International Centre for development oriented
Research in Agriculture

and

Antique Integrated Area Development (ANIAD)
Foundation Inc.

AN ANALYSIS OF RICE-BASED FARMING SYSTEMS IN VALDERRAMA

Antique, The Philippines

==========

Working Document Series 23
Philippines - 1992

==========

Note:

This document was prepared by members of an ICRA field team as part of the ICRA course. The objectives, methods and recommendations of the report should be seen in that context, and do not necessarily represent the views of the ICRA staff or the collaborating institution. Copies of this report are available from ICRA on request.

AN ANALYSIS OF RICE-BASED FARMING SYSTEMS IN VALDERRAMA

Antique, The Philippines

Roberto ARAÑO	The Philippines
Stéphane DONDEYNE	Belgium
Kwabena OPOKU-AMEYAW	Ghana
Olivier PUGINIER	France/Germany
Narayan SHRESTHA	Nepal
Cecilia SUMANDE	The Philippines
Foday TURAY	Sierra Leone

July 1992

International Centre for development oriented Research in Agriculture (ICRA)
P.O. Box 88, 6700 AB Wageningen, The Netherlands

"Sa pira ka adlaw maubos ang lupa kag tubig kag wara't lupa nga mabilin kag ang mga tawo sa Valderrama maagto sa America kag ang mga taga America maagto sa Valderrama"

Anthony R. Tamba, 8 years

(One day the water will eat all the soil and nothing will be left, and the people of Valderrama will come to America, and the Americans will come to Valderrama)

ACKNOWLEDGEMENT

We wish to express our sincere thanks to the farmers of the municipality of Valderrama, and barrio Dugman, municipality of Bugasong, who always were very friendly and demonstrated to have a lot of patience in giving us information and proved their great sense of hospitality.

We are especially grateful to all barangay captains for their strong support and warm hospitality during our visit.

The Governor of the province of Antique is greatly appreciated for his visit during the workshop, and for all his support.

We also extend our gratitude to the officers and staff of DA, DENR, DAR, ACA, ATI, NFA, NIA, AFFCUI and Land Bank and other institutions involved for valuable comments and suggestions during our workshop and discussions.

We are also thankful to the staff of the Bureau of Soils laboratory for their support services in analyzing our soil samples and all officials whom we consulted in collecting information in Iloilo.

The staff at the municipal office of Valderrama are also greatly appreciated.

We would like to thank the PMO staff of ANIAD, our host institution, for providing all necessary logistics and friendly support during our study period.

We are very much thankful to the families of Edwina and Oscar Obsina for their kind hospitality during our three months stay in Valderrama, as well as Lydia Barco and Celina Bohol who made our lives very comfortable and enjoyable.

Last but not least, we would also like to thank our interpreters Jenebeth and Joey Alotencio and Doreen Lagao, as well as our driver Sohrab Vitudio for their continuous assistance without whom this study would not have been completed.

EXECUTIVE SUMMARY

1 Objectives

This farming systems study in the municipality of Valderrama in the Philippines has as main objectives the analysis of the bio-physical environment,existing research, extension and farmer linkages, farmers'perceptions of their problems, access to and use of credit, land and other resources, crop and livestock production activities, and to provide appropriate and specific research, development and policy recommendations.

2 Methodology

The field study was conducted using a variety of Rapid Rural Appraisal (RRA) techniques and was divided into three parts: a familiarization phase, an informal survey and a main survey.

The selection of Valderrama as the study area was done in advance by the host organization ANIAD. After an initial "window survey" to gain a first impression, the ICRA team proceeded to visit a number of barangay for reconnaissance. Selection criteria included areas with uplands and/or lowlands, the presence of the ANIAD network, physical accessibility and "peace and order". A total of six barangay were visited, namely Boroc-Boroc, Buluangan II, Binanugan, Lublub, Manlacbu and Tigmamale.

In order to gain a quick insight into farming practices, an informal survey was conducted in only one barangay, namely Lublub, which was mainly selected for its representativeness of the various land forms and remoteness. A household list was prepared with the help of key informants, including land types farmed on, but had to be modified when indications did not correspond to reality. The sampling frame focused on diversity for a qualitative survey. Interviews were conducted with help of interpreters and evolved in two stages from a checklist to a questionnaire. A land use survey started in this phase and was later expanded to include soil analyses. The results of the informal survey were presented at a workshop with barangay captains, GOs and NGOs represented.

Following a review of the workshop, the main survey of two weeks duration was conducted. Questionnaires were designed to cover land tenure, fertilizer use and alternative crops to rice. For livestock, the survey continued on the principle of heterogeneity and representative numbers of respondents. The selection of farmers was systematic from household lists. The outcome of the field study was submitted to ANIAD in the form of a report.

3 Problem perception

In order to better understand problems and constraints in agriculture, a Causal Tree Analysis (CTA) was conducted at the workshop by the three groups of participants; barangay captains, as well as representatives of GOs and NGOs. In addition, the ICRA team performed the same exercise as an evaluation of the workshop. The analysis consisted of problem ranking and the construction of a causal tree based on the most important one. Each group presented its diagram for discussion. All analyses focus on the complex issue of insufficient food production and malnutrition, listing causes of physical, agricultural, technical and infrastructural nature. A lively discussion highlighted the different perceptions, particularly those of institutions as providers of different inputs and farmers at the receiving end. The CTA was an important contribution to the field study.

4 Agricultural land-use

A map of the landform types and land use according to the local land classification systems of the barangay of Lublub, which is one of the more remote barangay was prepared. It indicates the importance of the flat (datag) land and of the terraced land at the foot of the hills (datag hagdan hagdan). Farmers commonly make terraces on land as steep as slopes of 40%. This land is mainly used for rice production, the major crop in the area.

Part of Lublub's best agricultural land as well as part of the village itself is threatened by river bank erosion which force farmers to rely more on unterraced and steep land (banglid and bantod land). Farmers succeed to reclaim part of the land destroyed by the river, by creating bunds of stone wall in the river bed and so entrapping silt and sediments (labangan land). Due to its upland character only a very limited part of the land is irrigated (datag tubig land).

The most common soils on the sloping areas are tentatively classified as Dystric Cambisols (Alimodian sandy clays), and some Chromic Cambisols, and Dystric Gleysols, & Dystric Fluvisols.

Most of the soils were slightly acidic with pH values ranging between 6.0 and 6.7. Medium values were obtained with regard to the organic matter content and nitrogen and relative high values were obtained for potassium. However, the values for phosphorus were rather low and some soils seems to suffer some deficiencies.

Apart from the already mentioned river bank erosion rill erosion was commonly observed on unterraced sloping farms. Farmers were observed to grow rice under extreme circumstances: on slopes as steep as 40% and some times on virtually bare rocks. On the other hand problems of gully erosion were observed which seems to emanate from problems of low soil fertility, especially low

phosphorus levels.

5 Crop production activities

Crop production activities involve both annual and perennial crops. The most preferred annual crop is rice which receives most of the production resources although crops like groundnuts, mungbean and maize are also grown.

Farmers used a host of rice varieties most of which were of improved origin, the most common of which were IR36 and IR66. Farmers used as seed materials from their own harvest or exchanged with other farmers.

The most commonly used establishment method of rice was wet broadcasting although some farmers practised dry broadcasting, transplanting and dibbling. The seed rate used for 1 ha of land varied between 25 and 270 kg.

Farmers are aware of the effect of fertilizers on the growth and yield of rice and generally applied the nitrogenous types. The dosage used varied greatly with about 20 parcels receiving more than 120 kg/ha N. This might be a reflection of ability to buy and lack of knowledge on how much to use.

Most farmers applied pesticides to control insect pests and diseases in rice fields. Herbicides were combined with hand weeding to control weeds.

Rice yields ranged from 0.3 to 7.0 t/ha. The mean values were generally lower than those reported under optimum conditions. Yield was not affected by season but rather by land type. Irrigated parcels produced higher mean yield than the unirrigated ones. Rice yield seemed also to be influenced by N application.

About 59% of the respondents reported not being able to produce enough rice for their household and had to use other crops as supplement, buy or borrow rice. About 53% of those who could not produce enough rice depended on off-farm activities to buy rice.

The yields of groundnut, mungbean and maize were generally lower than what have been reported elsewhere in the province probably because of the low management attention given to them and drought. More than 50% of the yields were lower than the mean yields recorded.

Farmers preference for any crop apart from rice depended on a variety of factors. Groundnut was preferred because of its market value and mungbean because of its so called ease of cultivation.

With the exception of coconut and banana, very few farmers grow perennial crops probably because of the long maturity period of

these crops which makes the allocation of the already scarce land to the production of these crops unattractive.

6 Livestock production activities

Livestock is an integral part of the farming systems in the study area, providing draught power, food, cash and employment opportunity for the household economy. They are mainly raised on the backyard scale and herd size are very small. The common species owned by farmers were chicken (89%), carabao (47%), pig (52%) and cattle (42%). Animals are either owned or kept under pasagod/pahonol system.

Almost all the species except pigs are native breeds. An analysis of reproductive performances of native and hybrid pigs indicated that farrowing intervals are long being 10.3 and 9.1 months respectively. This maybe attributed to inadequate nutrition and inappropriate breeding practices.

The large ruminants are mainly fed with roughages which includes Imperata cylindrica, Leucaena leucocephala, Gliricidia sepium, Saccharum spontaneum, rice straw, peanut leaves and other local grasses. Farmers mentioned the period between March and April are the most lean period for fodder. 82% of the respondents reported fodder as problem.

The feeds for pigs is mainly rice bran with an additional supplement of other locally available feeds such as Ipomea aquatica, Manihot utilissima, Xanthosoma sp., Ipomea batatas, and kitchen waste. Although, 94% of the farmers are buying rice bran they reported to have no problem in maintaining hybrid pigs.

Animal health problems reported in the study area included Haemorrhagic septicaemia, in large ruminants, newcastle disease which caused 71% mortality during the last three year period in poultry and scouring in pigs are the major important diseases prevalent in the areas.

7 Socio-economic setting

In the household of modal size of 5, decisions are shared between husband and wife or are taken by the person in-charge of the specific task. Farm tasks are interchangeable between males and females, but certain operations are apparently gender specific.

Farm production, apart from post-harvest operations, is mostly dependent on manual/animal labour, although, machines are gradually being introduced into the system. However in the remote hilly and upland areas, hand labour is used for all activities. The use of the power tiller in the place of hand labour/draught animal represents a loss in income by the group of households who

depend on selling their services for wages.

Most farmers are not aware of the existence of the agrarian reform council in their barangay, an indication of the lack of consciousness of their rights under the Comprehensive Agrarian Reform Programme (CARP). Tax declaration is the common agricultural land title acceptable at the barangay level but not officially recognized. Consequently, farmers cannot use such land as collateral security to avail themselves of bank loans. Under CARP 15 beneficiaries have received their ownership awards. However, the acreage under voluntary offer for sale, for which potential beneficiaries have already been identified, has not yet been transferred because of the lack of fund to pay the owner of the land.

Four modes of accessing agricultural land are found: share tenancy, ownership, leaseholding and mortgaging. Share tenancy is overwhelming, while leasing is least practised. Most share tenants have blood relationship with their landlords, and some therefore prefer to maintain their present status in order to avoid conflict. The lack of awareness on the part of the tenants of their agrarian rights is also sustaining this form of tenancy, which has been in existence for a very long period. What is more, the tenant-owner linkage is strengthened in some cases by the outflow of credit and gifts from owner to tenant.

The common sharing arrangement under share tenancy is the 50:50 of both inputs and harvest. When inputs like chemicals are provided by the owner, they are taken as credit to the tenant. In terms of net income of tenants, the 70:30 system, though not common, seem to have advantages for the tenant. Moreover, the influence of the owner on production decisions is relatively less in the 70:30 than the 50:50 system.It is more or less the same in the choice of the first crop, given that the owner's share in most case based on rice.

Very few farmers have benefitted from bank loans, due mainly to the bank conditions to be fulfilled and the lack of information by the farmer on how to access this type of credit. The loan repayment capacity of some farmers is seemingly low given the depressed price of palay, especially during the harvest period. Only the Valderrama Credit Cooperative Union provides both savings and credit facilities to its members. Being a multi-occupational cooperative, farming gets less than 20% of the available funds. Three other associations perform only credit functions and therefore have to depend on external sources of funds. The informal sources of credit such as relatives, friends and traders, seem then to be important forms of loans which are easily accessible to the farmers. The interest rates usually range from 50% to 167% for a definite but flexible period. These high interest rates take away the potential investment capital of the farmer, who then become over time more and more dependent on this source of credit.

Various institutions are concerned with the generation and transfer of agricultural technology. While some of the institutions tend to specialize in terms of these two functions, others perform both but in certain specific agro-ecological zones. However, farmer-to-farmer contact in technology transfer is the common practice. Visits by agricultural technicians to farmers are infrequent and those in remote areas are hardly visited. This low contact between farmers and technicians can partially be explained by the wide dispersion of farmers coupled with the relatively poor logistics of the extension system.

8 Conclusion and recommendations

The cropping sub-system consisting of both arable and perennial crops, is diverse, and this diversity is explained, in part, by the dominance of the sloping land ecology over the lowlands. Perennial crops are grown on the uplands and they serve the dual purpose of controlling erosion and of providing cash income. The production and productivity of arable crops are low. This situation is due to a combination of factors, of which include land shortage, insufficient moisture supply, soil erosion, inappropriate cultural practices and lack of proper maintenance of water control structures. There is virtually no new land available for expanding crop production and the solution to increasing production, therefore, lies in increasing productivity.

Livestock is an important aspect of the farm household economy as it provides draught power, food, cash and employment opportunities for women and children in particular. The realization of the full potential of the livestock component is hindered mainly by health and nutritional problems.

Both informal and institutional sources for the supply of farm productive resources and for the disposal of farm produce co-exist. The restrictive conditions of access to and the lack of sufficient information by farmers on the latter sources, make farmers to be highly dependent on informal institutions. These informal arrangements though they keep the system going, tend to not to work to the financial advantage of the farmer.

For the improvement of the performance of the rice-based farming systems in the study area the following recommendations are therefore made;

Research

1) Annual crops
-fertilizer use in rice and other crops; on-farm trials to determine the appropriate types and quantities of both inorganic and organic fertilizers useful for upland crops.
-improvement in cultural practices in other crops; on-farm-trials to test the technical and economic viability of herbicide use on

these crops.
-improvement of drought tolerance in upland crops; breeding or screening for drought tolerant varieties existing in the study area and to be followed by on-farm-trials to test their performance.

2) Perennial crops
-shade/spacing studies in coffee; trials on the interaction between shade and spacing in coffee with particular reference to Glyricidia sepium and banana species.

3) Pigs
-identification of the causes of long farrow intervals in breeding pigs.
-determination of the effects of internal and external parasites on the growth of fattening pigs.

4) Poultry
-test the effectiveness of a heat resistant vaccine against Newcastle disease.

Development/extension

1) Annual crops
-promotion to more farmers the use of the soil testing kit for the analysis of soil nutrients before fertilizer application.
-support to farmers' effort in the construction of irrigation facilities.

2) Perennial crops
-encouragement of coffee farmers to adopt appropriate tree coppicing techniques.

3) Livestock
-introduction of suitable pasture legumes and grasses to farmers.
-encouragement of the growing of more multi-purpose trees like Leuceana leucocephala and Glyricidia sepium on marginal lands.
-promotion of the stacking of rice straw as a reserve for dry season feeding.

4) Institution and organisation
-strengthening of existing peoples' organisations and facilitating their formation where they do not exist.
-enhancing the availability at the disposal of the farmers, of information on appropriate agricultural innovations and credit.
-encouraging bank lending to farmers through their registered associations.

Policy

1) reconsideration of the use of the 18% slope criterion as a basis for the

classification of land into crop and forest lands.

2) conversion of the customary land title in to legal state titles recognized by the state.

3) shift from reforestation projects to community-based forestry projects.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

The International Centre for development-oriented Research in Agriculture (ICRA) has as its objective the training of young agricultural scientists to enable them to widen the scope of their specialised training, in order to carry out research, that is relevant under farmers' circumstances and compatible with the overall goals of governments.

After three months of theoretical work in the Netherlands participants are sent to developing countries to carry out a field study as an inter-disciplinary team which brings them into close contact with situation within which farmers work.

The study reported here is an analysis of a rice-based farming system in the municipality of Valderrama in the Philippines by a group of seven agricultural scientists.

The objectives of the study were to:
- analyse the bio-physical environment
- assess the existing research, extension, and farmer linkages
- examine access to and use of land and credit
- crop production activities
- access livestock production potentials
- analyse farmers perceptions
- and provide particular and appropriate recommendations concerning policy, research and development in agriculture.

The organisation of the report starts with a review of background information on the province, followed by the methodological steps used, presentation and discussion of survey results under the following topics:
- analysis of farmers problems
- characteristics of the agricultural land-use
- crop and animal production activities
- and socio-economic settings.

The report ends with conclusions drawn from the results and recommendations made.

2 BACKGROUND INFORMATION ON ANTIQUE PROVINCE

The main source of data for this section is the OIDCI's Assessment Report Volume I to III, 1991, which made extensive use of information contained in the Profile of the Province of Antique, 1987.

2.1 Location and physical environment

2.1.1 Location and area

The province of Antique is one of the four provinces of Panay island located in the western Visayas of the Philippines. It is located between the 121°40' and 122°20' east longitude and between 10°20' and 12°00' north latitude. Antique is a relatively long and narrow province along the west coast of the island with an area of about 252,200 ha. It is bounded on the north and northeast by Aklan Province; on the east by Capiz Province; and on the southeast by Iloilo Province (see figure 2.1).

2.1.2 Relief and drainage

The relief of Antique is dominated by a mountain range running from north to south. The highest peak, Madja-as in Culasi, reaches up to 2,090 m asl. Between the narrow coastal plains and the foot of the mountain range is a rolling hilly terrain trenched by narrow valleys of streams originating from the mountains.

The province is adequately drained. Most of the rivers and streams discharge on the west coast. They are relatively short with steep gradients. Deltaic plains are small and very few. The largest river of Antique is the Sibalom river. The larger streams are perennial, but many tributaries run dry during the dry season. High waters and destructive floods generally occur in May, July, October and November.

2.1.3 Geology and soils

The underlying bedrock of the province consists of shale, sandstone, limestone, basalt and diorite. The high mountains of the province are made of igneous and metamorphic rocks, largely volcanic in origin. The lower hills and the rolling areas are sandstone, shale, conglomerate or limestone formations.

According to Otsuka et al. (1988) only reconnaissance soil surveys of the Philippines have been conducted by the Bureau of Soils. For Antique province a soil map was published in 1962 on a 1:150,000 scale prepared by Calimbas et al. (1962). The major mapping units are soil types and soil complex. The three most widespread units are discussed here.

The Alimodian sandy clay is the most widespread soil type, covering about 40% of the province area. It was developed from soft sedimentary rocks, like shale and sandstone. These soils can be reasonably deep, 60 to 150 cm.

The remaining land of the mountain and hilly areas (38% of the province) has been mapped as undifferentiated mountain soils, meaning that not enough data on those areas was available to make any meaningful classification.

Most soils of the valleys, presumably Fluvisols, are classified as Umingan sandy loams. They are subject to occasional flooding and are mostly devoted to the cultivation of lowland rice and sugar cane. They cover about 4% of the province.

2.1.4 Climate

The province of Antique can be divided into two agroclimatic zones; a wet northern zone with a nine to ten months growing season and a dry southern zone with a growing season of seven to eight months (FAO, 1982).

The mean annual air temperature of the province is about 27.4°C with mean minimum and maximum values of 23.9°C and 30.9°C respectively. The coldest months are January and February with April and May being the warmest.

The three principal air streams affecting the climate of the province are the northeast and southwest monsoons and the trade winds. The northeast monsoon starts its activities around October and disappears in April. This period corresponds to the dry season in the province as the amount of rain brought by this wind is comparatively little. The activities of the southwest monsoon commence around May and intensify in August, gradually disappearing in October. The southwest monsoon brings with it heavy rains and therefore determines the main rainy season.

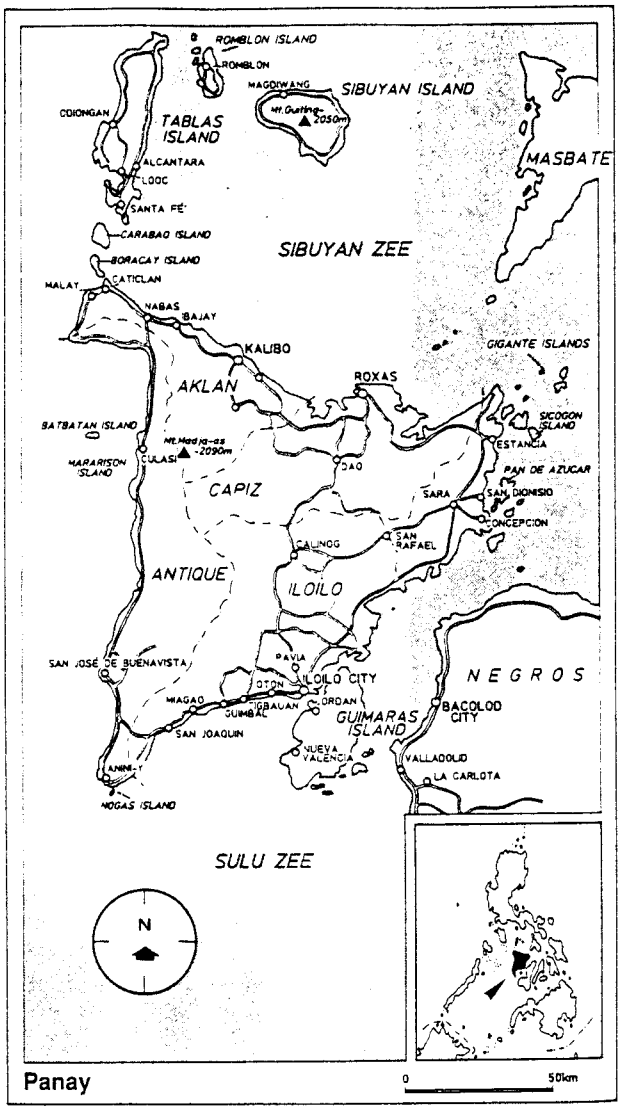

Figure 2.1 Location of Antique province, on Panay island, western Visayas in The Philippines.

