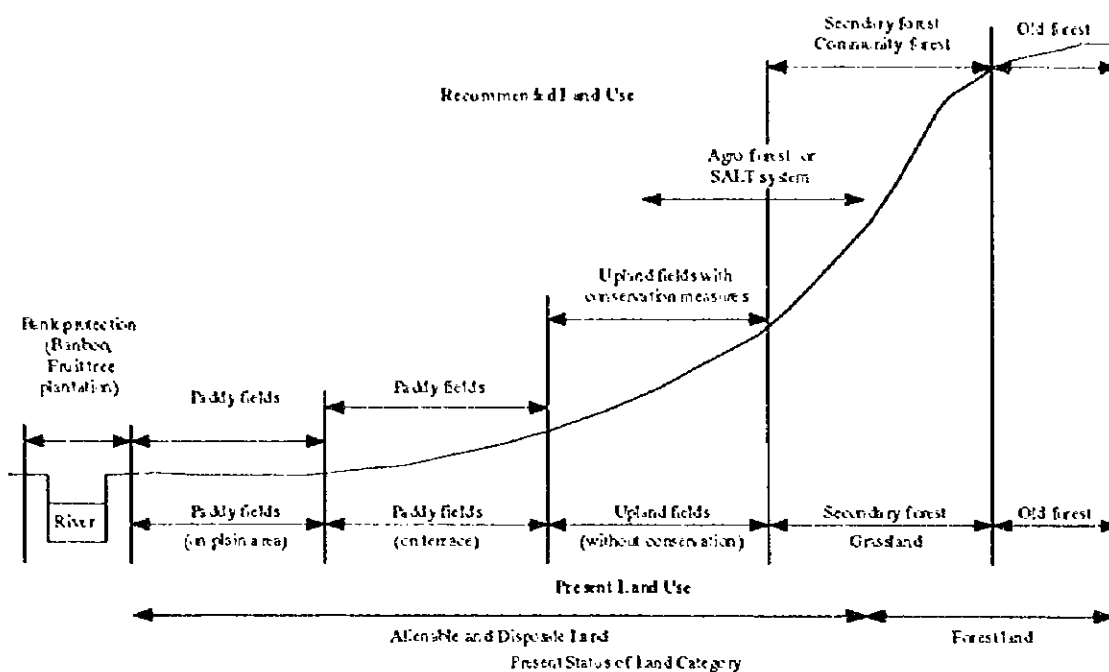
<u>Land category</u>	<u>Target</u>	<u>Final Goal</u>
Forest Land	Permanent vegetation	Establishment of forest
A&D Land	Application of soil conservation measures	Sustainable land use such as agro-forestry, terrace farming, etc.

The land user's intention is also a main decision factor in A&D Lands. This is depending on the customs, technology and knowledge obtained by the user's, marketability, etc.

**4.1.2 Outline of Future Land Use Concepts**

Taking into consideration the above criterias, the outline of future land use concepts on the circumstance are summarized as follows :





## 4.2 Basic Development Approach

### 4.2.1 On Forest Lands (Referring to Rehabilitation Sub-project)

As mentioned above, the watershed rehabilitation sub-projects will be implemented in Tigum watershed from 1998, and also may be carried out in Jalaur (Calinog) watershed in future. These watershed rehabilitation projects consist of soft concepts (community organization) and also hard concepts (reforestation and erosion control). DENR has applied these watershed rehabilitation approaches on the critical watershed in the whole of country. Thus, this type of project is assumed to be easily understood and also smoothly conducted by the Government. The watershed management concept in this report refers to the one of Watershed Rehabilitation Sub-project. The outline of concepts are described in the following section.

#### (1) Community organizing

The community organization and strengthening are a key factor for deciding success of the watershed management program because the community takes the main works watershed management. Once a community be organized, a planning and implementing of watershed management can be conducted by the community itself with supporting of Government agencies concerned and/or NGOs.

To organize community successfully, the responsible and respected leaders will be needed since the management of such organization will depend on their capabilities and commitment. Consequently, the government assistance such as training of leaders, education and dissemination of information for community organizing, budgetary support, etc., is required. Involvement of NGOs to assist for the government works is also required.

The participatory approach will be applied through the community organizing works from study stage to monitoring stage. The development needs of participants and also the conflicts between participants to be overcome can be identified at the study stage. While, the settlers' intention for project sustainability such as self-reliant, responsibility, ownership, etc., can be risen by application of the participatory approach from the planning to monitoring stage.

## (2) Social and integrated development

Since the watershed and forestry management is not a high priority concerns for the settlers as noted in chapter 3, several social development such as road improvement, school construction, construction of water supply system, income generating activities, etc., shall be incorporated into the watershed management plan directly and indirectly, and conducted under the settlers' participation. The social and integrated development program will be an incentive for the settlers to maintain and sustain the watershed improvement plan. In addition to rising an incentive to maintain the plan, it will also contribute to improve the basic constraints such as "shortage income", "poor accessibility", etc.

## (3) Proper land use development

According to the above land use guidelines, the future land use will be set up with emphasis on taking a balance between forest conservation and farming operation. Thus, a reforestation program, and introduction of agro-forestry and upland farming system into the watershed area shall be main activities of hard components in the project.

### 4.2.2 On Alienable and Disposal Lands

The main work on A&D Lands is to be a extension and dissemination for the importance of soil conservation and its measures to the land users or owners. The MAO (Municipal Agricultural Office) and CENRO (Community Environment and Natural Resource Officer) will be a main engine for the extension works. Therefore, the strengthening of the extension system of MAO and CENRO, which are in charge of the watershed area of Jalaur and Suague watersheds, is essential to attain the long term goal of sustainable land use in the watershed. In addition, it is also recommended to establish an experimental farm to efficiently disseminate the technologies of sustainable upland farming in the watershed areas.

## 4.3 Outline of Technical Approaches

### 4.3.1 Farming Technology

#### (1) Soil conservation measures

There are three types of soil degradation and erosion control measures, namely i) vegetative measures, (ii) structural measures, and (iii) cultural measures. The description of soil erosion control measures and the merits and demerits are summarized in Table H.4.1. In general, vegetative measures are easy and less expensive to establish and repair compared with structural measures. In addition, vegetative measures can improve the soils if nitrogen fixing trees are used for hedgerow and the leaves and branches are used as green manure and mulching materials. On the other hand, they are less effective in very steep slopes and difficult to attain erosion control effect immediately after the establishment. The structural measures have the characteristics almost opposite to vegetative measures, i.e. difficult and expensive to construct and maintain but become effective right after the establishment. The cultural measures are the ones already or potentially mingled in the vegetative and structural measures.

#### (2) Agro-forestry system

Agro-forestry system is also one of the vegetative measures for land conservation and also is a common farming system in Philippines. It is a system where perennial trees grow on the same land management unit with agricultural crops and/or animals. The recommended types of agro-forestry system are presented in Figure H.4.1, and summarized as follows :

Type	Summary
Randomly-mixed agro-forestry	involving different species of forest and fruit trees and also agricultural crops with no definite pattern of arrangement.
Row-inter crop agro forestry	involving the integration of the forestry species with the agricultural crops simultaneously on the same unit of land with a definite pattern, such as (i) trees along border, (ii) alternate row, (iii) alternate strips.

In the Philippines, comprehensive agro-forestry system, named as SALT (Sloping Agricultural Land Technology) system, has been promoted by DA and DENR because of the easy and cheap nature of the measures.(ref. Figure H4.1)

#### 4.3.2 Development of Alternative Energy Source

As mentioned above, firewood cutting is one of the reason for forest degradation, since the local people mainly use firewood and charcoal for their energy source and its demand has increased with increase of population. The improvement of cooking stove for rural life is one of the effective measures for sustainable energy development. The introduction of biogas system as an alternative energy source is also useful. In addition, it the another advantage that the residue (slurry) of biogas can be used as soil improvement materials.