The summary of the monthly rainfall values for the period 1956-1986 recorded at Valderrama, Antique, is presented in Table 2.1. The annual amount of rainfall recorded during the period showed year to year variation with values ranging from 1946 mm to 4750 mm. The months of December to April, which coincide with the dry season, exhibited the greatest variation, i.e. higher standard deviation values than the means.

The presence of typhoons influences the amount of rainfall and winds. The frequency of occurence of typhoon in the province is 7% (Otsuka et al., 1988). As can be seen from figure 2.2 this result in a very irregular rainfall pattern with rains of high intensity.

Table 2.1 Monthly rainfall data for Valderrama for the period 1956-1986 (mm)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
average	36.6	8.2	29.7	75.5	306.3	511.3	617.8	624.8	541.9	339.2	191.9	82.9
std*	58.1	14.1	40.5	95.0	196.8	206.2	313.5	172.1	230.8	216.4	171.5	132.1
max	243.3	60.9	150.3	422.1	875.2	1001.2	1286.8	1090.1	1102.0	857.9	723.8	680.6
min	0.0	0.0	0.0	0.0	0.0	90.8	3.6	344.2	13.2	0.0	0.0	0.0
median	11.4	0.0	5.1	38.6	271.5	515.7	487.9	568.8	497.2	274.0	126.7	26.0

* std = standard deviation
Source: OIDCI, 1991

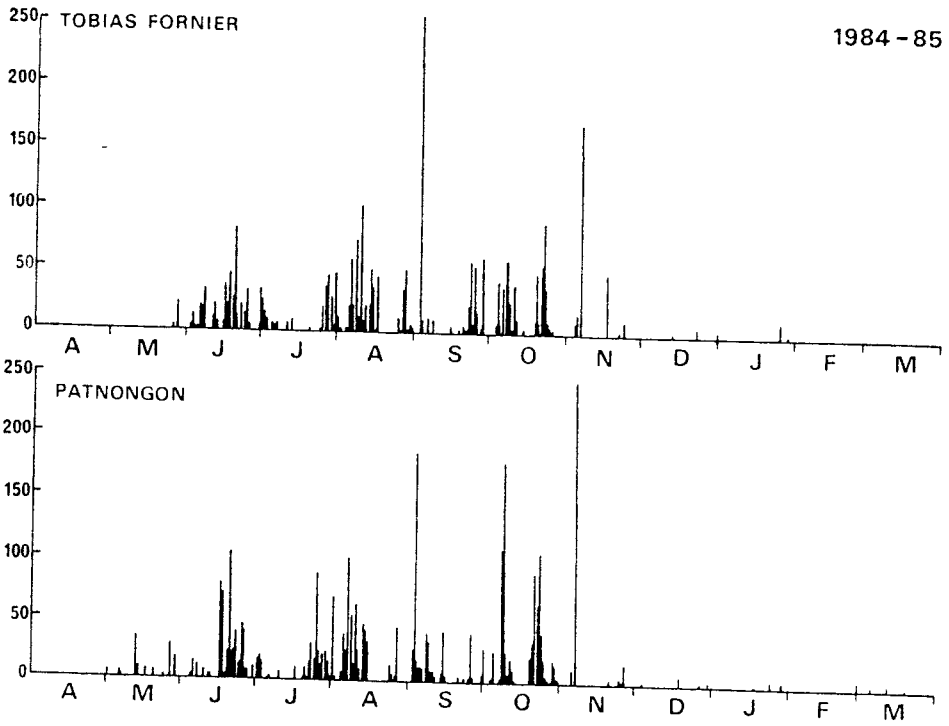

Figure 2.2 Daily rainfall (mm) during 1984-85 in Tobias fornier and Patnongon (Source: Tasic, et al. 1987)

2.2 Land utilization

2.2.1 Land classification and vegetation

Lands under 18% slopes are normally declared as alienable and disposable (A&D). About 53% of the total land area of the province are certified as A & D areas while the remaining 47% are classified as forest and public lands. Land classification by municipality indicates that the concentration of forest lands are in Valderrama, San Remigio, and Culasi representing 42% of the total land (OIDCI, 1991).

The majority of classified forest lands (70%) are already cultivated to various crops while the remaining areas are mostly brush lands (13%). Ninety-nine percent of lands classified as A & D are utilized for various agricultural uses. According to the RP-German Forest Resource Inventory in 1987 (OIDCI, 1991), the annual decline of forest land has been estimated to be 528 hectares.

2.2.2 Agricultural production activities

Crops

Crop production activities in the province are carried out on terraced, non-terraced land parcels and home gardens, involving rice, corn, mung bean peanuts, cassava, squash, pechay, radish and others. Among the annuals, the most preferred crop is rice as shown by the area planted to this crop for the 10 year period of 1981-1990 (Table 2.2).

Table 2.2 Area planted to various crops, Antique, 1981-90

Year	Area planted (ha)			
	Rice	Other food crops*	Cash crops** (plantation)	Vegetables
1981	51,730	3,975	264	252
1982	43,500	3,984	273	247
1983	36,310	3,781	279	205
1984	43,290	3,799	284	221
1985	36,290	3,814	293	249
1986	35,410	3,834	298	256
1987	35,930	3,572	300	254
1988	37,540	4,001	304	238
1989	39,280	3,522	310	228
1990	34,280	3,042	248	98

Source: Compiled from OIDCI, 1991
* data did not include maize
** data are for mango, coffee, cocoa and cashew

Rice in the province is planted both as irrigated and rainfed and the ten year trend of 1981-1990 shows an increase in the proportion irrigated (OIDCI, 1991). About 35-40% of the total rice production is from the upland farms. The other food crops are mostly grown in the upland areas. Perennial species include both agricultural crops and forest species.

The most common agricultural perennial crops are banana, coffee, mango, cocoa, coconut, jackfruit, starapple, avocado, cashew and orange. These crops, however, occupy a small portion of the available cultivable land and are on slopes (Table 2.2). The forest species include bamboo, ipil-ipil, mahogany, Gmelina, duhat, santol and others.

The cropping pattern used in the uplands include monocropping which is common on terraced and bunded lands and intercropping mostly found in the non

terraced sloping lands and homelots.

According to the OIDCI (1991) study carried out in the uplands of the province, very little use is made of fertilizers and in situations where inorganic fertilizers are used, they are applied to correct nitrogen deficiency in rice farms. As in the case of insect pests, insecticides are applied to control pests in rice fields.

The study (OIDCI 1991) on crop production in the uplands hinted that there is:

- a decline in the productivity of commercial and food crops which was tentatively attributed to declining productivity of the land.
- a shift to commercial crop production as a result of the efforts of EBJ-UDP.
- an increasing acceptance of coffee and cocoa.

Such claims, as was rightly pointed out, are inconclusive and would therefore require an in-depth investigation.

Livestock

Livestock are an integral part of the agricultural economy in most of the rural province of Antique. The 1991 livestock population in Antique has been reported to be 122,893 animal heads excluding poultry, out of which 41% were swine, 25% carabao (water buffalo, Bubalus bubalis kerebau), 23% cattle and the rest were goats. Most of these breeds are indigenous to the country. They are mostly raised under backyard scale.

The most commonly owned species of livestock in the uplands of Antique are cattle, water buffalo, chicken, swine and goats. About 68%-73% of upland households of southern Antique and about 47% of the northern households raise cattle (OIDCI, 1991). Water buffalos and goats are mainly raised in the backyard levels only (OIDCI, 1991).

Goats are generally adaptable to the uplands and dry locations. Goats farming has also been recommended as potential in the upland areas by the Sloping Agricultural Land Technology (SALT). However, OIDCI (1991) records show that goats are the least preferred species among backyard farm animals. The carabao is mainly raised as draught animal and cattle for meat production. In spite of the low economic return, cattle are mostly stall fed on hand cut leguminous fodder. Farmers are at present unwilling to grow green manure and even fodder on land reserved for food crops. However, in areas where livestock are an important part of the farming system, growing of some tree fodder such as madre de cacao (Gliricidia sepium) and ipil-ipil (Leuceana sp.) has been initiated.

Two major livestock production systems exist in the upland areas; one is farmer owned and the other is the pasagod/pahonol. Under the pasagod system female animals are raised by a farmer caretaker and the offsprings are alternately shared by the owner and caretaker.

The capital San José serves as the main trading and distribution centre. The nearby town of Sibalom is also an important market centre, especially serving the central district of Antique. The Sibalom livestock auction market can be taken as a good example of an operational trading centre. Sale of animals provides additional cash income for typical upland farming household. The

animals are sold as and when there is the need for cash. However, it has been reported that livestock contributes about 40% of sales of farm products which is more than any other enterprise (ICRA, 1982).

2.3 Socio-economic structure

2.3.1 Population profile

In 1990, the population of Antique was estimated to be 406,361 inhabitants, representing less than one percent (0.7%) of the entire population of the Philippines. The provincial population growth rate has, over the decade, been increasing irregularly. It was 1.9% per annum in 1970-1980, but decreased to 1.6% in 1980-1990. For the latter decade, the annual population growth rate of 1.6% is far below the national value of 2.4%. Between 1980 and 1990 the population decreased by 25% and 2.3% for Valderrama and Patnongon municipalities respectively. However, the average family size of 5.2 is in the same order of magnitude as the national average of 5.3. This means that the relatively low provincial population growth rate can largely be attributed to outward migration.

In 1990, the workforce (15-64 years) of Antique was 262,000 or 55% of the total population. This active population seems to increase over time, given the fall in the dependency ratio from 93% to 82% between 1975 and 1990. The gender-wise population distribution is almost even; being 50.35% males and 49.65% females. The male proportion is however more pronounced than females in the rural areas, particularly in the uplands and the converse holds in the urban centres. Moreover, out-migration tends to be more outstanding in the female population.

The Antique population is predominantly rural, as only 21.4% of the population live in the urban areas. The lowlands, occupying about 15% of the provincial land area, carries more than two-thirds of the population, and hence their high population density of 742 persons/square kilometres compared to 59 for the uplands.

2.3.2 Economic activities

In absolute terms, the labour force participation rate in the province is reported to have been increasing over time, but in relative terms it is lower than the national figure of 64.5%. Unemployment, which is urban biased, in 1990 stood at 5.5%. However, underemployment is common.

With the overwhelming rural population, primary production forms the backbone of the provincial economy. While agriculture, incorporating fishery and forestry, accounts for 63.2% of employment of Antique, it is the main source of income for only 42.8% of the total number of families. The rest of the 36.8% of employments come from non-agricultural activities, about 49% of which are found in the rural areas. 23% of the families depend on non-agricultural activities as their main source of livelihood, whereas remittances constitutes the main source of income for 34.2% of the households.

Relative to the estimated annual minimum national income of P29,000 per average family, the provincial average income of P27,276 is indicative of the presence of a high proportion of families, below the poverty line, the

majority of whom are obviously engaged in agriculture.

2.3.3 Land tenure system

In Antique like other provinces of the Philippines, there is a skewed distribution of land ownership. The presence of landless and tenant workers, just to mention two, cannot be avoided. Presently, the province has no comprehensive official information on land ownership. Only 3 of the 18 municipalities, San José, Sibalom and Hamtic, have in principle sanctioned cadastral surveys needed for the determination of land rights. However, according to estimates the tenurial system can be described as follows: owner/part-owner (60%), lease holder (4%), owner/tenant (12%), owner/leaseholder (4%), owner/mortgaged (6%), owner/share tenant (9%) and other combinations (5%).

Access to agricultural land can then take several forms:

- private ownership; which could result from either or a combination of inheritance, purchase and primary occupancy. Land transfer through inheritance, a common practice in Antique, leads to fragmentation and scattering of plots of land. Land holdings may become too small for economic exploitation. Absentee farming may then be common. Land sale can also result in the creation of a landless class.
- mortgage and lease; cash-starved families sometimes mortgage their land in order to satisfy certain needs. Such land can be cultivated by the temporary holder or by a third party. On the other hand, where the possibility exists, especially in the case of public land, leasing is practised.
- share-tenancy; a common practice mostly in the lowlands, where mainly landless farmers cultivate the land as share-croppers.
- squattering is characteristic of the landless, who usually occupy vacant non-alienable and non-disposable public land for agriculture and human settlement.

The cultivation practices of most of the uplanders are not ecologically sound, as they lead to severe soil erosion. In the long-run soil fertility is bound to decline and hence productivity.

Apart from the owner/cultivator, others like tenants and squatters, may feel insecure and therefore disinterested in improving or maintaining the productive capacity of the land. Inevitably, yields and consequently returns to the producer will be lowered.

The government policy towards the land tenure problem is to secure land ownership through the issuing of certificates of land ownership and lease hold contracts.

2.3.4 Infrastructure facilities

The depressed status of the province is also reflected in its relatively limited infrastructure. An important number of upland barangay are not serviced, especially during the peak of the rains, by health centres, schools and motor vehicles.

2.4.1 Government Organizations (GO)

The agencies with the most direct responsibility for the achievement of development goals are the government organizations, which are the following:

- The Department of Environment and Natural Resources (DENR)
- The Department of Agriculture (DA)
- The Department of Agrarian Reform (DAR)
- The Department of Trade and Industry (DTI)
- The Department of Education, Culture and Sports (DECS)
- The Department of Health (DOH)
- The National Irrigation Administration (NIA)

Their main function are to facilitate equitable access of people to natural resources, sustainable development in terms of increased productivity while enhancing environmental conservation at the same time, and people's empowerment.

The establishment of the DENR was a move towards a natural resource and environmental lead agency, while its predecessor was primarily a regulatory one. It is responsible for the management of public lands, including forest land and coastal mangroves, whereas the DAR mainly focuses on agrarian reform in rice and corn areas and limited areas of resettlement, as well as being in charge of implementing the Comprehensive Agrarian Reform Program (CARP).

2.4.2 Local Government Units (LGU)

The Local Government Unit (LGU) refers to government at provincial, municipal and barangay level, headed by elected representatives (governors, mayors and barangay captains). The province of Antique encompasses 18 municipalities and 590 barangay (village areas). LGU's are extension arms of the executive branch and can legislate ordinances and exercise power over their eminent domain to promote or regulate government undertakings. The barangay is the smallest political subdivision, followed by the municipality with supervisory powers over the barangay, and the province provides overall supervision.

2.4.3 Non-Governmental Organizations (NGO)

NGOs have been active in the Philippines in various forms since independence. In the 1980's, the establishment of NGOs has been facilitated by the government as a result of a growing willingness to rely on the private sector and the perception that NGOs can be effective in reaching the poor. The main roles NGOs have played are:

- Advocacy of the rights of the poor
- Community mobilization and organization
- Capacity building and skill development
- Participatory research and extension
- Provision of access to resources
- Provision of linkages and communication among NGOs and between NGOs and GOs

In Antique, NGO activities date back to the 1950s, with civic and religious organizations like Catholic Action. The diocese under the Dutch bishop introduced a socio-economic dimension, and American and Dutch volunteers have been involved in education and extension work. There are a total of 10 NGOs in Antique:

- Antique Development Foundation (ADF)
- Participatory Research, Organization of Communities and Education in the Struggle for Self-Reliance (PROCESS)
- Antique Federation of Cooperative Credit Unions, Inc. (AFCCUI)
- Antique Human Development Program (AHDP)
- People's Alliance for the Cause of Evelio (PEACE) Development Foundation, Inc.
- Hantique Igcabuhi Centre - Hublag Evelio (HIC-HE)
- Antique Farmers Development Assistance Program (AFDAP)
- Antique Federation of Non-Government Organizations (AFON)
- Rural Growth Centers-Integrated Development Incorporated (RGC-IDI)
- Pangkabilugan Pangkauswagan sang Antique (PPSA)

Only the first eight NGOs are of significance and seven of them are tied with ANIAD for a three-year period. On the initiative of the NGOs involved with ANIAD (ADF, AFCCUI, HIC-HE, PEACE, AHDP, PROCESS), an apex organization was created in 1989 as a link institution, the AFON. The current ANIAD-NGO network covers 150-200 barangay for mainly organization. Related to NGOs are People's Organizations (PO), which include groups of farmers, fishermen, landless workers and rural women.

2.4.4 Evelio B. Javier Upland Development Program (EBJ-UDP)

The EBJ-UDP can be seen as standing apart from the NGO, GO and LGU categories, since it is an inter-agency organization headed by a board of directors, chaired by the governor, who established it through legislation by the Provincial Board in 1976. It complements field operations of the DA in the upland areas, particularly the 8-18% slopes. It is a government foundation originally established as the Antique Upland Development Program (AUDP). Its main funding came from the Ford Foundation which allowed a rapid expansion in the late 1970's. However the Ford Foundation later pulled out which led to serious problems for the organisation. After the assassination of Governor Evelio B. Javier, the name was changed to EBJ-UDP in his honour. Under the New Local Government Code EBJ-UDP is likely to be absorbed by the Office of the Provincial Agriculturist (OPA), and most of its staff are already contracted by ANIAD. The ANIAD explicitly states that in its short-term framework and also mentions the elimination of the policy board. The transfer to the OPA has been completd and EBJ-UDP now operateds as a GO.

2.4.5 The Antique Integrated Area Development Program

The ANIAD is based on a bilateral agreement with the Philippine Government and the Government of Netherlands signed in 1990. It was established as a foundation to give it an NGO status. ANIAD has formulated a long-term plan of strategic upland development for a minimum of 10 years, and is currently in phase I (1991-1993). ANIAD has become an overall linkage and development organization involving all types of organizations in Antique. The main objective is to create an institutional environment that is fully supportive of long-term goals of the upland strategic plan for resource conservation.

ANIAD co-ordinants between the various types of institutions and has set up a board for that purpose, headed by teh Governor of Antique, as shown in the table below.

ANIAD has the 5 GOs and NGOs under contract, as well as most of the EBJ-UDP staff and has established AFON as a network institution of NGOs. High priority is given to the uplands, defined as slopes of more than 8%, which constitute 83% of Antique's land area and sustain 33% of the population.

Board of the ANIAD Foundation		
GOs	NGOs	LGUs
DA (1987)	AFON (1989)	Province
DENR (1988)	AFCCUI (1969)	Municipality
DAR (1987)	PROCESS (1982)	Barangay
DOH (1987)	PEACE (1988)	
DTI (1987)	ADF (1985)	
NIA	HE-HIC (1988)	
EBJ-UDP (1976) transfer to OPA done	AHDP (1988)	

note:

* dates in brackets refer to date registered
* before the adoption of the Constitution of 1987, Departments existed as Ministries
* the Chairman of the foundation is the Governor of Antique

3 METHODOLOGY

3.1 Reconnaissance survey

3.1.1 General RRA Techniques

When conducting a field study such as the ICRA one, without the possibility to perform experiments, the most useful approach is the use of Rapid Rural Appraisal (RRA) techniques that can quickly provide information for the specific task. This approach has been compared to that of an explorer (Rhoades, 1982) as an attempt to gain an overview of the area to be studied. RRA can generate useful and accurate information on rural conditions and has become widespread for various kinds of informal surveys for agricultural development planning.

The approach taken by the ICRA group was influenced by a meeting with ANIAD in the Netherlands and a second meeting after arrival in Antique, during which our host organization presented its ideas on areas to look into. The main literature review was done in Wageningen, where two weeks were available to prepare for the field study and to formulate a background report for a first familiarization with the work. Whenever necessary, ICRA team members also visited institutions to obtain more information on certain subjects throughout the period of the field study.

3.1.2 Familiarization with the study area

The municipality of Valderrama, within which the ICRA team worked, was selected before hand by the host institution. Valderrama comprises 22 barangay (equivalent to village areas and henceforth referred to in the local term), so that even within this area there is a considerable diversity of farming systems.

Upon arrival in Valderrama, a one-day "window survey" was conducted for a first impression of the environment by being driven around, which took the ICRA team upstream of the Cangaranan river and through some barangay. Initially more time was allocated to this activity, but due to our delayed arrival in Antique, the window survey was reduced to one afternoon. A part of the initial contact phase included visits to municipal officials to introduce the group.

3.1.3 Barangay selection

A list of selection criteria for barangay to be visited was drawn up and evaluated in the form of a matrix. Seven barangay were visited, of which six are covered by the network of organizations that are members of the ANIAD Foundation as follows:

1. Boroc-Boroc (ANIAD); upstream, east of Valderrama, mainly lowland
2. Buluangan II (ANIAD); north of Valderrama, upland
3. Binanugan ; south of Valderrama, upland
4. Lublub (ANIAD); upstream, east of Valderrama, land mixture
5. Manlacbu (ANIAD); upstream, east of Valderrama, land mixture
6. Tigmamale (ANIAD); downstream, west of Valderrama, mainly lowland
7. Takas (ANIAD); one of the two barangay of Valderrama poblacion

The ICRA team used the barangay profiles written by AFCCUI in the selection process, providing a summary of barangay which are part of the ANIAD network. Various factors influenced the selection of barangay. It was important to see areas within and outside the ANIAD network. Two purely upland areas not bordering the river and outside the ANIAD network were included to balance the sample. A constraint to a well-balanced survey was the "peace and order" situation, which limited access to areas that are considered safe by local guides and the military. This constraint led the ICRA team to focus on the river area, yet including two upland barangay within reasonable distance. The timetable is summarized in annex V.