#### 4.4 Institutional Development Concepts

##### (1) Strengthening coordination with agencies

To realize the basic development approach, the close cooperation between different interest groups (farmers, foresters, energy users, etc.) and technical specialists (natural resource scientists, sociologist, engineers, etc.) in the planning and implementation of development programs is important. The appropriate coordination among the different government line agencies will be required, especially the DENR, DA, NIA, LGUs and NGOs , etc. One approach is to establish a multi-sectoral task force which will be organized for the watershed management under the initiative of DENR. This task force may take the same structure as the Multi-sectoral Environmental Protection Committee (MEPC) being pilot tested by DENR in selected regions (eq. Region 2) of the country.

##### (2) Training

Training is necessary not only for government staff but also for the participating land users. For the government staff training, it is recommended that a section for training is to be established in the "task force" to develop staff capability for community organizing and watershed management. NGOs shall be made as a core of the training works to settlers. Through the training, appropriate technology such as sloping agriculture, crop rotation, agro-forestry, etc. will be inculcated to the beneficiaries. The skills will serve as a significant incentive to increase their involvement in conservation-with-production activities. The importance of watershed management and community development will also be the main items in the training curriculum.

##### (3) Extension

For the effective extension of watershed management system, it is proposed that a model project of integrated agricultural and forestry development will be applied at several sites in the watersheds. This procedure can be expected to help the government in saving money and staff, and also enable the settlers to understand the effects of proper watershed management to their rural life. It is also recommended to establish an extension section in the "task force".

## 5. WATERSHED MANAGEMENT PLAN IN THE JALOUR AND SUAGUE WATERSHED AREAS

Total areas of Jalaur and Suague watershed are about 100,000 ha and 20,000 ha, respectively. These, of course, include a plain area especially in Suague watershed. However, to apply an improvement plan for the entire watershed areas at once is assumed a dreamy story, since the cost, time and manpower for the works will require huge amounts. Reasonably considering, it is recommended to implement a model rehabilitation project on the selected micro-watershed area in order to demonstrate the effects to the surrounding areas, step by step. Thus, this model project in the priority area will be the first step of the watershed management. Although the watershed management plan will significantly contribute to revitalization of the RISs, the beneficiaries and the implementation agency of the plan will be different with the main development plan as villagers in upstream of the RIS and DENR. Therefore, it is recommended to conduct the watershed management project as an another project against the main project. It is an alternative that the watershed management plan will be executed as a project in the Forestry Sector Project (FSP), taking into consideration the project similarity.

### 5.1 Selection of Priority Watershed Area

The model development site is selected through the following consideration.

Item	Consideration Point
i) Land category	The selected area should be categorized as Forest Lands at present.
ii) Emergency :	How is the degree of watershed degradation ?
iii) Demonstration Effect :	How does it expect the effects of dissemination and demonstration in the watershed ?
iv) Unification :	Is the area of watershed unified as one area.
v) Size of Area (Forest land) :	Is the size of area a optimum level from 2,000 ha to 5,000 ha.
vi) Administrative situation :	Does the area locate in one municipality ? or it covers several ones ?

The relevant sub-watershed in Suague (2 sub-watershed : Magapa and Suague) and Jalaur (8 sub-watershed : Panay, Jalaur, Asisig, Alibunan, Tagbacan, Ulian, Lumunan and Tambunac) is evaluated based on the above table. The results are presented in Table II.5.1, and summarized as follows :

Item	Suague Watershed	Jalaur Watershed
i) Land category	452 ha in Magapa, 4,766 ha in Suague	from 256 ha to 11,507 ha of eight (8) sub-watersheds
ii) Emergency	high degree at both sub-watersheds	moderate to high at all watershed
iii) Demonstration Effect	moderate effect due to poor accessibility	moderate to high effect (A similar project will be launched in Calinog in near future.)
iv) Unification	Suague and Magapa are reasonable	Panay, Ulian, Tagbacan are reasonable
v) Size of Area (Forest land)	Suague (4,766 ha)	Tagbacan (3,083 ha), Tambunac (2,952 ha)
vi) Administrative location	in one municipality (Suague)	Panay and Alibunan located in only Calinog Municipality, Other areas extend over several municipalities