3.2 Informal survey in barangay Lublub

The outcome of the visits to barangay and the selection process was the decision to conduct an informal survey in Lublub. This choice is a combination of a bias towards remoteness, accessibility and a mixture of upland and lowland within one. The vehicle assigned to the team limited access to areas without too difficult ground and water conditions. Lublub is not accessible by road in the rainy season and was thus covered before the rains started. Lublub additionally has farmers on upland and lowland, thus giving a mixture of farming systems. The choice of only one barangay for a first survey allowed a study in more detail. The attention was thus drawn on an area upstream of Valderrama.

3.2.1 Sampling frame

A list of the inhabitants was obtained from the secretary of Lublub, which had been compiled during the 1990 population census. The list was extended to include a classification of land types by household with the help of the secretary and two other key informants. Parallel to that a list of land types in the local language Kinaray-a was formulated by asking farmers what various plots are called. During this exercise it became clear that the terms written initially by the ICRA team in English were not appropriate, as they used criteria for distinction that differed from the ones used locally. It was agreed to use local expressions instead and to define them according to local perception (see section on land forms). The result was a distinction of four land types.

Out of the sampling frame of 207 households, a sample size of 30 was defined on the basis of heterogeneity and diversity of the farming systems, as well as a spread over barrio and sitio. This approach can be compared to that of a purposive sample or échantillons raisonnés, with households from all land types and locations. The sample unit was the household, which is the easiest single unit for such a survey. The sample size of 30 was only a guideline, while a focus on diversity was more important with the inclusion of farmers from all types of farming situations. An important observation was the correlation between what the key informants classified under the different land types and landless, and what respondents actually said they farmed on when interviewed. There was very little correspondence between the two, which made the interview process more difficult for a balanced sample. The main survey was therefore undertaken without a classification of land types by key

informants. By interviewing 28 farmers in total, enough diversity was obtained for this qualitative survey, and the interviews stopped at that sample size.

3.2.2 Interpreters

It was difficult to find interpreters and only one was available during this stage of the field study. This meant that the tutor and the counterpart had to act as interpreters, thus imposing a constraint on these two team members, since most of their work was translation. Nevertheless, the interviews could be conducted, but at this stage it was realized that a future survey on a larger scale would require additional interpreters.

3.2.3 Interviews

The interviews proceeded in various stages, with a one-page checklist as a start for the first series of interviews, followed by questionnaires for semi-structured interviews. The checklist included points on land tenure, household profile, farming and source of inputs, as well as institutional linkages. A total of ten households were surveyed in this manner over a period of one week.

In order to obtain more detailed and comparable information, the checklist was converted into a questionnaire in semi-structured interview form. The ICRA team realized that it was a mistake not to pre-test the questionnaire, which resulted in modifications as interviews proceeded, thus evolving in three stages. The third version was pre-tested in Valderrama.

3.2.4 Land use survey

Parallel to interviews, a land use map and a transect were produced as further RRA tools. During the first phase of the field study in the barangay of Lublub a map of the landform types and land use was prepared according to the local landform classification. An enlargement of the topographical map to a scale 1:12,500 was used as a base. By walking in the area, it was possible to identify the location of the various land units and to draw these on an overlay of the topographical map.

In a second phase of the study a survey was carried out to get a better insight in the agricultural land management in a wider area of the municipality, with regard to various land and soil characteristics (slope, soil depth, soil texture, parent material,...). Slopes were measured using a clinometer, soil depth was evaluated using a soil auger and a measuring tape, soil texture and other soil characteristics were estimated in the field. An appraisal of the cropping practices and the evidence of the occurrence of erosion were also recorded. To enable efficient recording of the data a checklist was prepared (see annex III). As much as possible, interaction with farmers was sought to have their opinion on the condition of the soils and their management practices. This revealed to be a very interesting exercise, and a lot of information was obtained during these informal interviews.

The study was carried out at the beginning of the rainy season, just before the on-set of the heavy rains. It coincided with the period the period when most farmers were doing their land preparation and planting; on the other side the recorded observations on erosion are only of relative meaning.

From 12 selected plots, soil samples of the upper 30 cm were taken for soil analysis to get an idea of the soil nutrient status. Eleven samples were taken from fields, while one soil sample was taken from a forested area for comparison with the agricultural land. Each sample was made up of three sub-samples from the 0-30 cm upper layer taken randomly.

The samples were air-dried before being analyzed at the laboratory of the Department of Agriculture in Iloilo, The Philippines, for pH, organic matter content, available phosphorus and potassium. Relative values of the nitrogen status were obtained using a rapid soil test kit of the Department of Agriculture.

The organic matter content was estimated by perchloric digestion, phosphorus content was determined according to the modified Olsen method. Potassium content was determined by flame photometry with sulphuric acid extract of the soil. Soil pH was measured using a calomel electrode with a 1/1 soil/water suspension.

3.2.5 Workshop

The results of the informal survey were presented at a first workshop in collaboration with ANIAD, to which the relevant NGOs and GOs were invited. The workshop served mainly to validate the overall picture obtained by the ICRA team and to conduct a Causal Tree Analysis (CTA) with the participants to identify problems and discuss possibilities to tackle them. This exercise was important for the design of the main survey.

3.3 Main survey

The week following the workshop was used to gather more information from government offices and to visit the Sloping Agriculture Land Technology (SALT) project in Magdungao in Iloilo province to see an alternative to terrace farming for soil and water conservation. The main survey, scheduled for the first half of June, was of a more quantitative nature to provide information for concrete development interventions.

3.3.1 Formal questionnaire

A planning meeting served to elaborate the main areas to survey as follows:
1. Land tenure
2. Effect of fertilizers
3. Alternative crop to rice
4. Soil samples and erosion
5. Pig breeding
6. Diseases in livestock
7. Feeds and forage

The above were compiled into a questionnaire covering four areas and a soil investigation:
1. Land tenure; 5 barangay with 10 samples each (actual total 79)
2. Fertilizer use; 4 barangay with 20 samples each (actual total 78)
3. Alternative to rice; 4 barangay with 20 samples each (actual total 78)
4. Livestock; 7 barangay without sample size specification (actual total 53)
5. Soils; sampling and description in 5 barangay (actual total 12)
There was overlapping of respondents in the first three topics investigated.

3.3.2 Survey area

Interviews during the main survey were limited to one hour as well, and took place in the following barangay:
1. Land tenure; Takas, Buluangan II, Tigmamale, Binanugan, Manlacbu
2. Fertilizer; Takas, Buluangan II, Binanugan, Tigmamale
3. Alternative to rice; Buluangan II, Takas, Binanugan, Tigmamale
4. Livestock; Takas, Buluangan II, Tigmamale, Pandanan, Manlacbu, Binanugan, Lublub
5. Soils; Buluangan II, Tigmamale, Binanugan, Manlacbu, Bugnay
There was a similar emphasis on a sample covering a wide range of farming systems in various locations.

The methodology for the selection of farmers was similar to the procedure of the informal survey, using a list of households prepared by the barangay captain. This time the selection was purely systematic. When farmers were not available, the opposite or nearest household was chosen. The procedure for the livestock survey differed. Farmers holding breeding pigs, poultry, carabao and cattle were listed with the help of key informants and interviewed as per number required, covering sitio and barrio as far as possible.

After an analysis of the data collected in the main survey, the results of the whole study were written up and submitted to ANIAD for discussion. The final report was handed to ANIAD for distribution to relevant institutions.

4 PROBLEM PERCEPTION

4.1 Causal Tree Analysis

Discussion of perceived problems and their relative importance formed part of the first workshop and provided valuable feedback on the progress of the field work as well as a method to direct the main survey to focus on the most crucial ones. The exercise was presented in the form of a Causal Tree Analysis (CTA) for each of the groups of participants of the workshop. There were four diagrams in total by the following groups:

i. Barangay Captains (farmer representatives)
ii. Representatives of Government Organizations (GO) in Antique
iii. Representatives of Non-Governmental Organizations (NGO)
iv. The ICRA team

4.2 Barangay Captains

The barangay captains or farmer representatives came from the six barangay visited by ICRA during the familiarization tour (Lublub, Manlacbu, Boroc-Boroc, Tigmamale, Binanugan and Buluangan II). Their analysis is centred on malnutrition as a direct consequence of low productivity, mainly referring to rice in the rice-based agriculture (figure 4.1) The causal tree branches into three lines. The first line from the left consists of an interaction of irrigation and erosion. The middle line focuses on inappropriate farming practices due to a lack of infrastructure and technical advice. The third line leads to inadequate land as a result of overpopulation. All the lines meet at the level of low productivity.

The first line (figure 4.1) has as its bottom cause burning of forest causing soil erosion, which implies a criticism of the traditional kaingin system of slash and burn agriculture. On the other hand it could also be due to indiscriminate burning not related to farming. In the study area this practice was found to be very rare, as most accessible land was already under cultivation. The inclusion of this issue in the diagram indicates that farmers are aware of the problems. At the level of a lack of irrigation system another branch is linked, that of a lack of credit to install water pumps. Irrigation infrastructures seem to be the most important constraint to irrigation, particularly as farmers move to steeper areas over time. It is further interesting to note the cross-link between inappropriate farming practices and soil erosion, thus also indicating that soil erosion is perceived as a complex issue. A lack of infrastructure (roads and transport) and technical support are the underlying causes of inappropriate farming practices, thus calling for institutional interventions. The third line, with overpopulation as its root cause, leads to insufficient datag land, the flat or terraced land type most valued for the rice-based production system.

4.3 Government Organizations

The group of representatives from government organizations (GO) ranked low productivity as the main problem (figure 4.2) and made a distinction between upland and lowland. The diagram for upland branches into four lines, with "peace and order" (referring to rebel activities causing insecurity) as the root cause of the first line from the left. "Peace and order" is a cause for

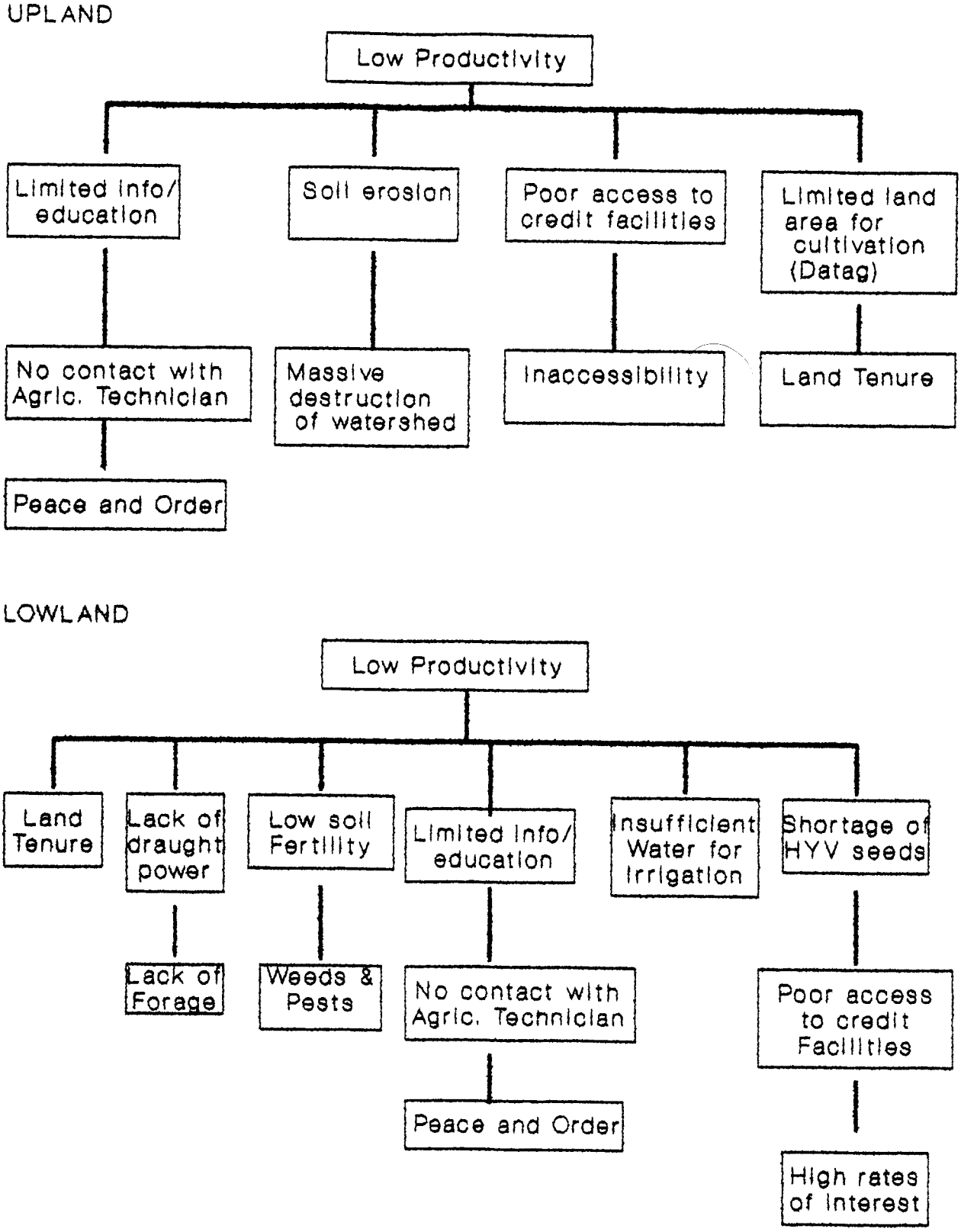

Figure 4.2 Causal tree diagram for upland and lowland areas prepared by representatives of Government Organizations (GOs)

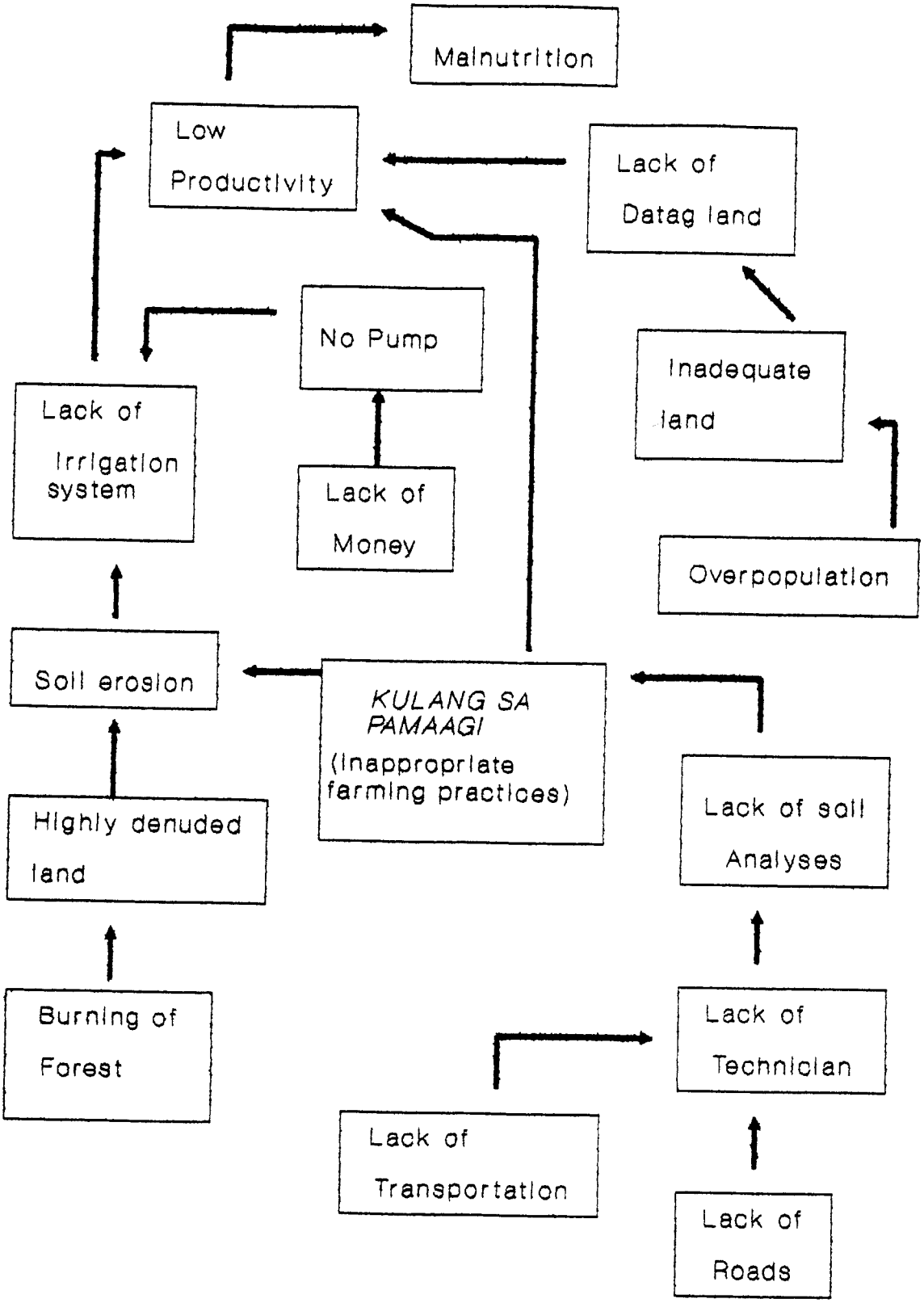

Figure 4.1 Problem-cause analysis diagram as perceived by Barangay Captains

the lack of technical advice and education for farmers. It is striking that the barangay captains did not include peace and order when referring to the lack of technical advice in figure 4.1, even though as local farmers they are directly affected by the situation. This can imply that as locals they are either not directly affected as compared to technicians coming from outside, or that they have become so used to the situation for it not to be perceived as a problem.

GOs are also aware of the problem of erosion in the second line (figure 4.2), with the destruction of the Cangaranan watershed as its underlying cause. The third line with inaccessibility as the root cause is a problem of infrastructure, having physical limitations of remoteness as well as institutional ones by poor access to credit facilities. Credit facilities are rare in number, and farmers are often restricted to private sources at unfavourable conditions. The fourth line of limited land for cultivation has land tenure as its root cause. Tenancy of land has been outlawed, yet the government's efforts to enforce land redistribution and the security of land titles has been slow, so that the traditional tenurial practices continue to exist widely without being affected. Until land titles become easily obtainable and at low cost, there will be little change in the land tenure system that has evolved over a long period.

For the lowland the tree has more branches, with land tenure mentioned again. Here a livestock component is included, leading to a lack of draught power, a problem absent in the upland. A third line lists weeds and pests as the underlying cause of low soil fertility, a simplification of a complex and debatable issue. Peace and order are perceived to cause the same line of technical advisory problems as in the upland. The aspect of irrigation is interesting. While barangay captains list lack of cash as the cause (figure 4.1), GOs mention insufficient water as the limiting factor of irrigation. The lack of cash and credit comes in the last line of figure 4.2, resulting in a shortage of HYV seeds. High rates of interest can mean the high rates for loans charged by institutions, as well as the usually even higher rates used by private sources of credit. Here again it is interesting that barangay captains do not mention high yielding variety (HYV) seeds as a problem.

The problem tree is thus composed of more factors in the lowland than in the upland, an important point to keep in mind in relation to the recent intensification of development projects for upland areas. For the municipality of Valderrama, however, which by definition consists of 95% upland, the causal tree for upland is the more relevant one for interventions. It is not surprising that GOs know more about farming in the lowland, since their presence in the upland is rather limited and have not been mentioned in any of the sitio visited.

4.4 Non-Governmental Organizations

The tree constructed by Non-Governmental Organizations (NGO) representatives focuses on insufficient rice production (figure 4.3). While the two previous diagrams are more or less linear, the NGOs have included a lot of cross links and interrelations. The lack of datag land ranks second in a first line out of six.

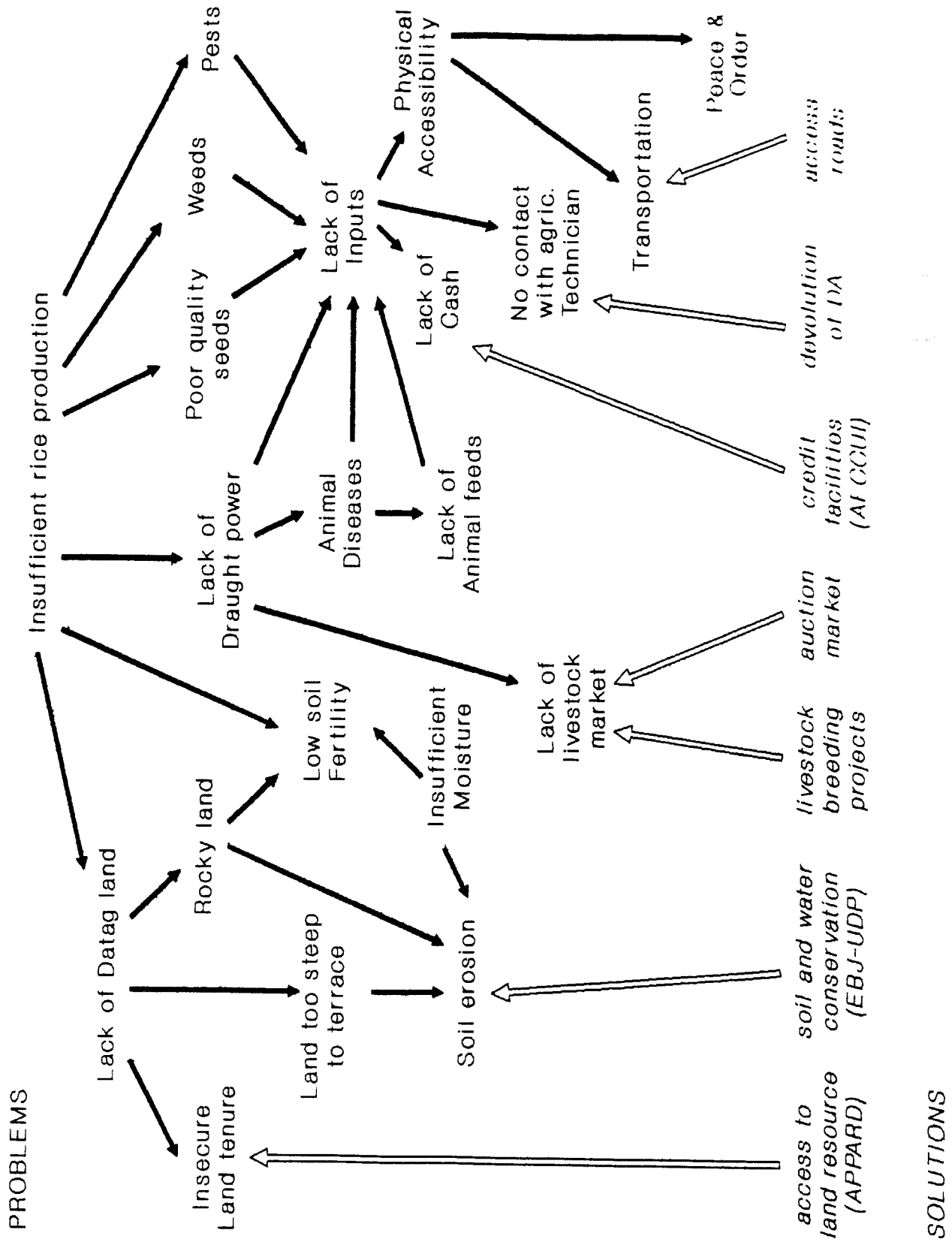

Figure 4.3 Causal tree analysis of problems and solutions as perceived by participants from Non-Governmental Organizations (NGOs)

Land tenure is mentioned again as an important problem, while physical features such as rocky land and steepness limit the datag land, rather than overpopulation as mentioned by barangay captains (figure 4.1).