The Suague sub-watershed area is considered as a most optimum site based on the above selection viewpoint. While, the Jalaur Watershed Rehabilitation Sub-project in Calinog, which covers the Panay sub-watershed, will be proposed to OECF as a sub-project of Forestry Sector Program (FSP) in 1998 according to DENR. Therefore, a significant effect can be

expected by implementation of a watershed management project in Suague sub-watershed simultaneously with implementation of the Jalaur Watershed Rehabilitation Sub-project.

## 5.2 Salient Feature of Model Site - Suague Sub-watershed Area -

### 5.2.1 Location

The model project site is about 15 km west of Janiway town or 25 km west of Pototan town. The model site is located at geographical coordinates of 122° 18' to 122° 18' latitude and 10° 58' to 10° 63' longitude. The total area of model project site is 4,766 ha. The area extends over 4 barangays of Janiway; Barasalon, Canawillian, Panuran and Quipot.

### 5.2.2 Land Use Condition

The land use condition of the model site are identified by the interpretation of aerial photo at a scale of 1/20,000, taken in Phase-I. Figure H.5.1 shows the present land use condition and the extending area of each category are summarized as follows :

Land use type	(ha)	(%)
1. Old forest	1,926	40.4
2. Secondary Forest (dense)	430	9.0
3. Secondary Forest (sparse)	1,066	22.4
4. Grassland / Open land	628	13.2
5. Upland	622	13.1
6. Paddy field	94	2.0
<b>Total</b>	<b>4,766</b>	<b>100.0</b>

Source : JCA Study Team, 1997

Old forest is a thick forest which consists mainly of primary forest as the Dipterocarpaceae species, etc. Secondary forest is divided into dense forest and sparse forest depending on the density. Grassland/Open land and Upland are presently cultivated or the land which are a former slash and burn cultivation fields, and thus have a high potential of erosion hazard.

### 5.2.3 Slope Condition

The model project site is composed mostly of rolling hill to very steep mountain characterized by undulating topography. Most steep mountain is located in east end in the watershed and mostly occupies the area of about 70% of the watershed area. These are mainly covered by the old forest and secondary forest, however some traces of slash and burn cultivation are found as a small patches of open land on this slope.

Degree of sloping	(ha)	(%)
0-3%	0	0.0
3-8%	117	2.4
8-18%	0	0.0
18-30%	778	16.3
30-50%	447	9.4
over 50%	3,424	71.8
<b>Total</b>	<b>4,766</b>	<b>100.0</b>

Source : Slope Map, Region IV, DENR

### 5.2.4 Socio-economic Condition

Based on the results of Barangay Accessibility Survey conducted in 1996 by Januway

municipality, the socio-economic condition and the present villagers' intention of the relevant barangays in the model site are shown in Table II.5.2, is summarized as follows :

Main concern	Barasalon	Canawillian	Panuran	Quipot
1. No. of H.H.	230	207	145	578
2. Population	1,200	1,242	800	3,096
3. Villagers' Intention				
1st priority	- Road improvement	- Water supply	- Water supply	- Road improvement
2nd priority	- Transport service	- Health service	- Agri. input	- Secondary school
3rd priority	- Secondary school	- Road improvement	- Road improvement	- Water supply

Source : Barangay Accessibility Survey, 1996, Municipality of Janiway, Hoito

The present concerns of villagers are converged on the improvement of rural infrastructures of water supply, rural road, school and health services. Out of these, rural road improvement and establishment of water supply system are cover most area of the concerns.