The livestock component forms a third line, featuring problems of feeds and diseases for a lack of draught power, with links to lack of inputs in the input line. A lot of problems are linked to a lack of inputs, which is important for a development-oriented network of NGOs. It is further interesting to note that inappropriate farming practices were not mentioned, an issue mentioned by barangay captains. Infrastructural problems of physical and technical nature are prominent as well, so is the "peace and order" situation.

The NGO group, dominated by ANIAD staff, went further to also formulate solutions for the various problem lines, while mentioning specific organizations for intervention. This approach is important to the ICRA team in the formulation of recommendations and elaboration for their implementation within the given infrastructure. It is also remarkable that the diagram focuses on methods to enhance rice production, without an attempt to diversify. Diversification does not feature in any analysis, an indication that it has a low priority.

4.5 ICRA Causal Tree

As part of the review of the workshop, the ICRA team also conducted a causal analysis (figure 4.4). The tree is built around the same problem as that of barangay captains - malnutrition, with insufficient rice/food production at the second level. It is therefore a synthesis of the other main problems. Insufficient datag land is also of key importance, but was not elaborated further. The tree then divides into a complex of factors underlying productivity, with a livestock component featuring in a first line around insufficient draught power. The next line refers to physical conditions of soil moisture and rocky land, yet with a whole sub-branch of soil erosion. Overpopulation is mentioned as a root cause, as it was by barangay captains in figure 4.1. Infrastructural problems of physical and institutional nature feature as the underlying causes of inappropriate farming practices and lack of cash, resulting in shortages of various inputs. There is a direct correlation of farming practices and land titles, referring to farmers operating within their own tenurial system apart from the government policy due to low impacts at barangay level.

4.6 Conclusion and Comparison

Problems of productivity and insufficient production feature in all diagrams as very important. An increase in productivity is thus implied as a desire for the possible approaches to solutions. The barangay captains were the only ones to rank malnutrition as the most important problem at the workshop (the ICRA team only conducted its analysis afterwards), and in the discussion following the presentations of all groups surprised the representatives of organizations slightly. This issue was taken up with interest. Solutions to the problem of production are not easy to find, since most of the available land is already under cultivation. Farmers even farm on slopes as steep as 60% to make ends meet.

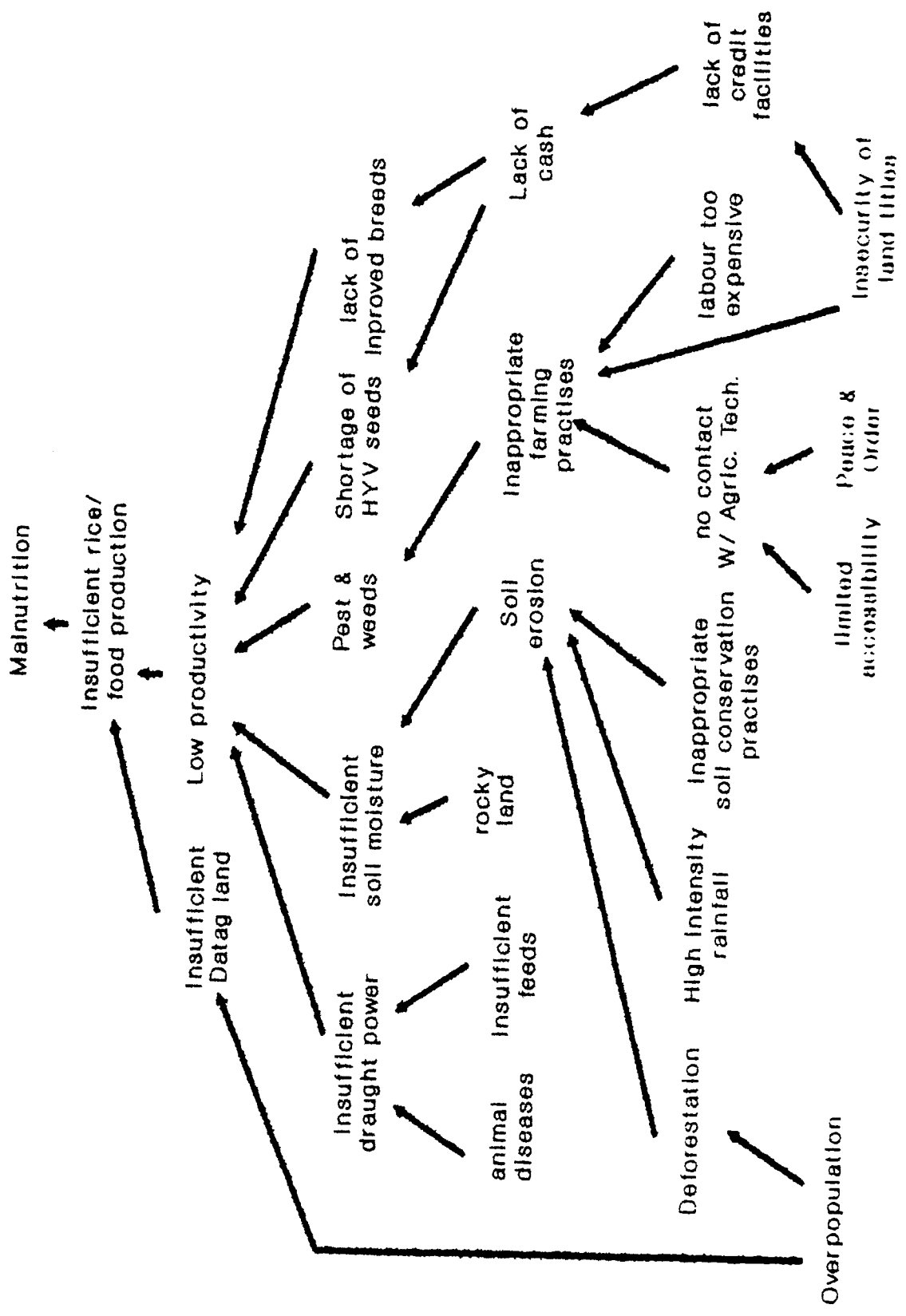

Figure 4.4 Causal tree analysis conducted by the ICRA team study area.

A direct cause of low production for all analyses was a lack of datag land, thus underlining the high value of this land type for the production of mainly rice. Land tenure and effects of obtaining or losing datag land are key factors for socio-economic structures. Barangay captains and the ICRA team relate this to population, given that most of the potential datag land has either already been in use for long or is in the process of conversion in the

Soil erosion, physical accessibility, technical advice and credit are common problems mentioned by all, while lack of draught power was mentioned by all except barangay captains. The only group not to mention peace and order as problem were also barangay captains. The ICRA team noted the common factors and problems to examine the use of fertilizer, alternatives to rice, land tenure, a livestock survey and soil samples in the main survey. The discussion that followed the presentation by the different groups focused to a large part on the provision of advice and inputs by various institutions. Barangay captains expressed that there have been many promises of agricultural inputs, credit facilities, and technical advice, but that in reality very little has actually reached the barangay. Promises were made again for interventions of different nature, and it remains to be seen whether they will be put into practice. It was important for ICRA to witness the discussion of different points of view.

5 CHARACTERISTICS OF THE AGRICULTURAL LAND-USE IN THE UPLANDS

5.1 Landform types

The barrio of Socket is located less than 10 km upstream of Valderrama in the valley bottom, along the Cangaranan river. It is surrounded by mountains reaching up to 640 m asl.

The Cangaranan river is a braided river, with shallow channels of low sinuosity. The river bed consists predominately of deposits of boulders and gravel. This river type is typical for watershed areas with highly irregular discharge and an abundance of coarse weathering material (Driessen et al. 1991).

The local landform classification encompasses the following units varying according to topographical location:

Bakolod: Top of a hill (cultivated or not)
Bakilid: Areas with very steep slopes and not cultivated; usually covered by grasses or forest.
Banglid: Areas with steep slopes, which can normally not be ploughed; they are therefore usually not planted with rice or maize but with crops like cassava, banana, pigeon peas and others or are covered with grasses and/or trees. Areas covered with a mixture of trees and grasses are often referred to as buruyan, or pasture land.
Bantod: Areas with steep slopes, which can still be ploughed; this land is therefore often used for the cultivation of rice and maize, which are either sole- or intercropped.
Datag: any flat area, and
Datag hagdan hagdan: terraced area. The parcels on these lands are bunded and are used for rice cultivation. The bunds are called kahon, and the whole parcel, including the kahon, is called kinahon.
Datag tubig, is either flat or terraced land that is irrigated.
Labangan: is a flat area within or close to the river bed, bunded with kinahon made of stones. This is done to entrap finer sediments and to reclaim arable land.
Bungyod: a small hill
Danaw: waterlogged area

As can be seen in figure 5.1 banglid, bantod and datag hagdan hagdan are usually found at the lower part of the slopes or at the foot of the mountains.

5.2 Soil properties and soil management

5.2.1 Physical soil characteristics and classification

A summary of some major physical soil characteristics is given in table 5.1 together with a tentative soil classification according to the FAO-Unesco legend of 1990 (Driessen, et al. 1991).

Most of the soil types found on the sloping areas are from Alimodian sandy clays soil series (Dystric Cambisols). These are the soils of the banglid and

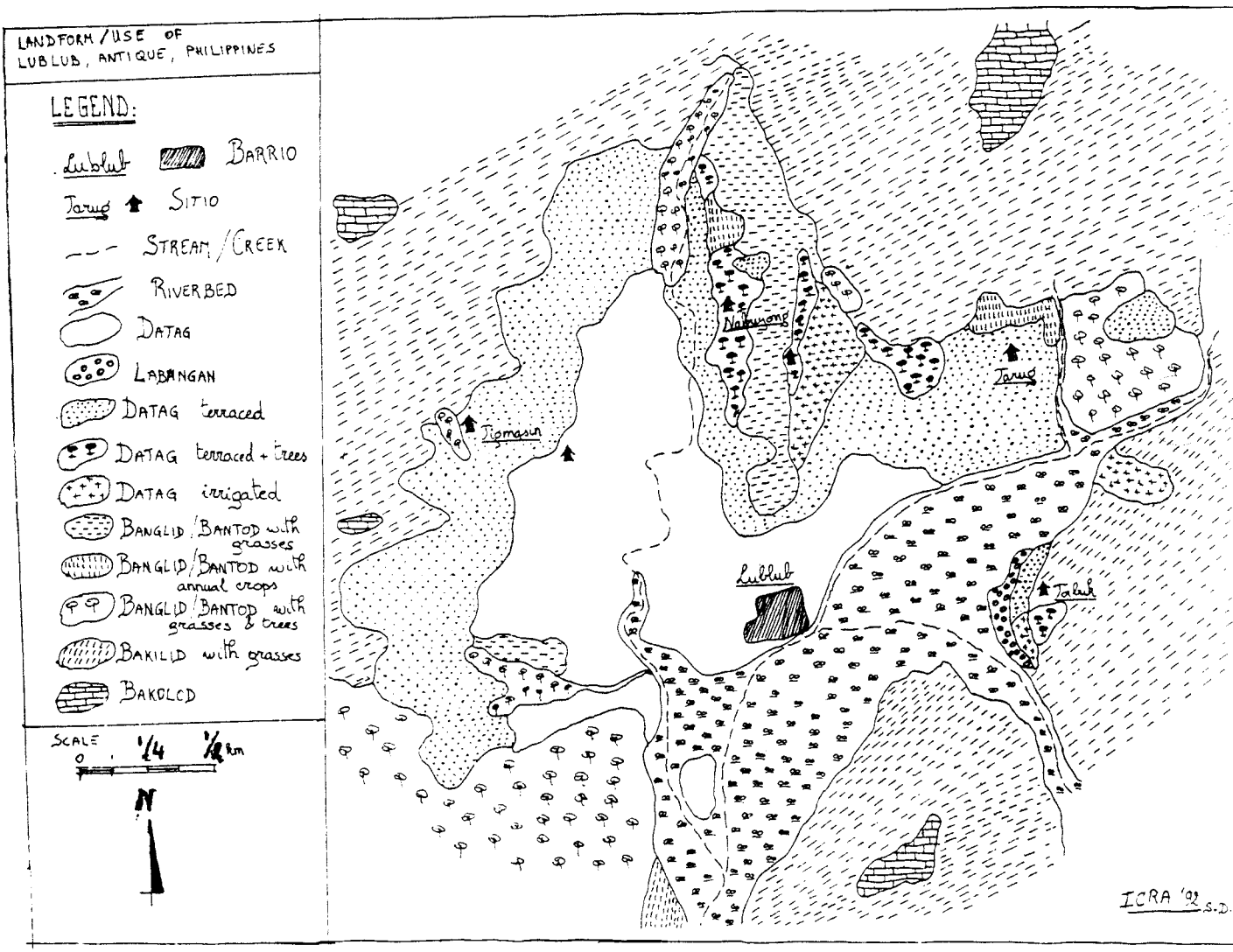

Figure 5.1 Landform and use in the area of Lublub, Antique, Philippines

bantod land and to some extent the higher located datag hagdan hagdan land. Some of these soils had a pronounced reddish colour (hue values of 7.5YR or lower and chroma of 4 or more, see table 5.1) and might be Chromic Cambisols.

Most of the datag hagdan hagdan and the datag land is saturated with water for a good part of the year. These types of soils are classified as Dystric Gleysols.

The lower datag land and on labangan, which are closer to the rivers and thus are areas regularly subjected to flooding, showed clear stratification through their profiles as a consequence. These are classified as Dystric Fluvisols. The soil depth of areas which were not affected by erosion was generally at least 50 cm. Under forest cover even up to 72 cm on as steep slopes as 80%.

Table 5.1 Major physical soil characteristics and tentative soil classification

Obs. No	Sample No	Landform type	Parent Material	Colour	Slope (%)	depth (cm)	Soil Texture	Stone'ss (%)	Rock'ss (%)	FAO Classification (tentative)
4	-	Banglid	mudstone	-	60	50	loam/silt	5-15	<5	?
15	-	Banglid	mudstone?	10YR4/4	20	30	sandy loam	15-30	<5	Dystric Cambisol
13	-	Banglid	sandstone	10YR5/4	17	20	loam/silt	<5	<5	Dystric Cambisol
6	-	Banglid	mudstone	10YR4/6	60	50	clay loam	<5	5-15	Dystric Cambisol
19	Bn1	Banglid	?	7.5YR3/4	80	72	sandy clay	<5	<5	Dystric Cambisol
5	-	Bantod	?	10YR3/3	40	100	sandy clay	30-50	<5	Dystric Cambisol
16	-	Bantod	?	10YR6/3	45	10	sandy loam	15-30	5-15	Dystric Cambisol
7	BII2	Bantod	sandstone	10YR4/6	60	40	loam/silt	<5	<5	Dystric Cambisol
2	-	Bantod	shale?	7.5Y4/6	25	50	loam/silt	<5	<5	Chromic Cambisol
22	M1	Bantod	mudstone?	2.5Y4/4	15	50	light clay	<5	<5	Chromic Cambisol
1	-	Bantod	sandstone?	7.5Y5/2	12	50	light clay	<5	<5	Chromic Cambisol
9	-	Datag hagdan	sandstone	-	32	100	sandy loam	15-30	<5	?
3	-	Datag hagdan	sandstone	-	10	60	sandy loam	<5	<5	?
8	BII1	Datag hagdan	sandstone?	10YR4/4	30	50	sandy clay	<5	<5	Dystric Gleysol
10	BII4	Datag hagdan	sandstone	10YR2/3	27	100	loam/silt	<5	<5	Dystric Gleysol
18	BII3	Datag hagdan	sandstone	10YR2/2	8	50	clay	<5	<5	Dystric Gleysol
20	Bn2	Datag hagdan	sandstone?	7.5YR3/2	22	20	loam/silt	5-15	<5	Dystric Gleysol
21	Bn3	Datag hagdan	sandstone	7.5YR3/2	15	60	light clay	<5	<5	Dystric Gleysol
11	BII5	Datag hagdan	sandstone	7.5YR4/6	27	20	loam/silt	5-15	<5	Chromic Cambisol
17	T1	Datag tubig	mudstone	-	20	50	sandy clay	<5	<5	Dystric Gleysol
12	T2	Labangan	alluvium	10YR3/3	2	50	loamy sand	5-15	<5	Dystric Fluvisol
14	T3	Datag	alluvium	10YR3/2	3	50	loamy sand	<5	<5	Dystric Fluvisol

least 50 cm. Under forest cover even up to 72 cm on as steep slopes as 80%.

An important feature of the soils in the area, irrespectively whether the presumed parent material were shales, mudstone or sandstone, is the fact that they are rich in clay and/or silt. This enables farmers to make bunds and terraces there and to conserve water on the land for rice production. Additionally, it can be assumed that the cation exchange capacities of these soils will be reasonably high. It is only on alluvial materials that the soil was found to be really sandy.

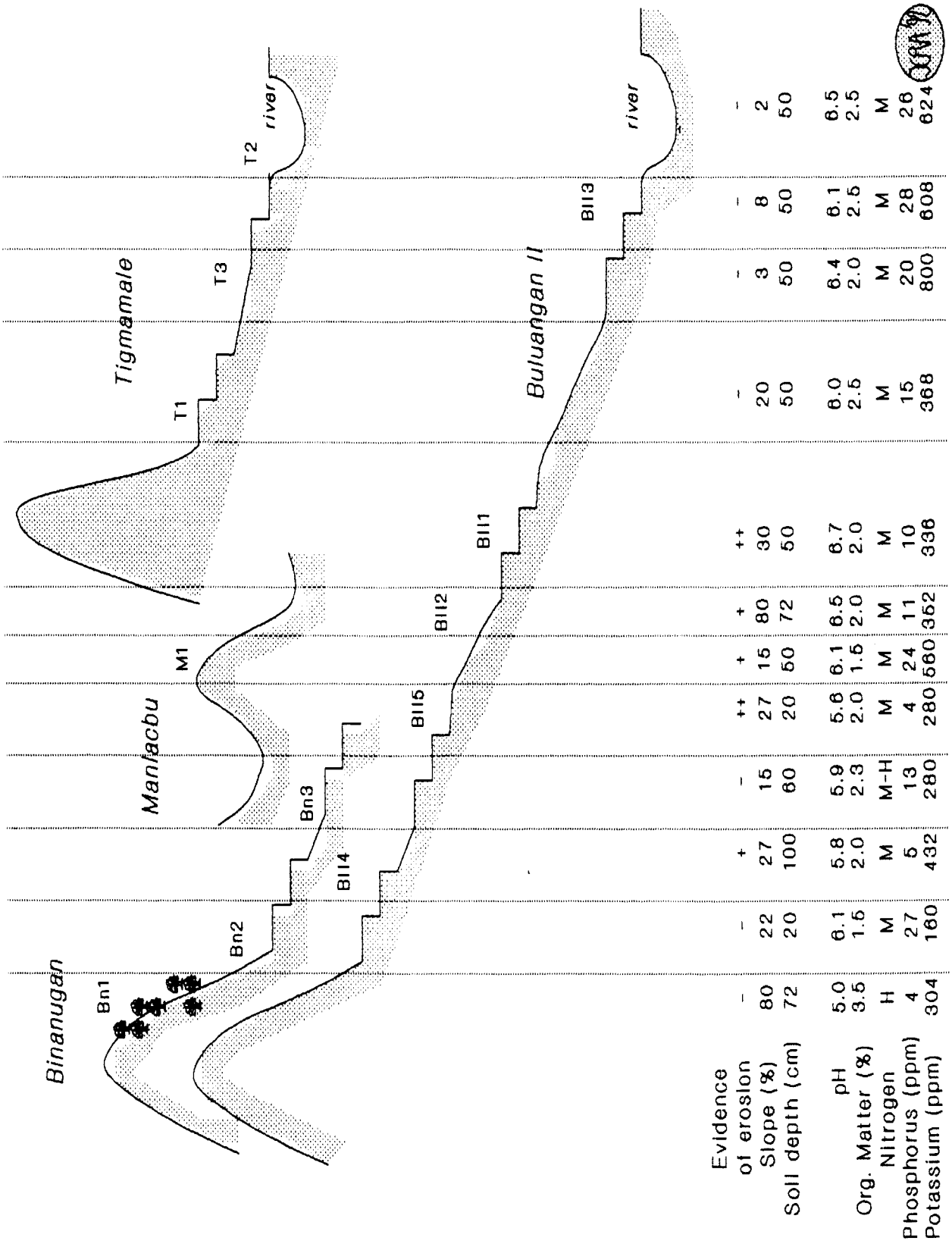

Figure 5.2 Schematic transect in four barangay of Valderrama municipality showing the physiographic position of the sampled soils and the major recorded soil properties (-: none, + moderate, ++ severe erosion problems; H, high, M medium Nitrogen content).

5.2.2 Soil fertility

In the following discussion the obtained values are compared to reference values published in the "Mémento de l'Agronome" (MCD, 1991) and in the "Agricultural Compendium" (ILACO, 1985).

Soil acidity

As can be seen from figure 5.2, most (seven out of 12) of the sampled soils had slightly acid soil (pH 6.0 - 6.7). Three sampled soils had medium acid pH values (pH 5.6 - 5.9), and only one sample was strongly acidic (pH 5.0). The latter was under forest vegetation and can be related to the higher organic matter content. The fact that most soils in the area are only slightly acid could be attributed to the parent material being marine sedimentary rocks (sandstone, shales and mudstone) and are thus relatively rich in carbonates.

Organic matter and nitrogen contents

All but one of the samples had medium values for the organic matter (OM) content, ranging from 2.0 to 3.5%. Only one sampled field in Manlacbu had a low OM content (1.5%). It was observed that the soil structure in this field was poor and very fine to fine granular, while the soil structure in the other observed fields was generally well developed angular blocky and medium in size. This might have resulted in the apparent soil erosion, even though the length of the field was short and the slope only 15%.

The highest OM content (3.5%) was found under forest cover of Casuarina equisetifolium. Litter fall accumulates under the tree canopy and is responsible for the high OM values.

Medium values were obtained for the nitrogen content for almost all fields except for the forest soil and for one sample taken from a field planted with mungbeans in Binanugan. Mungbeans and C. equisetifolium are leguminous plants suspected to have the capability of fixing atmospheric nitrogen.

Potassium and Phosphorus

All the sampled soils had moderately high (160 ppm) to high (240-320 ppm) or even very high ratings (>350 ppm) for Potassium. The highest values found, 560 ppm in Manlacbu (M1), 608 ppm in Buluangan II (BII3), and 624 ppm and 800 ppm in Tigmamale (T2 and T3, respectively) where all located at places were a relative accumulation of sediments had occurred. This indicates that there is a certain washing out of plant nutrients through erosion, and reciprocally a relative accumulation where eroded material are deposited.

Nine of the sampled soils had medium values for phosphorus, ranging from 10 to 27 ppm. Three sampled soils had marked low values (two of 4 and one of 5 ppm). These low values seemed to be related to their lower pH values (see figure 5.2). One of these soils was under forest (Bn1). The two others (BII4

and BII5) were in Buluangan II and were in areas seriously affected by gully erosion.

5.2.3 Soil management on the different landform types

Land preparation work is usually done with draught animals. Usually carabao or cows are used. Under few cases where these animals where not available, horses were used. Where the slopes are steep, the land is often tilled by hoeing, but farmers were observed to plough on slopes as steep as 50%.

Only in remote and highest located sitio of Binanugan and Bugnay farmers had no carabao and relied mainly on cattle for the land tillage, even on datag hagdan hagdan land. On banglid or bantod land ploughing is usually done parallel to the longest side of the field which tends most often to be perpendicular to the main slope.

Labangan

Most often crops grown on this type of land are rice, maize, peanut and mungbeans or it might as well been used as pasture land. The date of planting will depend on the chances of the land being flooded. Some of this land might be used for three crops a year, while other land might only be suited for planting from August onwards, i.e. after the peak of high intensity rainfall. Farmers often reported that their labangan used to be datag land which had been destroyed by the river, and only after several years they were able to reclaim the land and make again use of it. One common technique to reclaim the land is by bunding it with stone walls to entrap silt and sediments.

Datag

This is predominantly used for the cultivation of wetland rice. Only in the dry season, when there is not sufficient water for growing rice, other crops like onions, tobacco, mungbean or peanuts are grown. To enable the cultivation of wetland rice the different parcels are bunded.

In some barangay, like Tigmamale or the poblacion of Valderrama, sugar cane is also often grown. However, for the cultivation of sugar cane the bunds are destroyed. Converting sugar cane fields to rice fields entails thus always a lot of work.

Datag tubig

Irrigation is mostly practised on datag land, but can also be on datag hagdan hagdan. Tubig is the Kinaray-a word for water. In Valderrama the use of water pumps was not observed, in contrast with the lowland areas along the coast of Antique. Irrigation water is supplied through channel systems tapping river and creeks upstream. Usually the channels are made of mud. Only in Tigmamale a more sophisticated infrastructure is present, consisting of an off-take structure and cemented water channel.

Datag hagdan hagdan

Farmers normally only terrace land to enable them to grow wetland rice on sloping land. The terrace walls are made of earth and are usually covered with grasses. The terraces are usually built to conserve water on the land. Some times trees are grown on the terrace bunds, most commonly coconut trees. In Manlacbu, one farmer was met who had planted Gliricidia sepium along the terraces, and used the prunings as mulch and green manure. Only in the barangay of Binanugan and Bugnay terraces were observed made of stone walls.

Bantod and banglid

The most common crops on bantod and banglid land are upland rice varieties, cassava, maize, sweet potatoes, groundnuts and banana. It is striking that mungbeans are apparently not normally grown on this type of land. Onions were however, although only on restricted areas. They were grown on small beds and usually well mulched.

Often crops are intercropped. Observed intercroppings were:
- rice and maize;
- rice, maize and banana or cassava;
- peanuts and maize

Bananas and cassava are usually only grown at the borders of the fields, often at the steeper ends.

Some rice fields were observed on extremely steep slopes (60% or even more) and at places on very shallow soil, virtually on bare rocks. It remains unclear what brings farmers to farm under such extreme circumstances, but it doesn't require much to realize that this type of farming is not very sustainable.

Nevertheless farmers often try to convert sloping land to terraces, or practice some measures of soil conservation, like maintaining some bunds of grasses parallel to the contour lines, and making a drainage ditch at the upper part of the field to divert part of the run-off water.

On the other hand, farmers were sometimes observed to deliberately enhance erosion so that the sediments will accumulate on lower datag hagdan hagdan land or on land which they are converting into terraces.

Farmers also explained that they were not interested to terrace some bantod land because the water catchment area above the field was not large enough. Under those conditions, they would not be able to harness enough water to grow wetland rice on, so they preferred to leave the land as bantod land and use it for the cultivation of traditional upland rice varieties.

5.3 Erosion problems

5.3.1 River bank erosion

Of all the barangay visited, river bank erosion was a very important problem in Lublub. According to interviewed farmers, Lublub used to be one of the most populous barangay in the area and was known as the rice bowl of the watershed. However, due to river bank erosion, a great part of its best agricultural land, i.e. datag land, has been lost. This forces farmers to rely more and more on banglid and bantod land and has also enhanced an out-migration from the barangay. In Lublub the river is even threatening part of the barrio, and some houses had already to be moved.

5.3.2 Erosicn on sloping land

Rill erosion

This was observed on almost all bantod or banglid land in the study area. Farmers have the tendency to locate their bantod land either at the foot of the hills, where obviously part of the soil particles and soil fertility losses due to erosion will be compensated by the accumulation of material from higher located areas.

Gully erosion

Serious gully erosion problems were observed in Buluangan II (see figure 5.2). This is of course partly related to its mountainous character, but in the areas seriously affected by erosion, several abandoned fields were observed, including terraced ones. Farmers explained that the soil had become too infertile, so they were interested in maintaining the terraces. They did not mind the erosion of that land, as it was infertile anyway. Two soil samples (BII4 & BII5, see figure 5.2) were taken from that area and the results obtained seem to suggest that the soils lack some phosphorus.

Landslides

Evidence of the occurrence of landslides was only observed on very steep land and usually on land which was not under cultivation. Farmers often related these to some earthquake events in the past.

6 CROP PRODUCTION ACTIVITIES

Crop production involves both annuals and perennials. With very few exceptions, perennial crops are confined to the bantod/banglid lands and the home gardens. The annual crops on the other hand could be found on any of the land types (figure 6.1). Of the annual crops, rice is the most preferred crop and receives most of the production resources in terms of chemical inputs, land and labour. Most often rice is grown on the flat and terraced lands where water control could be achieved. However in situations where these land types are in short supply, the unterraced slope sides, bantod/banglid, are used. Other annual crops encountered in the survey included maize, mung bean, groundnut, tobacco, eggplant, onion, etc. These crops are grown as second or third crops in the systems when soil moisture conditions cannot support a crop of rice (figure 6.2) on the datag lands and as intercrops in the bantod/banglid lands. Most often the unreliabilty of the rainfall at both ends of the season forces the farmers to grow either one or two crops of rice.

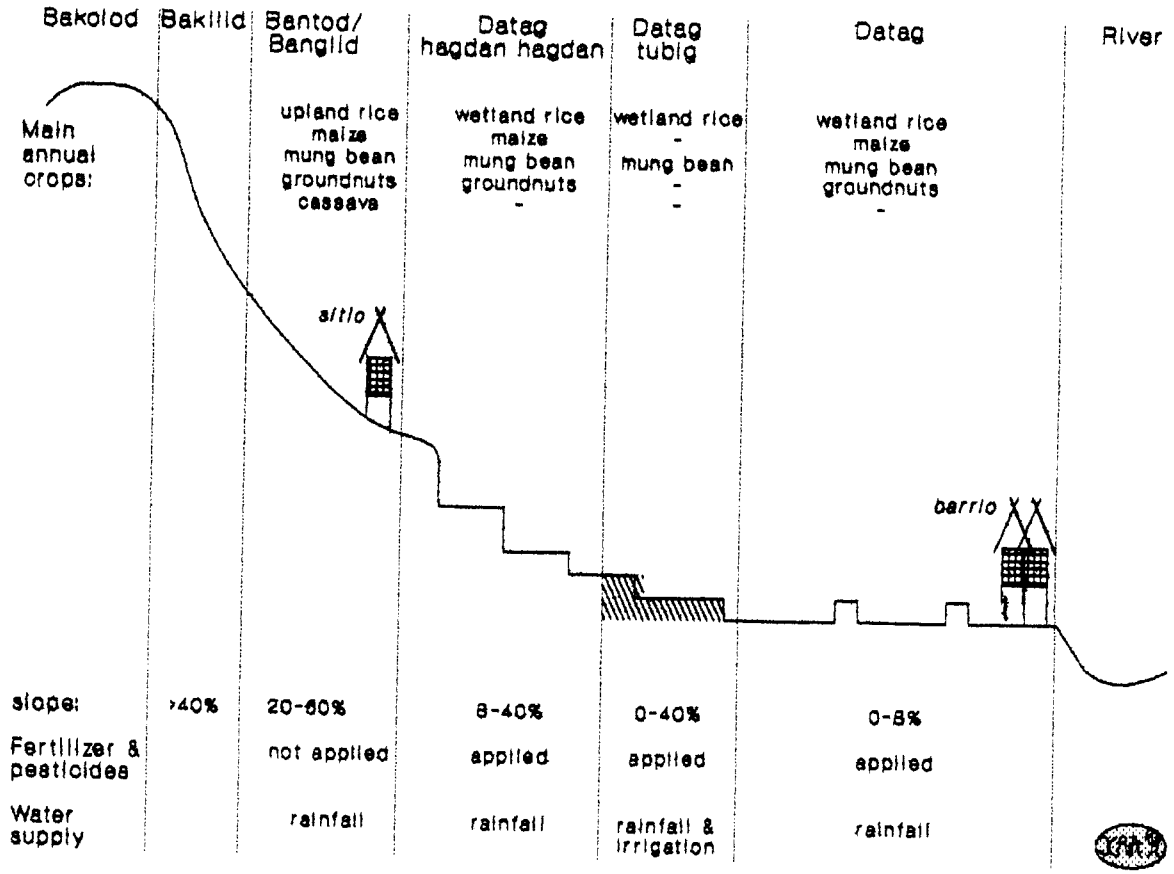

Figure 6.1 Schematic transect of the agricultural land-use in Lublub

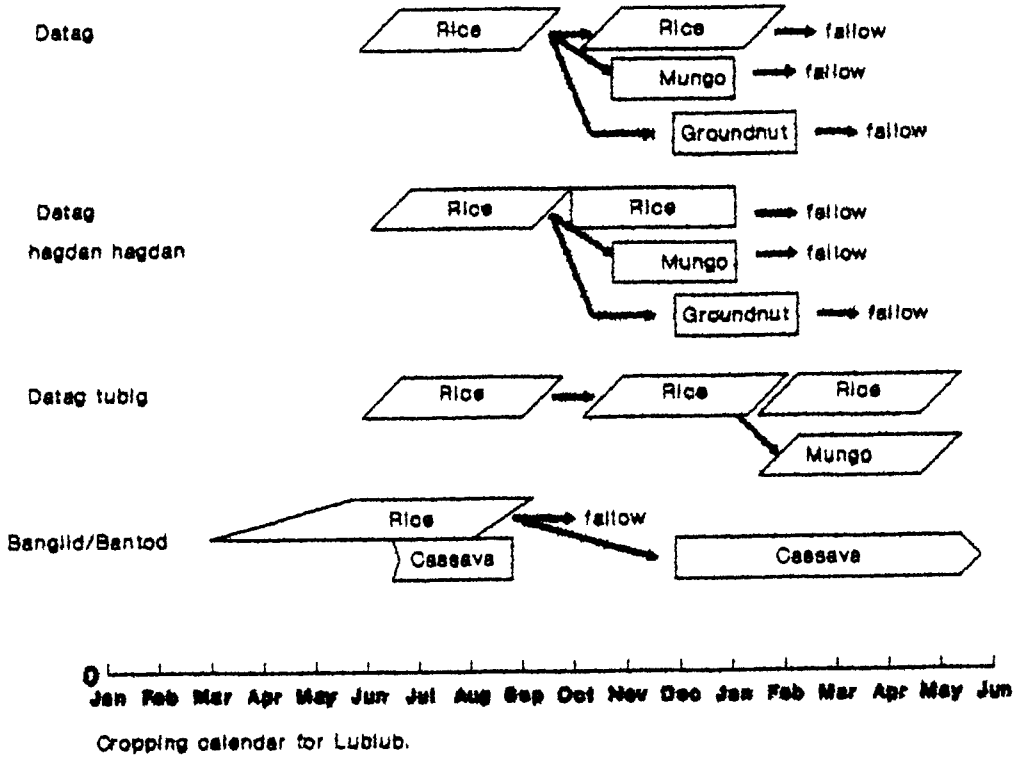

Figure 6.2 Cropping pattern and cropping calender

6.1 Rice production

6.1.1 Varieties and Seed Source

Rice was grown by all the farmers interviewed who had access to land. The varieties used by the respondents in the 1991-1992 cropping season included 7 tonner, Bordagol, BPI, UPL, Taiwan and IR varieties (IR10, IR36, IR58, IR60, IR62, IR64, IR66, IR72, IR74 and IR75). The most common varieties used in the year were IR36 and IR66 (frequencies of use 27.6 and 20.2% respectively). The frequencies of use of the other varieties were between 0.5 and 11%. Only one respondent each mentioned using BPI, Taiwan, UPL and IR72. Farmers obtained

seed for planting from their own harvest or through exchange with other farmers. Reasons cited for exchanging seeds included decline in yield of the old stock and the desire to experiment with new materials.

6.1.2 Method of Establishment and Seed rate

The rice crop is planted by either broadcasting dry or wet, transplanting or dibbling. The most commonly used establishment method in the 1991-1992 cropping season was wet broadcasting. The seed rate used per hectare varied greatly irrespective of the method of establishment (table 6.1 and figure 6.3).

Table 6.1 Seed rates used by respondents for the 1991-92 season.

Method of Establishment	Seed Rate (kg/ha)	
	Average	Range
Broadcast dry	125	70- 216
Broadcast wet	169	25- 270
Transplanting	87	32- 216
Dibbling	108	45- 180

Of the land parcels on which wet broadcasting was practised, 60% received seed rates exceeding those reported in the literature i.e.120-135 kg/ha (Tasic et. al., 1987; DA, unpublished). It must be emphasized that the area values were farmers' estimates using a local measure based on seed rate for transplanted rice. These should only serve as indications since no direct measurement were made of the land area due physical and time constraints, among others.

6.1.3 Fertilizer Application In Rice

Farmers are generally aware of the beneficial effect of fertilizer on the growth and yield of the rice crop. In situation where fertilizers are not used it is because the farmers could not afford to buy them. The most common fertilizers used in the 1991-1992 season were the nitrogenous types, urea (46-0-0) and ammonium sulphate (21-0-0) even though a few farmers mentioned using the complete fertilizer, NPK 14-14-14 and the incomplete one, NPK 16-20-0 (figure 6.4). Only two farmers in a total of 78 interviewed in the main survey did not use fertilizers for their rice crops. As with seed rate the variation in the dosage was high (figure 4.5). About 20 land parcels received more than the maximum 120 kg/ha recommended for the rice crop in the dry season by the Department of Agriculture. Even with the wet season crop, i.e. first crop, a lot of the applications exceeded 90 kg/ha which is the maximum recommended dose for that crop. The high variation in the dosage of fertilizer used reflects both the differences in the ability to buy fertilizers and

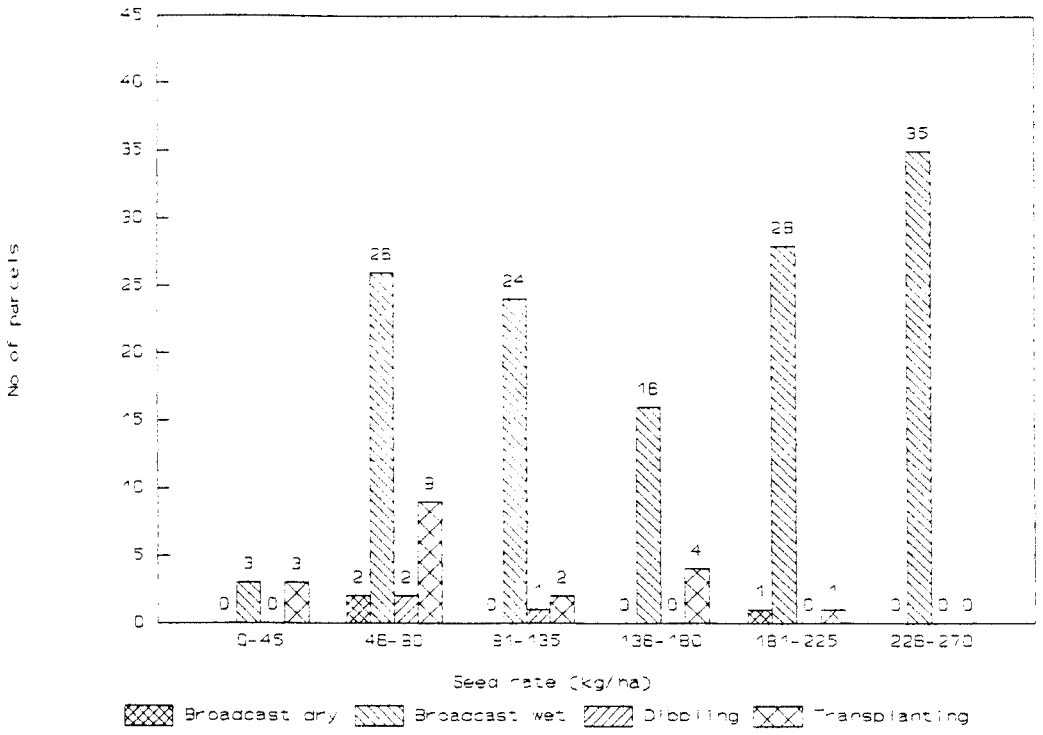

Figure 6.3 Distribution of different seed rates used with regard to method of establishment

farmers' inexperience in the use of fertilizers since a majority of farmers remarked that they learnt the techniques of using fertilizers by observing other farmers. The relationship between rice yield and N fertilizer application shows the effect of other limiting factors on yield (figure 6.6). In the case of the first crop this could be due to factors other than drought as the growing period of this crop always occurred in the rainy season. In the second crop, however, it could be attributed in some cases, to a combination of drought and other factors.