### 5.3 Project Component in the Watershed Management Plan

#### 5.3.1 Community Development

A comprehensive community development activities including community organizing, rural infrastructure development, and other livelihood activities, will precede the start of watershed management activities such as reforestation, erosion control. The activities will be undertaken jointly DENR, LGU and NGO. Other major activities in the watershed management plan will be undertaken after a genuine villagers' organization is in place in every barangays covered by the model site. The Community development activities will last for 24 month (two years). The schedule / procedure of the community development is described as shown below.

##### (1) Community organizing

###### (a) Preparation works

This work will cover two or three months that includes social investigation, biophysical profiling and establishing the relationship with the community and coordination with the LGU. The social investigation shall be conducted at in-depth level by applying a participatory approach such as RRA (Rural Rapid Appraisal) or PRA (Participatory Rural Appraisal), etc. The results of it will be useful to grasp the villagers' constraints and needs, fully related with the watershed degradation and will also serve as benchmark data in future monitoring stage.

###### (b) Institutional building and technology development

This work to be accomplished in the span of two (2) years is focused on institutional building and strengthening, technical skills enhancement and continuous dissemination and education to the villagers for the importance of watershed management through workshop. In order to mobilize the community and maintain the intention of community organizing, it is proposed that some of the other development works including i) rural infrastructure development, ii) agro-forestry development, iii) reforestation, iv) soil conservation program, etc., will be started within the span of 2 years, as a case for the on-the job training of the community.

###### (c) Empowerment

Through the above activities, it is expected that an empowered, self-governing,

self-reliant community organization will be formed, who can already handle their own socio-economic affairs and is technically equipped and ready for the integrated watershed management activities entrusted to them.

## (2) Rural infrastructure development

To rise up the villagers' intention to the watershed management, the rural infrastructure development will be planned through the discussion with community. The work quantities, material for construction and its supply, design, construction scheduling, etc., shall be formulated by the villagers in consultation with the community organizer (NGO and LGU). The skill and management capacity of community will be strengthened through the process. Based on the present concerns of villagers mentioned before and the result of rough survey by using topographic map at a scale of 1/50,000, the following options are considered for the infrastructure development.

Option	Summary	Q'ty
Option 1	Improvement of water supply system in Canawillian and Panuran	for 331 H.H.
	Improvement of barangay road from Barasalon via Panuran to Quipot	9.5 km of barangay road
Option 2	Construction of secondary school at Barasalon and Quipot	each 1 school
	Construction of health clinic at Canawillian	1 station

In addition to the above rural infrastructure development, four (4) bunkhouses for housing the workers during the plantation and five (5) lookout towers for forest fire detection shall be constructed. The bunkhouses will be set up at each barangay, and the lookout towers will be located in strategic spots in the sub-watershed.

## (3) Establishment of other income generating project

Bamboo made handicraft can be considered as a possible activities for income generation. By using product of bamboo planted during the project implementation, the community can expand the size of business and establish a particular group for production under the support of community organizers (NGOs contracted and LGU) and other related agencies. It is also expected to empower the women in the community. In addition, improvement and establishment of post-harvest systems, e.g. introduction of rural industry, will be also one measure for income generation. These will be discussed among the community at the community organizing.

### 5.3.2 Land Use Plan

Based on the present land use condition, slope condition and existing watershed rehabilitation program, the future land use is set up as shown below.

Future land use	Area (ha)	(%)
1. Paddy <1	94	2.0
2. Upland with soil conservation measures	23	0.5
3. Agro-forestry area including SALT system	778	16.3
4. Reforestation area <2	1,515	31.8
5. Forest protection area <1	2,356	49.4
<b>Total</b>	<b>4,766</b>	<b>100.0</b>

Remark : <1 Same as the present classification.

<2 Reforestation area includes i) supplementary reforestation area categorized as the "secondary forest (sparse) and ii) river bank protection on the bank of 50 m width along Suague river.