6.1.4 Pests and pesticides use

The dominant insect pests reported in the rice field were brown planthopper, green leafhopper, stemborer, rice bug and army worm, whilst the weeds mentioned were Echinocloa colonum, Paspalum conjugatum, Fimbristyllis littoralis, Echinochloa crus-galli and Cyperus iria. As with fertilizers, farmers use pesticides only in rice fields, probably because of the importance attached to the crop. The pesticides mentioned by respondents to have been used in the 1991-1992 season included herbicides, insecticides, fungicides and rodenticides. The most common insecticides mentioned were Thiodan (endosulfan), Fosferno (Parathion-methyl), and Nuvacron (monocrotophos) which

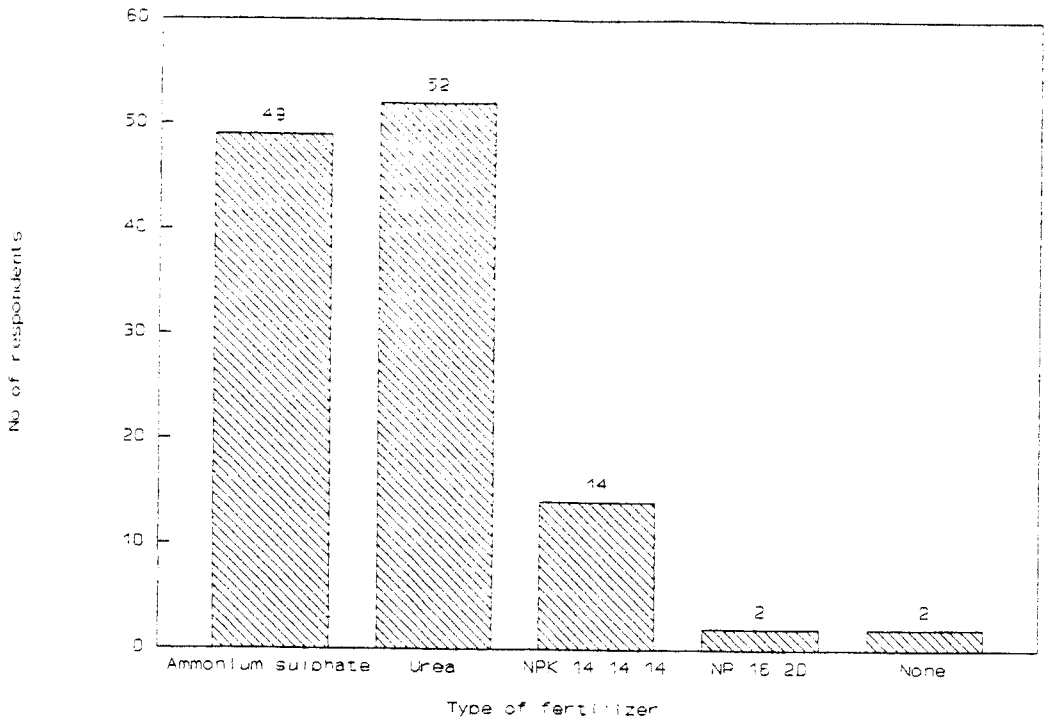

Figure 6.4 Number of respondents using different types of fertilizers

were used by 44%, 33% and 12% of the respondents respectively. The herbicides Machete, Agroxone, and Rilof H were applied by 12%, 42% and 24% of the respondents. The rodenticide and fungicide mentioned were Racumin and Benlate respectively.

6.1.5 Yield of Rice and sufficiency of rice production

Table 6.2 shows the average and the range of rice yields for the varieties on which not less than five samples were recorded in the last growing season. These values are consistent with yields recorded on farmers fields elsewhere, but are however lower than those attained under optimum conditions (Tasic et. al., 1987). Rice yield per unit area was not affected by season (figure 6.6) but rather by land type (Table 6.3). Yield on irrigated land was significantly higher than the unirrigated terraced land (Datag hagdan hagdan) possibly due to the absence of water stress on the former. The slightly higher yield in the lowland datag than the terraced land could be probably attributed to better control of water. Figure 6.6 clearly shows that rice yield among other factors is influenced by the amount of N fertilizer applied.

About 59% of the respondents reported not being able to produce enough rice for the household. Except in Takas where all the people with this problem

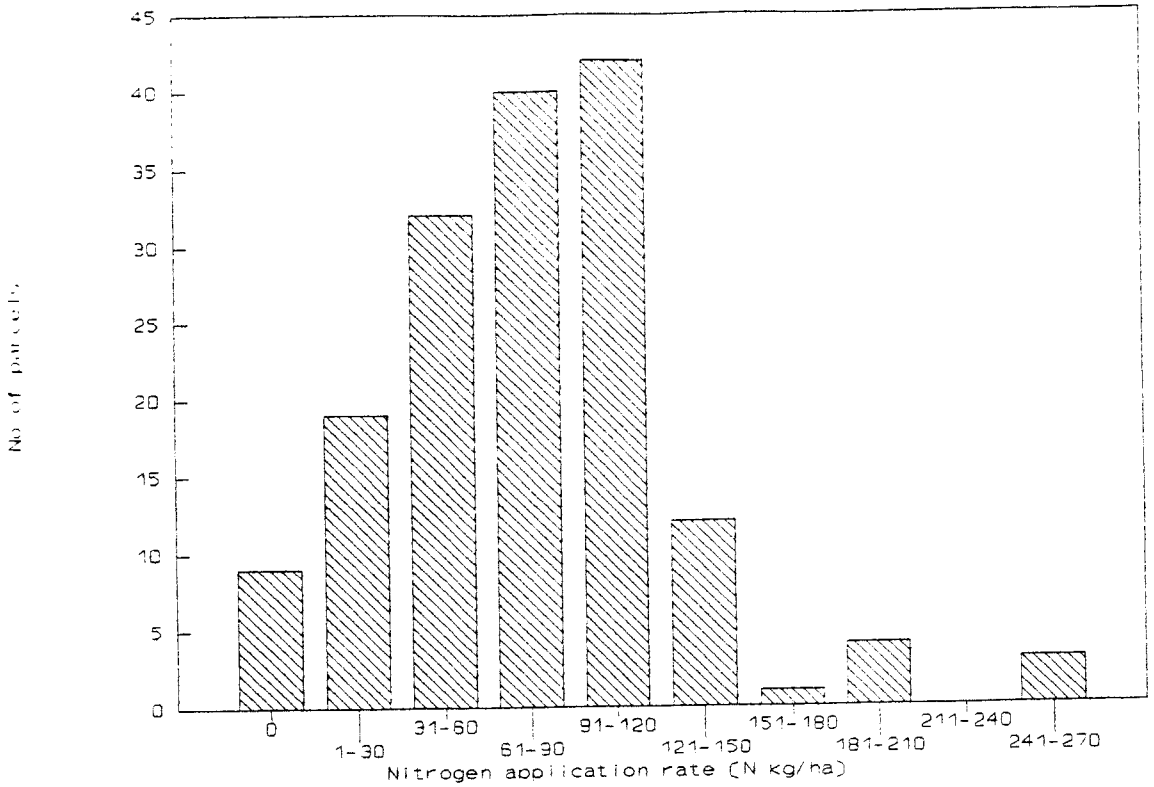

Figure 6.5 Distribution of different nitrogen application rates

Table 6.2 Yield of some rice varieties

Variety	Yield/ha (t/ha)		Yield/kg seed (kg/kg)	
	Average	Range	Average	Range
7 tonner	1.9	1.1-3.5	22.5	11.5-37.5
Bordagol	3.8	1.4-6.8	19.5	12.7-25.0
IR10	1.6	0.5-2.6	20.2	10.0-35.0
IR36	2.9	0.8-6.1	16.1	3.0-62.5
IR58	2.2	0.7-3.8	13.5	6.7-17.5
IR60	2.3	1.3-4.9	17.0	14.0-22.5
IR64	2.0	0.3-4.7	17.3	6.0-26.7
IR66	3.7	0.6-7.0	17.5	6.7-32.5
IR72	3.7	1.1-6.5	17.8	11.0-26.7
IR74	3.0	0.4-5.8	20.6	9.0-36.7

worked on unirrigated lands, the problem was acute in all barangay.

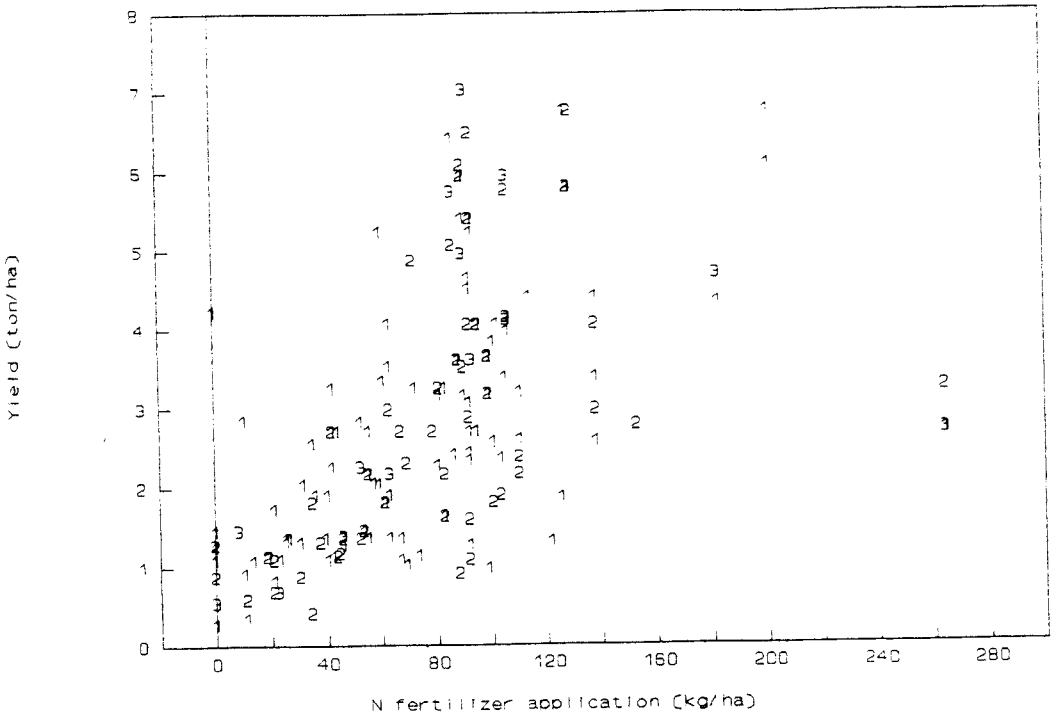

Figure 6.6 Relationship between nitrogen fertilizer application and rice yield (1, 2 and 3 are first, second and third crops respectively)

Table 6.3 Effect of land type on rice yield.

Land type	Yield (t/ha)
Datag	2.86
Datag hagdan hagdan	2.17
Datag irrigated	3.22
Mean	2.75
LSD 5%	0.828

Possible reasons for insufficiency in rice production are lack of favourable rice lands, insufficient water supply and fertilizer application as depicted by the effect of fertilizer on yield. In the event of insufficient rice

production, farmers use a host of strategies which include the use of alternative crops, borrowing and buying rice. To buy rice money is obtained from selling other crops, livestock or off-farm activities. Of the 47 respondents who reported to be insufficient in rice production, 25 indulged themselves in off-farm activities which included handicraft/carpentry, tuba tapping and local administration.

6.2 Production of other annual crops

On lands considered as favourable for rice production, annual crops other than rice are grown as either a second or third crop in the system. On bantod/banglid lands, however, these crops are the most commonly cultivated species and intercropping is practised. Fertilizer and pesticide application are minimal if not rare. On favourable rice lands where these crops are grown after rice, they receive very little management attention. Observations made on fields of such crops revealed high weed infestation.

Table 6.4 Yield of maize, mung bean and groundnut reported by farmers.

Crop	Yield/kg seed (kg/kg)	
	Average	Range
Groundnut (shelled)	8	1-25
Maize	51	12-112
Mung bean	8	1-37

The yields per seed rate of some of these crops as reported by farmers are presented in table 6.4. These yields are lower than what has been reported on adjacent farmers, plots in on farm trials (DA, unpublished) and could be due to the low management attention given to these crops. As these crops were most often grown after the rice crop it is possible that they suffered from the effect of water stress. One interesting feature about these yield data is that 73%, 66% and 57% of the yields reported for groundnut, maize and mungbean respectively fell below the average yield. The relatively low management attention given to these crops cannot be easily understood considering the fact that in situations of insufficient rice production, which normally occurred in the study area, these crops are used either directly or indirectly as supplements.

Farmers' preference for a particular crop other than rice depends on the use to which it is put. Some of the reasons cited by farmers for preferring certain crops included use for home consumption, high market value and the ability of the crop to grow and yield with very little inputs and management attention. Figure 6.8 shows that groundnut and mungbean are the second most preferred crop after rice. In the case of groundnut, the main reason given was its high market value whilst mungbean was preferred because of its use in the house and also its ability to grow with minimum inputs and care.

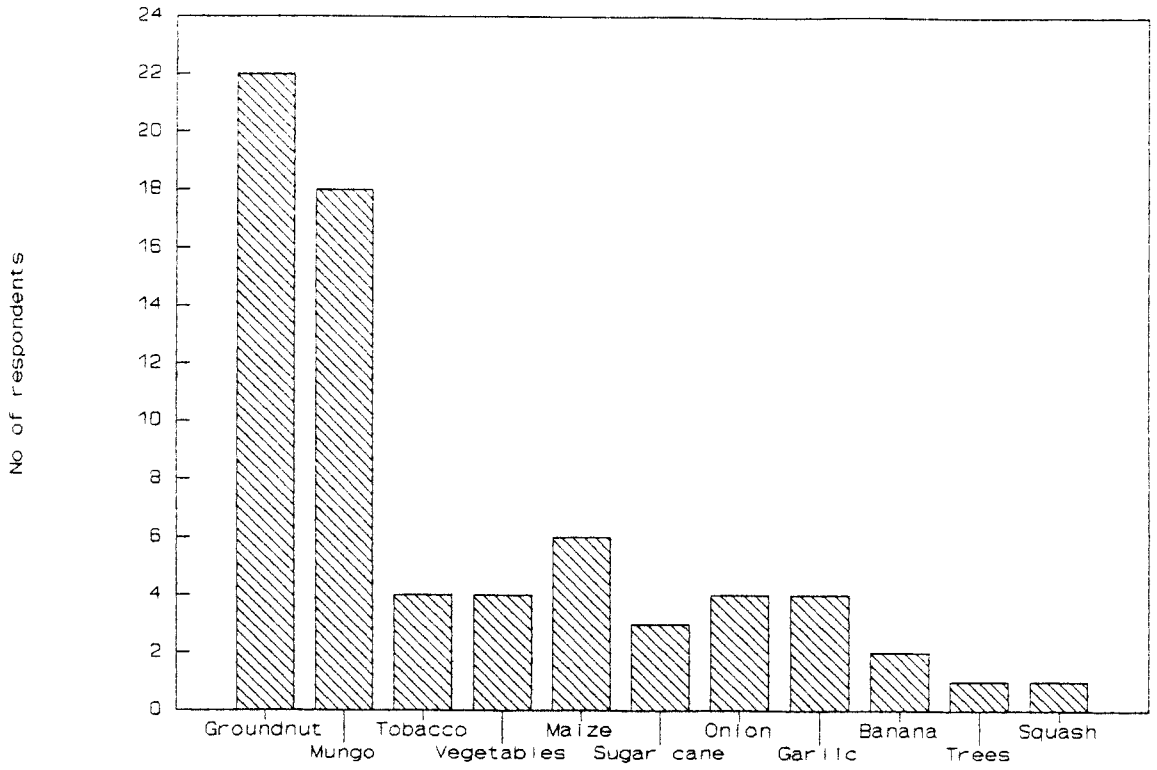

Figure 6.7 Farmers preference for crops other than rice

6.3 Perennial Crop Production

Although extension recommends the planting of perennial crops on sloping lands, with the exception of banana, coconut and jackfruit, the number of people interviewed in the main survey who reported having the various perennials is very small (table 6.5). Even in most cases where these crops are grown, the numbers are too small for them to be classified as farms consisting of any particular perennial crop.

The very low interest shown by farmers in the cultivation of tree crops could be due to insufficient land for food crop production, which makes the allocation of land to the cultivation of crops with long maturity period unattractive as some farmers depended on the banglid/bantod lands for food crop production. In the few cases where coffee was being grown, observations indicated that the farmers also lacked the technical know-how in the cultivation of the crop. The very few number of farmers growing cocoa and coffee in the survey indicates that the increasing acceptance of these crops in the Antique province as claimed in the OIDCI study (OIDCI, 1992) may not be substantial in the study area.

Table 6.5 Number of farmers growing the different perennial crops on their lands.

Crop	Number of Farmers	Average number of plants/stands
Banana	32	183
Coconut	28	26
Mango	4	2
Coffee	2	275
Cacao	4	9
Jackfruit	14	7
Bamboo	3	100

7 THE LIVESTOCK PRODUCTION ACTIVITIES

Livestock is an integral part of the upland farming systems in the province of Antique. Livestock includes carabao, cattle, goats, pigs, chicken, ducks and horse. Few goats were observed during our visit to barangay Lublub, but their owners did not appear in the sample. Draught animals, carabao and cattle in particular, play a dominant role in the agricultural production systems in the upland. The results of the first survey conducted in Lublub show that all carabao encountered are kept mainly for draught power, whereas cattle are kept for fattening, breeding and draught use. Pigs and goats are kept for meat, while chicken and ducks are kept for eggs and meat. Chicken are also kept for game and used in fighting competitions on special occasions. Ownership of animals in Lublub is shown in table 7.1. No single farmer reported the use of animal manure for the crop.

Table 7.1 Ownership of animals in Lublub based on the first survey result

Species	% of farmers with animals	Average median size of holding	% of farmers keeping animals pasagod/pahonol
Cattle	42	1.5	21
Carabao	47	1.0	nil
Pig	52	1.0	22
Chicken	89	3.0	nr
Horse	20	1.0	nr
Duck	5	-	-

nr - not recorded

Although from the above table carabao does not appear under pasagod/pahonol, the in-depth survey showed that 27% of the carabao surveyed were under pasagod system.

7.1 Herd structure

The herd structures of carabao and cattle are shown in figure 7.1. There were very few numbers of male cattle in the herd, because these animals are sold for beef production. In the carabao herds on the other hand, equal numbers of adult male and female were found.

Figure 7.2 shows the frequency distribution of herd size for three types of livestock based on the survey conducted in barangay Lublub. These figures show that most herds in Lublub are very small. Figure 7.3 shows that in Lublub only one farmer had ten chicken, while in the in-depth survey 50% of the respondents owned more than ten chicken (figure 7.4).

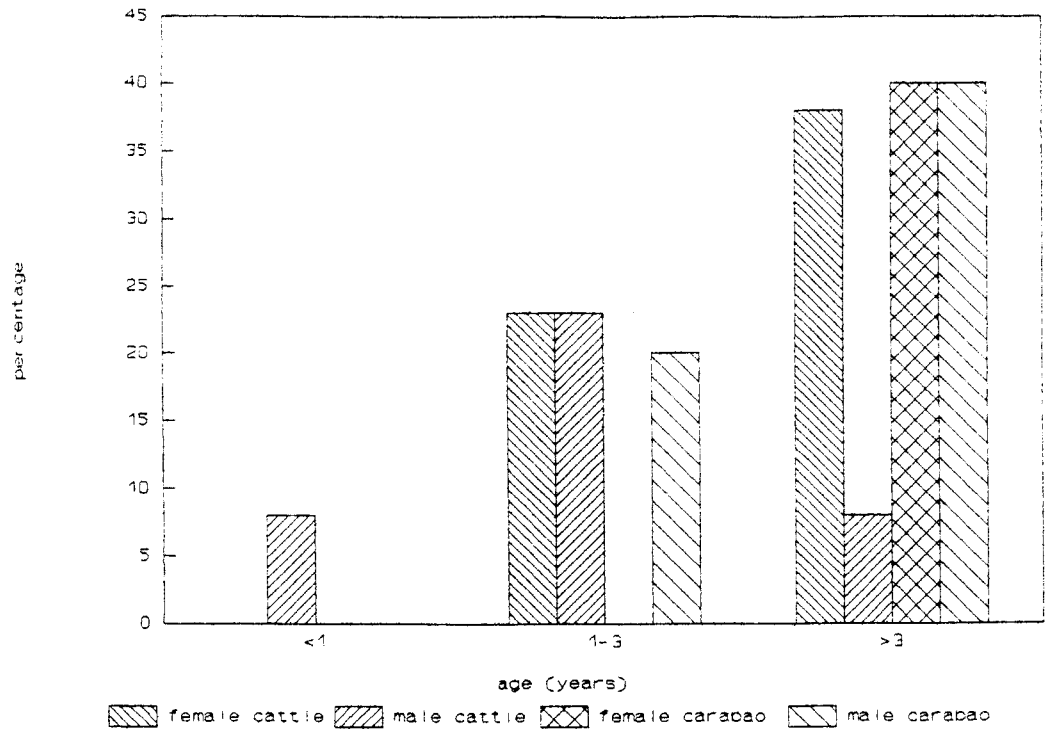

Figure 7.1 Herd structures for cattle and carabao

7.2 Pasagod/pahonol

Pasagod/pahonol is the local term used for animal raising systems under share tenancy arrangements between owner and caretaker. This system exists throughout the field study area. Pasagod is a system in which the tenant looks after female animals and shares the offspring alternatively with the owner, depending on the arrangement made earlier for obtaining the first offspring. Pahonol is a system in which mainly male animals are given to the caretaker for fattening and an increase in the additional value is equally shared between owner and caretaker.

In pigs there are many variations of pasagod/pahonol, such as equal sharing of piglets after farrowing, return of four piglets in the replacement of sows, return of two piglets after farrowing, especially under 4H club and Barangay Local Government Unit (BALGU) programmes. Percentages of animals under pasagod/pahonol system are shown in table 7.2.

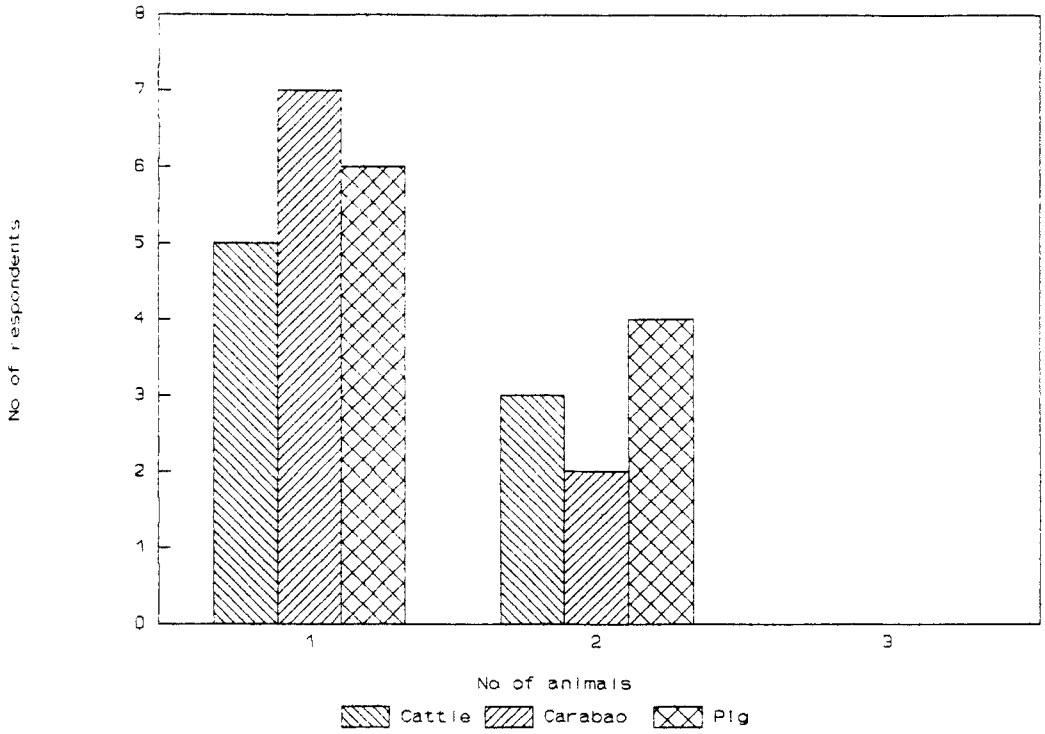

Figure 7.2 Frequency distribution of herd size in Lublub.