Taking into consideration the availability of manpower, technical capability and the climatic condition, the project activities shall be divided into three (3) phases ; 30 % of the area

for the first year, 50 % for the second year and 20 % for the third year. The developed area in every three year are :

Phase	(Unit: ha)			
	Upland	Agro-forestry	Reforestation	Total / yr.
1st year	7	240	455	702
2nd year	12	401	758	1,171
3rd year	4	160	302	466
Total	23	801	1,515	2,339

### 5.3.3 Reforestation and Agro-forestry Program

According to the land use plan, total 1,515 ha of the area will be designed as a reforestation area including supplementary reforestation in the sparse secondary forest and river bank protection on the bank of about 50 m width along Suague river, and total 801 ha of grassland or upland farming plot will be used for an agro-forestry farming. The following components will be included in the program.

#### (1) Nursery development

To give real essence of a community based approach to watershed management, it is recommended that the community shall be involved from the seedling production stage to plantation protection, maintenance and harvest. The raising of seedling will be done by each member of community. To ensure protection and maintenance of seedlings, each member is suggested to establish its own backyard nursery, raise, protect and maintain a certain required number of seedlings for their assigned area. Before, doing this, however, the community organizers (LGU and NGO) will firstly train the members on the proper techniques of seedling production.

The role of community organization is to provide basic inputs like certified seeds, plastic bag and fertilizer. In other hand, each household will receive a reasonable incentive instead of wage from the community organization same as the labor cost of seedling plus 10 % margin for profit.

The required number of seedlings for reforestation and agro-forestry to be produced with 30 % margin for mortality, which consists of 10 % for one during nursery operation and 20 % after outplanting, is about 2,265,700 seedlings and about 25,100 cuttings as shown in Table H.5.3. These seedlings will be collected to four (4) nurseries to be newly constructed at each barangay and be acclimatized and hardened for one to two months before the planting season.

#### (2) Tree species

Tree species to be transplanted will be finally decided in discussion with the community members to reflect their preference, during the community organizing. Based on the similar project experiences, the selected species to be applied are considered as shown below.

Land use	Considerable species
Reforestation	Narra, Mahogany, Acacia mangium, Teak tree, Rain tree
Agro-forest	Jack fruit, Cacao, Lanzones, Coffee, Rambutan, Guayabano, Giant Ipilipil, Chico, Pigeon pea, Banana
River bank protection	Giant Bamboo

#### (3) Plantation establishment

For the efficient plantation establishment and its maintenance, the community



organization will equitably assign the areas for development to the members or sub-groups. The member-households will be trained on how to properly plant the seedlings by the community organizers (LGU and NGO).

### **(3) Maintenance and protection of plantation**

The member of community will maintain what they have planted in their assigned areas. In practically, inventory of seedling survival shall be conducted two (2) months after planting, and all dead spots or stunted seedlings shall be marked for the replanting activities. This shall be done simultaneous with weeding and fertilizing of the seedlings for saving time and effort.

As a strategy to prevent plantation fires, a fire break will be installed. Banana will be planted along the edge of the forest plantations to serve as firebreaks.

### **(4) Harvesting and marketing**

Reforestation forest which will consist of Narra, Mahogany, Teak tree, etc., will be planted on the slope of over 30 %. This area shall serve as a permanent cover and be prohibited from harvesting. However, the thinning out of overwhelming number of trees will benefit the community and households as plots or logs. In the agro-forestry scheme on under 30 % of slope, several output (fruits, berries, others, which depend on the tree species) will be provided to the community. In addition, the bamboo lot can also be harvested and used for poles, bamboo made handicrafts, etc. As for agricultural product from agro-forestry area, to improve the quality and improve the accessibility to the market is essential for getting higher benefit. Therefore, the following options will be considered to apply in the area.

- i) introduction of agro-processing of jam making
- ii) dissemination of proper post-harvest process, especially coffee, such as drying, shelling and storing
- iii) establishment of the system of group-selling of the product for empowering the negotiation power

The community organizing worker shall train the members, especially women, on the marketing of the products, including the above alternatives.