Table 7.2 Percentage of animals under Pasagod/Pahonol

Species	% of animals under pasagod/pahonol	Remarks
Cattle	32	In-depth survey
Carabao	27	- do -
Pig	40*	- do -

* includes 4Hclub and BALGU

Pasagod is the more commonly practised system in comparison to pahonol. Out of 19 farmers interviewed in Lublub, only one farmer had cattle under pahonol system.

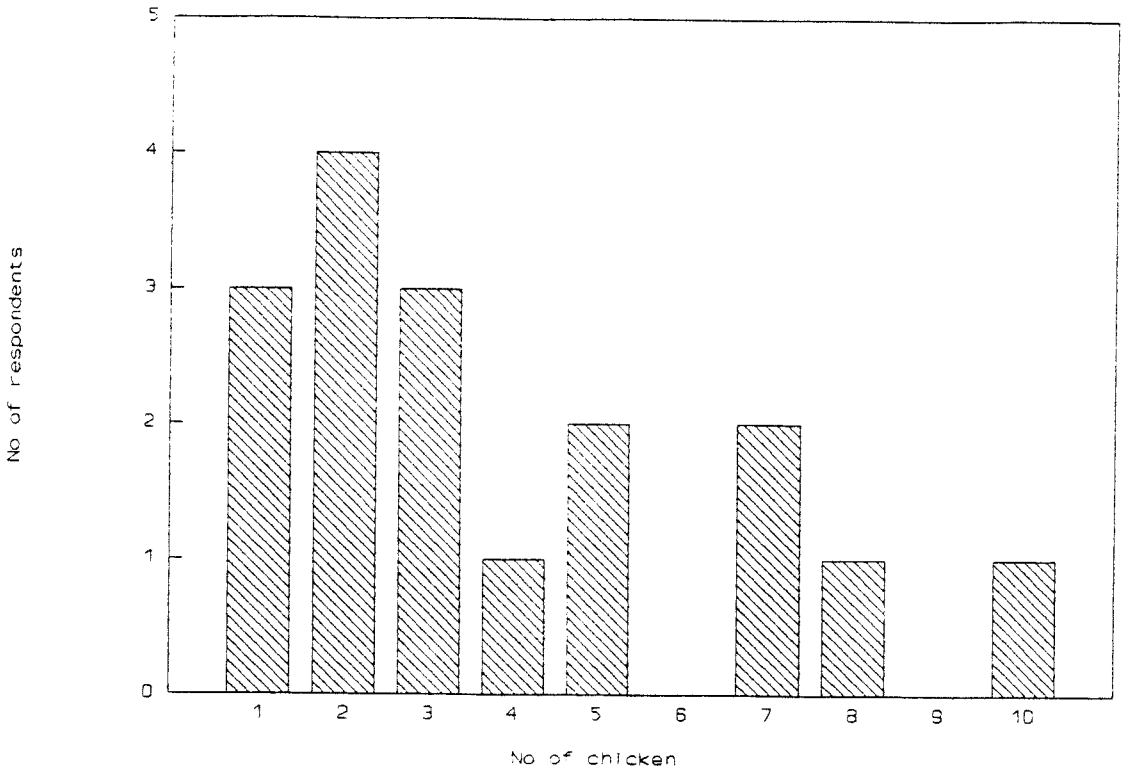

Figure 7.3 Frequency distribution of owned chicken in Lublub

7.3 Management

7.3.1 Breeding

Pigs and poultry

All the species except pig are Visayan, the so-called native breeds. It is interesting to note that out of 19 farmers interviewed in Lublub in the first survey, only one farmer had hybrid cattle and two farmers had hybrid pigs. However, in the in-depth study many hybrid pigs were observed in other barangay. The reproductive performances of hybrid and native pigs studied in six barangay are shown in table 7.3.

Moreover, table 7.3 indicates that farrowing intervals for both hybrid and native pigs are higher than values recorded in Nepal (Oli and Morel, 1985). This may be attributed to inadequate feed supply or inappropriate management practices. In-breeding in pig was also observed in Lublub, as one of the sows was mated with it's son. It obviously contributes to reduced vigour and fertility of small herds. It can also be anticipated that lack of knowledge in identifying an oestrous cycle in sows has caused long farrowing intervals.

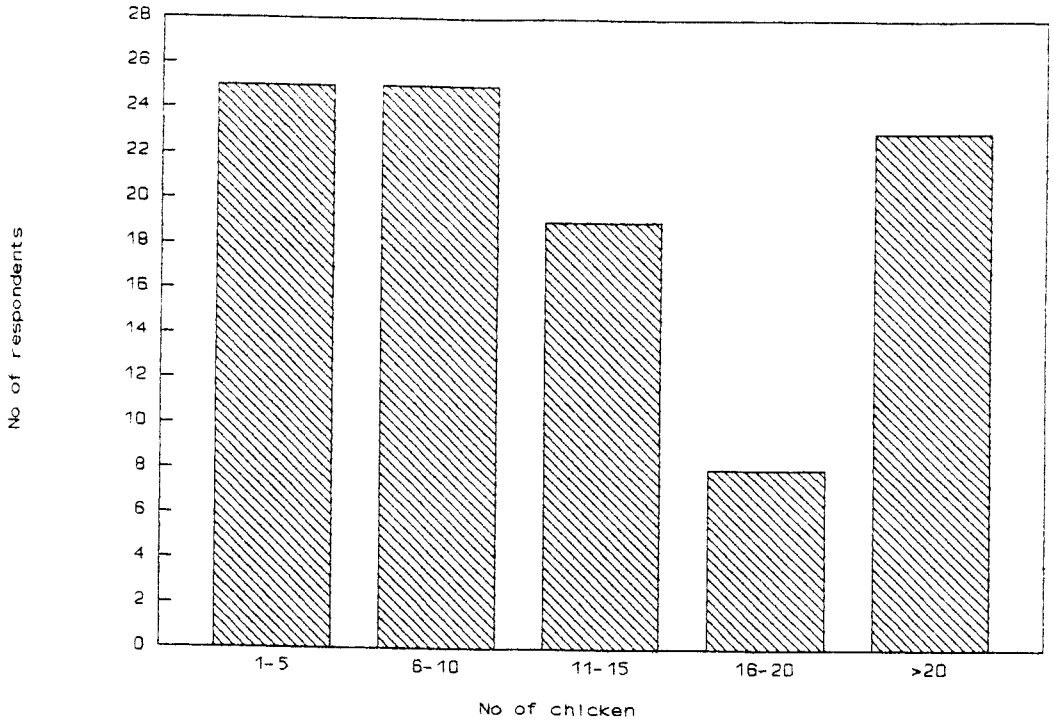

Figure 7.4 Frequency distribution of owned chicken in the in-depth survey

The failure to take the female to a male for mating at the right time is probably the main cause of long farrowing intervals.

Table 7.3 Reproductive performances of native and hybrid pigs in six barangay of Valderrama

		native		hybrid	
		mean ± sd	No	mean ± sd	No
age at first service (months)		11.6 ± 5.13	17	12.3 ± 4.50	24
litter size at birth	1st farrowing	5.4 ± 2.44	15	7.1 ± 1.78	23
	2nd farrowing	8.5 ± 3.30	10	7.8 ± 1.76	16
	3rd farrowing	8.4 ± 0.79	6	8.0 ± 1.70	9
weaned size	1st weaning	5.1 ± 2.30	14	6.2 ± 1.96	21
	2nd weaning	7.2 ± 1.39	9	7.1 ± 1.59	15
	3rd weaning	8.2 ± 0.40	6	7.4 ± 1.51	8
farrowing interval (months)		10.3 ± 3.45	10	9.1 ± 3.04	16

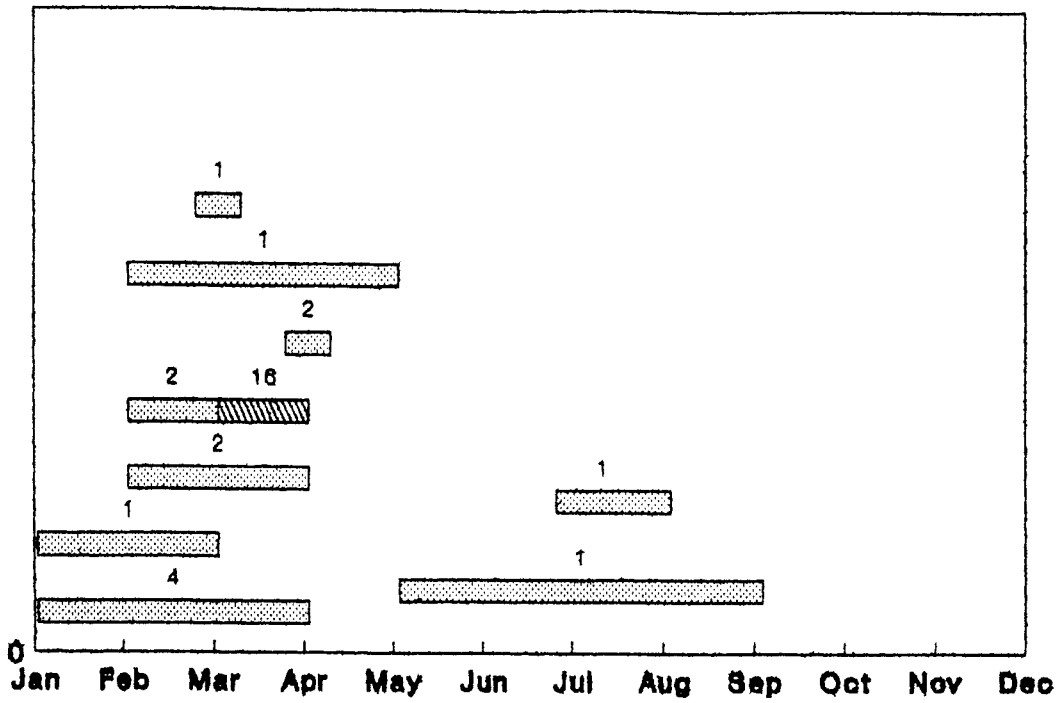

Figure 7.5 Lean period for fodder as reported by farmers (the digits above the bars represent the number of respondents per period)

Large ruminants

All the 38 farmers interviewed in the main survey who are keeping large ruminants, reported that they own native breeds. ICRA (1982) reported that Santa Gertrudis, Red Sindhi and Brahman bulls were distributed throughout Antique. The survey however did not encounter hybrids of large ruminants in Valderrama municipality.

Pigs for fattening

Few farmers keeping pigs for fattening were interviewed and some observations indicated that hybrid pigs are normally sold or slaughtered at an average age of about 10.6 months and native pigs at an average age of about of 6.3 months. Fattening pigs are sold through the middle men in the barangay, but sometimes they are slaughtered in the barangay and sold at Piso 50/kg of meat. It is clear that fattening pigs also contribute to the economy of the household.

7.3.2 Feeding

For ruminants the main source of feed is roughage and no single farmer supplements with concentrate, even for fattener and draught animals during field operations. The animals are normally grazed in the native pasture in fallow land. The most common species of grasses and browses are cogon (Imperata cylindrica), ipil-ipil (Leucaena leucocephala), madre de cacao (Gliricidia sepium), and tigbao (Saccharum spontaneum). No farmers reported using any improved forage legumes and grasses for animal feeding.

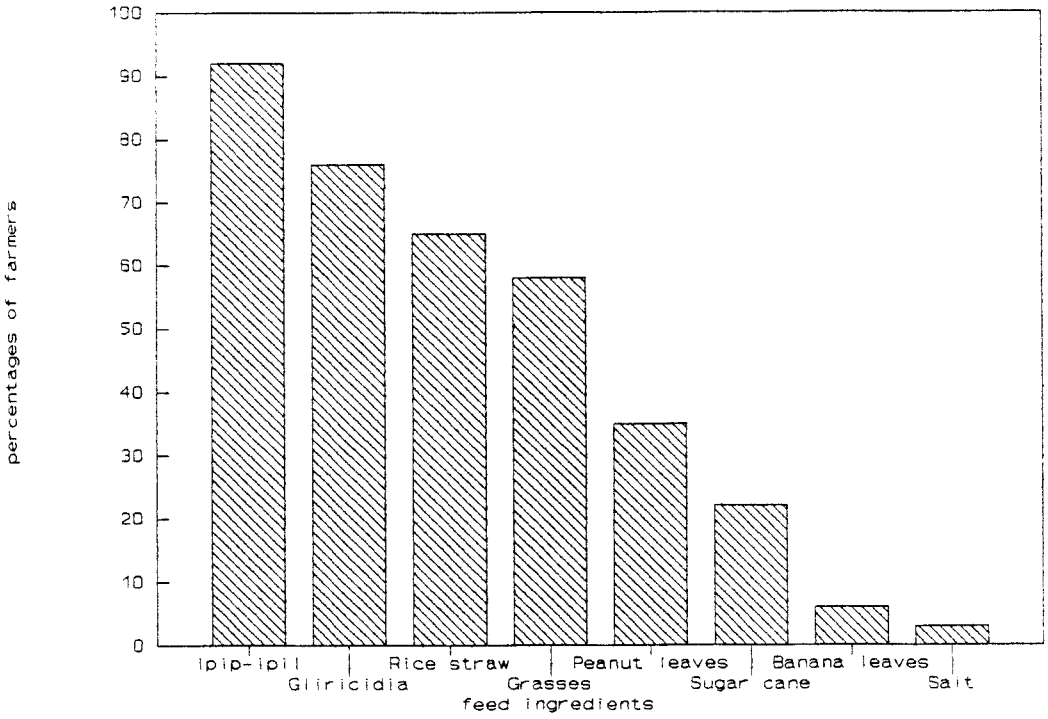

Figure 7.6 Percentage of farmers using different feed ingredients during March -April

The results of the Lublub survey show that March - April is the most lean period for fodder. However, other months have also been reported as fodder problem peroids. A similar observation was made in the main survey (Figure 7.5). Out of 38 farmers interviewed, 31 farmers (82%) reported that they have fodder problems, whereas seven farmers (18%), who have an access to pasture land, reported no fodder problem. During these scarce periods they mainly use ipil-ipil, madre de cacao and freshly harvested rice straw from third cropping and peanut leaves. Ipil-ipil and madre de cacao were used by 92 and 76% of the respondents respectively as fodder (Figure 7.6).

Although, 68% and 50% farmers have madre de cacao and ipil-ipil respectively,

there is much more potential to encourage farmers to grow these trees as fodder, fuel wood and soil conservation measures on sloping land. About half the respondents showed an interest to plant more Ipil- Ipil and Madre de cacao on their land if the seedlings made available. Some mentioned that they would plant on banglid, boundaries near the creek, bacolod and pasture land. The other half of the respondents did not show any interest in planting these trees due to various reasons such as lack of land, difficulty to control animals in the pasture land and already enough trees on their land through self generation.

There seems to be a great potential for farmers to stock their rice straw and use it as forage during lean periods. Pasture land can also be improved by introducing tropical kudzu (Pueraria phaseoloides) in the region. It has been reported that participatory research with farmers in Leyte, The Philippines, the tropical kudzu was successfully established by broadcasting seed in Imperata fallows, and it supressed the Imperata in less than one year (cited by Garrity, 1991).

Pigs are normally fed with rice bran three times a day, with an additional supplement of tangkong (Ipomea aquatica), cassava (Manihot utilissima), palawan (Xanthosoma sp.), camote (Ipomea batatas), ubad (inner part of banana stem), alusiman (Portolaca oleracaea) and kitchen wastes depending on the availability. Some farmers reported that they feed fresh ipil-ipil leaves, which they believe act as a de-wormer against internal parasites. Out of 53 farmers interviewed, 19% of the respondents reported that they use feed supplement such as Pigromix, Wonder grow, Booster mix and Afsillin. However, supplement is very occasional and especially supplemented during the lactation stage. 94% of the respondents reported that they buy rice bran within the barangay as and when required. It is, however, interesting to note that 84% of respondents keeping native pigs at present mention that they could maintain hybrid pigs. A small number of respondents (11%) reported that they will not raise hybrid pigs as it requires more managerial skills to maintain them as compared to native ones. Pigs are always looked after by female members of the household in Valderrama.

7.3.3 Animal Health

Aratay (Newcastle disease) in chicken, Hog cholera and Scouring in pigs, as well as lansang-lansang (Haemorrhagic septicaemia) are the major diseases in the area. In the first initial survey in Lublub, 68% of the respondents indicated aratay as the main problem in chicken. 15% of the respondents reported lansang-lansang as a problem in cattle and carabao.

The in-depth survey carried out in six barangay indicated an average of 71% mortality in chicken from the outbreak of aratay (Newcastle disease) within the last three year period (figure 7.7).

Some farmers reported that chicken are sometimes vaccinated against aratay and cattle/carabao against lansang-lansang. The lower mortality rate of chicken in 91/92 can be explained by the vaccination against aratay in that year.

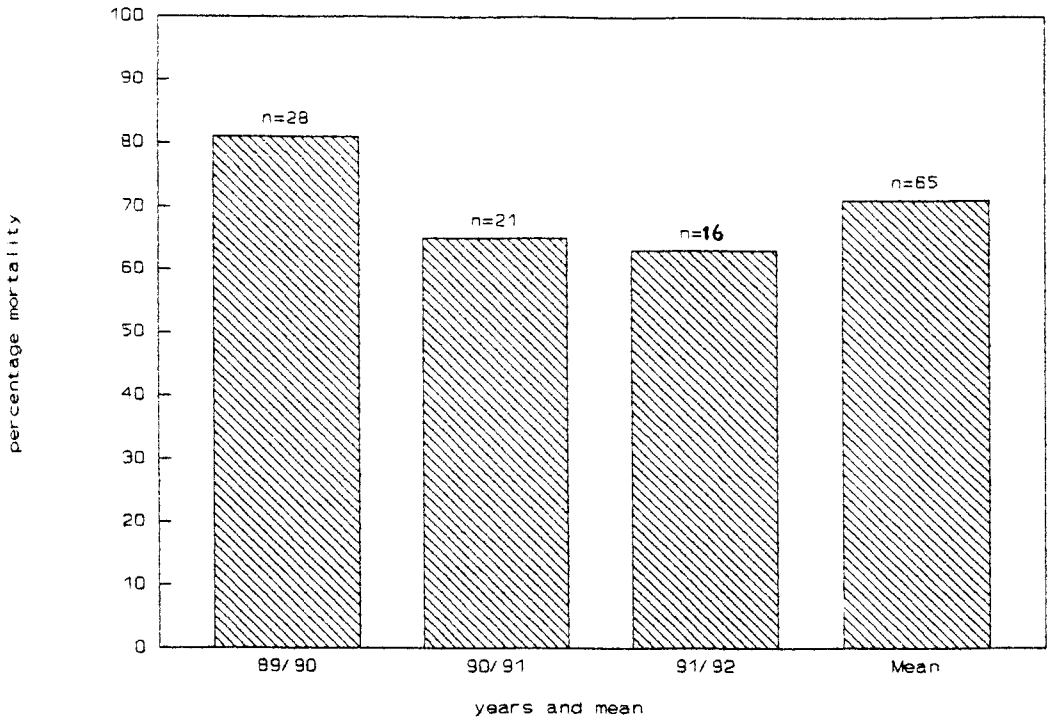

Figure 7.7 Percentage of chicken mortality for the period of 1989-1992

In the in-depth study carried out in six barangay, 30% of pig keeping farmers reported the use of de-wormer against internal parasites. The common drug used was Latigo-50 as a de-wormer. It is very interesting to note that out of 53 farmers, one farmer was using small shrimps mixed with feed as a de-wormer and other using fresh ipil-ipil leaves. It appears that if the effectiveness of these local remedies could be confirmed, it would be much more economical to the farmers.

8 SOCIO-ECONOMIC SETTING

The socio-economic environment in which the household is found, determines the mode of acquisition of resources and the availability of on and off-farm opportunities to the extent that, it influences household decisions and well-being. This chapter therefore focuses on the internal structure of the household and its linkage to agricultural and agriculturally- related institutions.

8.1 Household

In the study area wherever manual agriculture is dominant, the household size is not only important as a source of farm power but also as a consuming unit. The household work force is determined by the age structure and size of the household.

In the Lublub study 17 household respondents were composed of 97 persons. On average the size of the household was then 5.7 persons, about half of whom where available for farm work. The household usually consists of husband, wife, children and sometimes parents of either of the spouses. Fifty of the 97 persons in the sample were females. In the main survey, with a sample size of 79 households, the average household size was also about 5.7, but with a size range from two to eleven. For this survey the modal was between four and five members.

The age distribution of the sample respondent in the main survey is shown in table 8.1. Most of the interviewees fall within the age class of 25-55 years. All the interviewees (68) except three, had some formal education as depicted in table 8.2. This high literacy level could facilitate the adoption of farm innovations.