## **5.3.4 Education Program of Upland Farming System**

This will be carried out as one package in community organizing components by the workshop, lecture, and site observation. This program include :

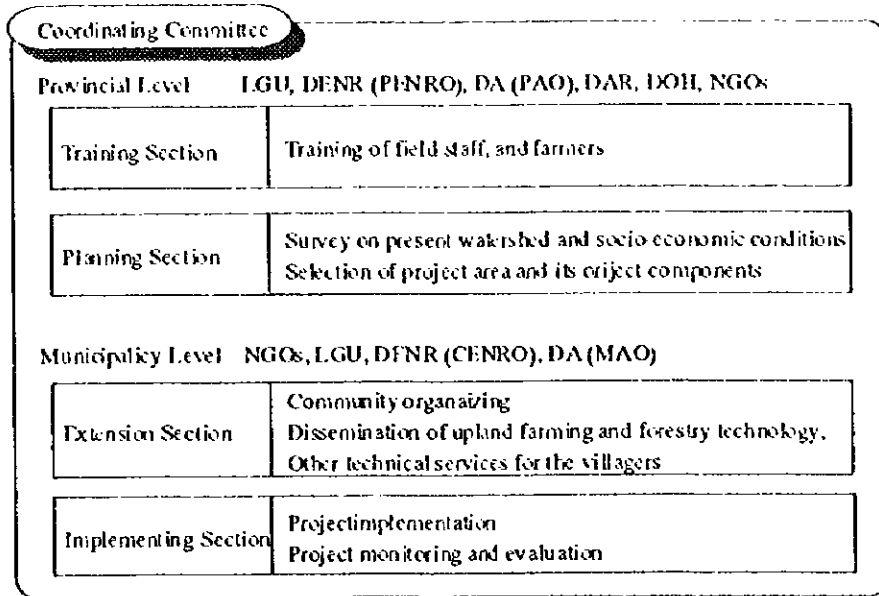
- i) discussion with the members on the productive, ameliorative and protective functions of technologies; and importance of the upland farming system (agro-forestry and soil conservation and management),
- ii) demonstration and observation of skill applied in using and improving existing technologies; and of effect of upland farming system, and
- iii) making individual or group plan the agro-forestry and soil conservation design, and
- iv) preparation of an entire development plan of the community.

## **5.4 Establishment of Project Management Organization**

### **5.4.1 Establishment of Task Force**

The development plan on institutional aspect is to establish a multi-sectoral coordinating committee at national and provincial level. Through WRDP (Water Resource Development Project) funded by the world bank, an inter-departmental executive steering committee may be established at national level. It is proposed that a task force committee at the local level shall

be established for the management, monitoring and supporting of watershed management project. The committee, therefore, can be expected that the committee has a comprehensive function for watershed management programs. In the fields, LGU and NGOs shall be a main engine on the activities in this committee as the community organizers. The organization and its function are considered as shown below.



#### 5.4.2 Project Management Organization at Model Site

The actual project components of the watershed management plan will be mainly conducted by the community organization in consultation with the coordinating committee, especially NGOs and LGU who will work as a community organizer. Of course, the overall supervision of the project is carried out by DENR Region IV. The proposed organizational chart of the community organization is presented in Figure H.5.2.

#### 5.5 Tentative Implementation Program

Prior to community organizing, preparatory activities are pre-qualification of NGOs, bidding and awarding of contracts, etc., will be done. Community organizing will be done during first two (2) years. Implementation of the major watershed management activities including nursery operation, plantation establishment, and management and maintenance, are programmed for a period of six (6) years. The construction of rural infrastructure facilities are scheduled for completion within the first two years. The tentative implementation schedule is presented in Figure H.5.3.

#### 5.6 Cost Estimate for the Plan

##### (1) Total project cost

The total cost for the watershed management project for six year operation is estimated at about 76.1 million pesos as shown in Tables H.5.3 to H.5.7, and summarized as follows :

Components	Cost (p. 1000)
1. Protection works	17,420
2. Reforestation works	19,990
3. River bank protection works	3,620
4. Soil conservation and fire break works	3,790
5. Rural infrastructure development	16,860
6. Preparation works (Land use survey, social investigation)	1,220
7. Project management cost (including community organizing cost)	6,290
8. Physical contingency	6,920
<b>Total</b>	<b>76,110</b>

## (2) Cost recovery

As for the cost recovery of the watershed management project, most of the cost shall be beard by the government subsidiary. However, the beneficiaries shall also cover the part of this. The said beneficiaries include the direct and indirect benefited people. The direct beneficiaries is members of community organized in the model site. The indirect beneficiaries, on the other hand, are people in the lower reaches of the watershed, composed of i) farmers in the CIS along the Suague river, ii) the farmers in Suague RIS, and iii) the ones in Jalaur RIS. In this case, the charge to recover the partial cost is assumed to be collected from indirectly beneficiaries as a part of the Irrigation Service Fee.

While, the charge for the direct benefited people is mainly compensated by labor, although the most of works will be contracted with the community organization.

## 5.7 Expectable Benefits from Watershed Management Project

The following direct and indirect benefits can be expected by implementation of the project.

### (1) Forestry production

A significant benefit to the community as well as the villagers will be born from plantation field, especially from agro-forestry field, at the mature stage of fruit trees. Total benefit at the final (mature) stage is estimated at about 19.4 million pesos, and the estimated benefits from each plantation field are shown in Table H.5.8 and summarized as follows :

	(Unit : thousand pesos)				
	Reforestation	Agro-forestry	Hedgerows	Firebreak	River bank protect.
Benefit (at mature stage)	0	12,628	598	50	6,075

The harvesting can start from 2 years to 10 years after the plantation, varying on tree species. Since the reforestation area will be maintained as the forest protection area, the benefit from the area is not counted in the estimation.

### (2) Increasing Household Income

Through the community organizing activities, the farming technology will be improved and farming support system will also established in the community. It will benefit to increase farm production. By improvement of marketing condition, the farm income will drastically increase in future. Besides of agricultural product, the additional generation of employment opportunity during the project implementation will also contribute to increase and to stabilize the household economy.

(3) Employment Generation

The project is expected to create an additional employment opportunity during the project implementation. After implementation, there will also be a substantial number of employment opportunities to be created from agro-forestry plantation fields such as pruning, weeding, harvesting, and post-harvest activities (drying, shelling, and making jam, etc.).

(4) Reduction of Suspended Load

By increase of forest cover and application of soil conservation measures on the farm land, the occurrence of erosion will be reduced year by year. The suspended load into the Suague river, therefore, will be reduced simultaneously. It will significantly contribute to maintain sustainability of Suague RIS.

Expansion of forest area is also expected to increase a water holding capacity of the watershed area. The base flow of Suague river will also increase and it will be resulted in the stabilization of river flow throughout a year.

## **6. RECOMMENDATIONS**

In order to contribute the sustainability of the proposed rehabilitation and improvement projects on the existing RISs (Suague and Jalaur Proper RISs), the watershed management plan on the Suague sub-watershed was formulated as a model project in the watershed area. The plan will consists of the following components.

- (a) Social investigation by using a participatory approach such as PRA
- (b) Community organizing by the community organizers (LGU and NGO)
- (c) Rural infrastructure development in the relevant barangays
- (d) Establishment of income generation project
- (e) Reforestation
- (f) Establishment of agro-forestry farm
- (g) Dissemination of sustainable upland farming
- (h) Application of river bank protection

If the watershed management plan on the Suague sub-watershed area will be implemented simultaneous with the implementation of the Jalaur watershed sub-project proposed as a project in the Forestry Sector Project (FSP), the expected positive impact will be enormous by the multiplication effects. In addition, the implementation of the watershed management plan on the Suague sub-watershed area is also proposed to be done as a project of FSP because of the similarity with the one of Jalaur watershed sub-project.