Table 8.1 Age distribution of the sample respondents of the main survey

Age classes	No of respondents	Percentage
15-25	3	4
26-35	15	21
36-45	21	30
46-55	16	23
56-65	11	15
>65	5	7

Table 8.2 Level of schooling of respondents

Years of schooling	Number	Percentage
None	3	4
0-3	12	18
4-6	34	50
7-10	17	25
+10	2	3

8.1.1 Farm task and farm power

Apart from agriculture, the mainstay of the household economy in the study area, other sources of income include, receipt of remittances, carpentry, handicraft, wage labour, tuba collection and sale of charcoal/firewood. In Lublub, 6 out of 19 respondents reported to be receiving remittances from relatives working in other places. Within barangay the flow of gifts, especially from relatively well to do family members, to other needy relatives is common.

Most farm households are headed by males. The woman is usually considered as an assistant. However within the household, decisions are commonly shared, or taken by the person responsible for the specific task. It is worth noting that during our interviews, some of the male respondents had to depend on their wives to give correct estimates of the quantities of inputs used during the previous cropping season.

While the men usually perform farm operations considered as heavy duty, such as land preparation, planting of tuber crops, threshing, firewood collection and tuba tapping, the women engaged themselves apart from the household chores and tasks requiring a lot of skills like crop maintenance. Marketing of livestock and crop produce are usually male and female dominated respectively. Men and women engaging in harvesting, children as young as ten years do assist both parents for example in fetching water and carrying for the animals. No farm task is strictly gender specific as the roles are interchangeable according to the prevailing circumstances.

Households in the study area depend, for agricultural production, on animal and manual labour, and to a lesser extend on mechanical power which is extensively used in post-harvest operations. Family exchange and hired labour are the different forms of manual labour. Under hired labour, open participation as well as contractual arrangements are reported. In this latter form, the labourer has a mutual understanding with the farm operator to perform not only one operation but others as well where his or her services may be necessary, for example ploughing and harvesting. This sort of arrangement could be for a cropping season or the entire cropping year.

The landless and farmers with chronic food shortage constitute the pool of hired labourers. Both male and female are engaged in selling their services. The resulting labour wages are important supplements to other sources of

income to these groups.

The use of animal power is typical. According to the office of the Municipal Agricultural Officer (MAO) 99%, (i.e. 6808) of 6868 estimated number of large animals in the municipality in 1991 are cattle and carabao. Most farmers have access to draught animals either as owners or tenant animal keepers, i.e. pasagod or pahonol. The hiring of work animals for land preparation is widely practised. They are also important in transportation. Farm mechanical equipment found in Valderrama include power tiller, locally called hand tractor, thresher and mills for rice and sugar cane. These machines are owned by a small minority who hire them out to other farmers. Mechanical threshers are commonly used but the traditional manual threshing method, linas, prevails especially in the steepy upland and very remote areas.

The non-use of threshers by certain farmers is usually associated with poor harvest and/or the long distance and difficult terrain, which render transportation extremely difficult. Whereas the use of the power tiller is limited to a small number of irrigated parcels, the draught animals are used on all land types, except the unterraced steepy uplands where manual labour is the overwhelming source of farm power even for threshing and milling.

Manual labour is mostly used for repair of water control structures, planting, weeding, harvesting and transportation while machines like power tillers are limited to land preparation. Although animal power has almost replaced human labour for land preparation, it now has to compete on a very minimal scale with the power tiller. Some farmers use the animal to plough and then the power tiller to harrow. The use of mechanical power in the place of hired animal/manual labour in land preparation and threshing represent an important income loss for poorer household who depend on such activities for wages.

This loss in income by the poor household is at the advantage of the relatively well-off, the owners of the machines. The use of herbicides is also replacing the use of female labour, as weeding is mostly done by women.

Payment of hired labour, whether in cash or in kind always incorporates meals. Cash payment for labour is the practice for land preparation, repair and maintenance work and weeding, as against sharing the harvest for harvesting and threshing, as is indicated in table 8.3.

Table 8.3 Payment of harvester and thresher

Form of payment	Number of fields harvesters	thresher
cash	50	-
kind	34	75
both	2	-

The unit price paid for hired farm power varies according to the type of activity and the source of power. In Lublub the cash payment per day, per man/animal in 1991 was reported to be about P40 for land preparations and P20 for other operations. As land preparation is male dominant and weeding is

female specific, a unit female labour under the prevailing circumstance is less remunerative than male labour.

The reported farmer-harvester/thresher sharing ratios are 10:1, 25:2, 23:2. Manual threshers in Lublub are usually paid one unit for every eight unit of the harvest. The payment in advance of hired labour, especially for harvesting and threshing, is also practised. Such payment is usually done during the lean period and the amount normally paid is usually far less than when the operation is in progress.

8.2 Land tenure

Land is a fundamental capital resource in agriculture. Access to most institutional credit is conditional on land ownership right in the area of study. As this area of study is basically agrarian, access to land means to a large extent guaranteed livelihood.

8.2.1 The Comprehensive Agrarian Reform Program (CARP)

In Valderrama, as is the case of the other parts of Antique the agricultural land is relatively scarce given the increasing number of competing users and the concentration of lands in a few hands. With an increasing active population relative to the limited job opportunities in the non-agricultural sector, agriculture is looked upon to provide gainful employment to all those who can not find other forms of employment.

To redistribute land as well as to correct some inequalities, inherent in certain tenurial arrangement in the use of agricultural land the Government of the Philippines has been implementing an agrarian reform program since 1972. In effect the tenancy emancipation act under presidential decree no 27, was declared in 1972 with the main focus on converting rice and maize lands under share tenancies into lease-holding or ownership. This programme has evolved over time both in scope and implementing agency. In 1988 under the Aquino administration the Agrarian reform programme was converted into the "CARP" under the Department of Agrarian Reform (DAR). The DAR succeeded the Ministry of Agrarian Reform (MAR). The CARP covers as well no-rice and non-corn lands. In pursuing its objectives DAR works in close collaboration with other institutions like NGOs, DA and DENR. In Valderrama the DAR office operates in 15 of the 22 barangay in which it has organized barangay agrarian reform councils (BARC).

DAR effectively operates in the more readily accessible barangay as the remaining seven barangay considered as "non-CARPable" are distant and remote. Apart from the BARC, DAR also works with PO (peoples organizations) formed by APARRD, for example the KKMB of Buluangan II. In sum there are only three barangay in which DAR is active as shown in table 8.4.

Table 8.4 Active barangay under DAR

Barangay	Acreage (ha)	No of beneficiaries	Status
Buluangan II	272	98	Foreclosed
-	28	15	Allocated
Canipayan	134	48	Voluntary offer for sale
Takas	30	11	Voluntary offer for sale
Total	464	172	-

Source: Municipal DAR office, Valderrama

Of the 464 ha indicated in table 8.4, only 28 ha (i.e. 0.6%) have been completely transferred to 15 farmers in Buluangan II. That is, 15 farmers have been issued land ownership awards. The remaining acreage of 272 ha which was foreclosed by the Development Bank of the Philippines in Buluangan II have also been allocated to 98 beneficiaries who are amortising, in palay, their bank loan through the appointed agent. Four of these 98 potential CARP-beneficiaries in Buluangan II were captured in the survey seem apparently ignorant of the terms of the DBP bank land they have been allocated. Although the transfer of the DBP land was discussed with the potential beneficiaries according to some source in the barangay, this explanation might not have been sufficient. In the main survey, 56 of the 79 interviewees (70%) claim not to have heard of the agrarian reform council in their barangay, though the four sampled barangay are under the coverage of CARP. This is, obviously, an indication of the ignorance of the majority of the respondents of their rights under CARP. This lack of information do negate the progress of CARP.

Regarding the 164 ha under Voluntary offer for sale (VOS) the main problem cited by the Municipal DAR office is the lack of funds to pay the land owners. Under the CARP- act land is sold to the government, who in turn allocates it to a chosen beneficiary.

8.2.2 Tenancy arrangements

In the Lublub survey, the importance of the land tenure issue became evident given the high degree of land fragmentation and the complex nature of the land holding arrangement. The 51 land parcels were reported by the 23 respondents in Lublub, and the farmer-operator cultivated on average 2.2 parcels, with a range of one to four. In the main survey, the average number of parcels per farmer is 1.63, ranging from 1 to 6 parcels. On average the size of a parcel is 24.5 gantas of seed rate (about 0.82 ha). The parcel with minimum acreage of 0.2 ha is found on irrigated datag land, whilst the maximum area of 4 ha on a bantod land. The small size of the parcels means that the household has most often to depend on more than one land parcel.

The forms of tenurial arragenments observed during the study, i.e. share tenancy, ownership, mortgage and lease holding. These tenurial systems are not farm operator specific as farmers can access at least one of the four modes of tenancy mentioned above.

Ownership

The most important sources of land for owners are land inheritance and purchases. Land inheritance is from both parents. This contributes to land fragmentation and to the small size of farm parcels. The limite size of the parcels do explain partialy why certain farmers cultivate both owned and tenated parcels. All owners in the survey have tax declaration as their land title. The tax declaration is issued by the local government office and is acceptable by the people but not officially recognised as legal title. Consequnetly commercial banks do not accept tax declared land as title as security for loans. This means that the sampled farmers can hardly avail themselves of bank credit.

More than half (about 60%) of the reported 129 parcels were operated by tenants and the remaining were shared among owners, mortgagees, and lease holders. This shows the prevalence of share tenancy in the study area as a mode of accession to the land. The number of tenant operated parcels was almost twice that of owner operated parcels. The dominance of share cropping is also reflected in the number of share tenancy in the sample.

Lease holding

Of the four tenurial arrangements existing in the study area, lease holding which is being promoted by DAR, is the least practised, only 3 out of 129 parcels where under lease holding. The type of lease holding practised, can be considered as a variant of share tenancy as the lease rent, though fixed in advance, is paid in palay after harvest. Moreover, no definite lease period is practised although the minimum period is considered to be one year. With no written agreement, this tenure system as practised the respondents could be precarious for the lessee, as it can be terminated at the end of the cropping year without a long period of notice by the owner.

The land rent under lease holding as recorded in the survey, is higher for irrigated parcels then for any other type of land. The annual rent for an irrigated land for about 0.42 ha was 34.25 cavans as against 33 cavans for a non-irrigated terraced upland of about half a hectare.

However, lease holders prefer this type of land arrangement because according to them it is a more equitable way of distributing the harvest. Moreover, they prefer not to share all harvest especially of the readily marketable crops. There is also less influence of the owner on production decisions.

Mortgaging

Land mortgaging though contrary to the agrarian reform act was practised in 15 of the 129 parcels recorded in the survey. Of these mortgaged parcels, seven were cultivated by the mortgager as tenants. Unlike lease holding, a written contract prepared by a notary officer exists for mortgaging. To satisfy urgent financial needs like payment of school fees, farmers mortgage their land in the absence of any other source of fund. Traders/money lenders

in the barangay with readily available cash are most often the mortgagees. Mortgagers with only one parcel and with no other alternative source of income are forced to become tenants of their own fields. Eight land parcels were cultivated in the previous cropping season by a mortgager/tenant. Mortgage fees vary according to the land type and size.

Though the mortgage period is fixed in the written contract, in practice it is open as mortgagees are the least concerned in the case of delayed payment. The pledge land is kept as long as the mortgager is unable to redeem it. Loans under mortgage arrangement are not interest free. In effect the interest paid is translated into the revenues generated from the use of the mortgaged land. Mortgagee and mortgager usually live in the same environment and hence have close relationship. The former may therefore find it socially unacceptable to take the necessary legal action in the case of non-compliance with the terms of the contract. Land transfer to a third party subject to the original terms of the agreement is practised.

Share tenancy

Share cropping as a popular tenurial arrangement in the study area exists in different forms. More than two thirds (42 tenants) of the sharing tenants in our sample reported practising the 50:50 sharing of input cost and harvest with the landlord. Eight of the 42 share croppers deduct all variable expenses before sharing, while the gross harvest is shared in the case of the rest. The 70:30 sharing system although favoured by the DAR is of less importance in Valderrama especially for rice cropping as only 4 respondents reported it. The 75:25 arrangement, mentioned by only one respondent for rice crop, applies mainly to the tobacco crop. In both 70:30 and 75:25 arrangements, all the production costs are borne by the tenant.

Cases exist in the sample of farmer operators who consider themselves as tenants even though there is no sharing of harvest per se. In effect, this farm operator stays in the same household as owners who could either be the father or mother. Sharing exists in this set up as the tenant and parent eat from the same pot.

In the main survey, 30 and 11 respondents respectively have relatives and non-relatives as their landlords. One interviewee reported tenanting parcels from both relative and non-relative. The bond between tenant and landlord would therefore be very strong. Moreover, some relatives provide credit and other services to their tenants.

In figure 8.2, two cases are presented to show the genealogical relationship between tenants and their landlords. In the first case, the farmer is tenanting two pieces of land owned by the same relative. One of the parcels is however mortgaged out by the owner to a third person from whom farmer is tenanting the land. Besides, the tenant is also owning a small parcel of land inherited from the husband's side. In the second case, the household has inherited land from the parents of both the husband and wife. At the same time the farmer is also tenanting land from his own father as well as from a distant relative but through a mortgagee.

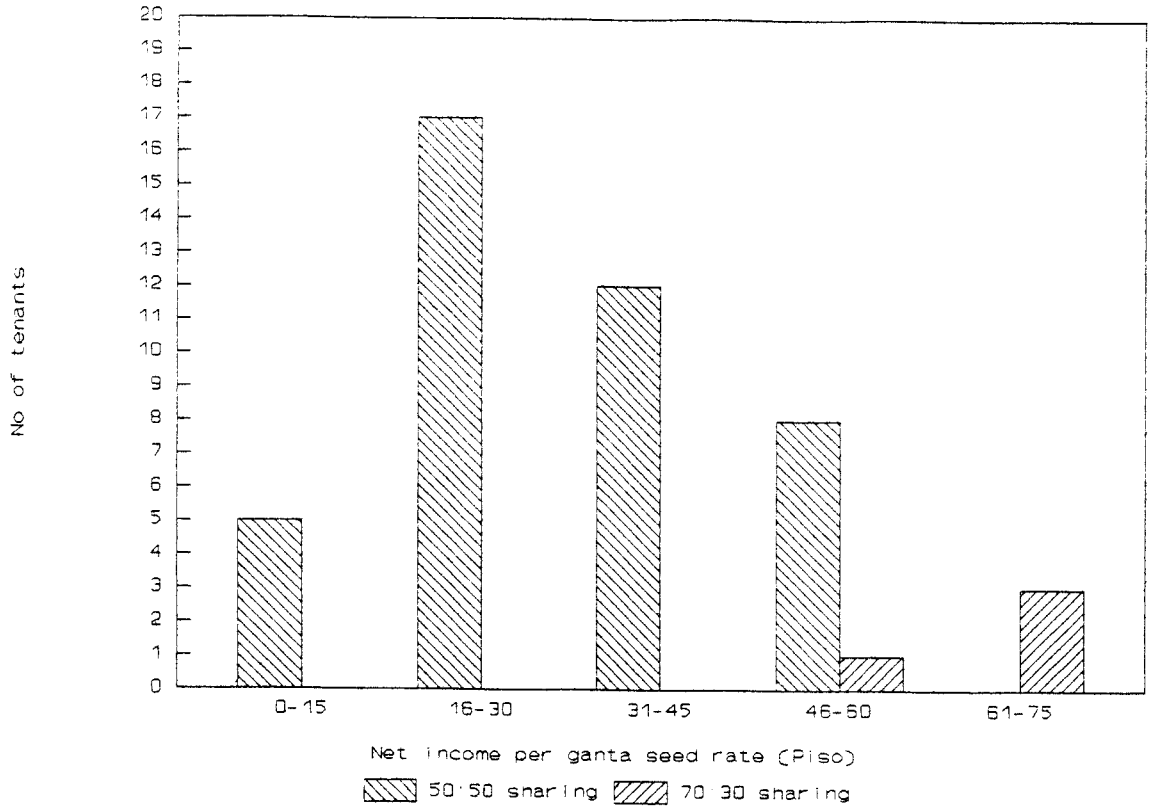

Figure 8.1 Net income per gantas seed rate to tenant for rice production in 1991-'92 cropping year

Inputs shared comprise of variable expenses on chemicals, seeds and labour hiring. When cash is paid for hired labour, it is usually provided by landlord whilst the tenant provides meals for the workers. The input cost can affect only first crop or all crops. In input sharing system practised by 19 out of 42 respondents, only the rice crop is affected and the other crops are put under the 70:30 arrangement. However for the remaining 23 interviewees, sharing of variable expenses concerns all arable crops. Under share cropping, the tenant can not dispose of the land. The influence of the land owner is important mainly in the choice of the first crop. For major investment decision, the tenant has to consult the landlord. Tenants who are not related to their landlords,are less inclined to invest on the tenanted, as the land can taken away, at any time by the landlords,given the absence of any legal binding documents.

The tenant's net income (estimated as the harvest in Piso less rent and variable expenses on chemicals, seeds, hired labour, interest charges and irrigation fee) is depicted in figures 8.1. On average, the tenant receives P33 and P63 under the 50:50 and 70:30 sharing arrangements respectively for

every ganta expenses on seed. Thus the financial advantage for the tenant under the 70:30 sharing system is apparently illustrated. The owner's share is low relative to the variable expenses in the 50:50 sharing. However some owners do get a share in the variable expenses given that some of the inputs are usually provided by the owner on credit basis.

Even though the 70:30 system is apparently more remunerative than the 50:50, reasons given by tenants for not practising it includes the following: common practice, relationship with owner too intimate, less risky in case of crop failure, area too small and less productive and the sharing of input cost.

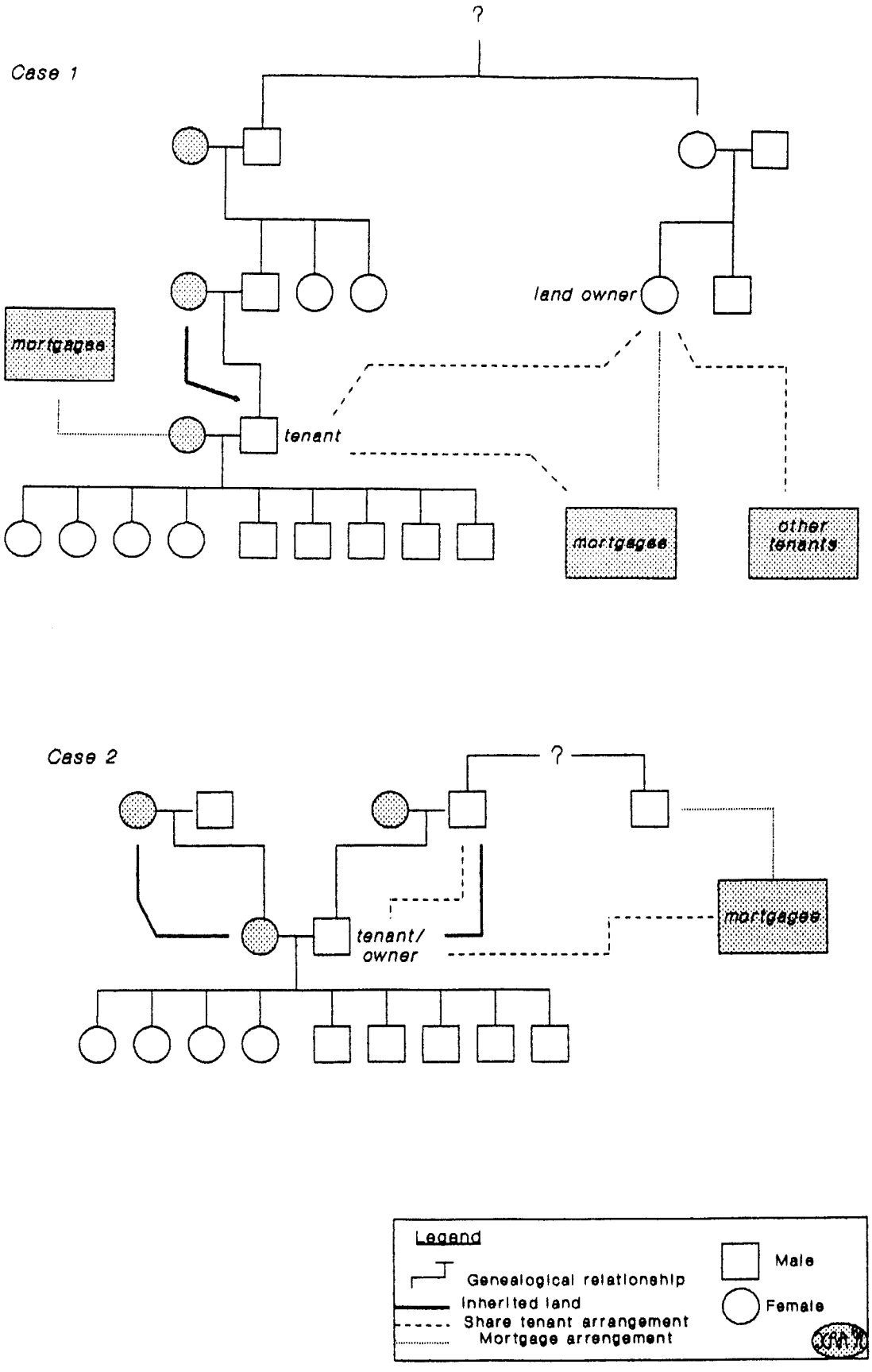

Figure 8.2 Two cases of tenants showing their genealogical relationship with their landlords.

8.3 Access to credit

In marginal agriculture credit is vital in improving the farm productive base as well as in acquiring certain critical resources. In the study area farm loans can be obtained from banks, development agencies, cooperatives and informal sources. Conditions to access to such loans are source specific.

8.3.1 Bank loans

A rural bank existed in Valderrama poblacion between 1976-'87. The bank was closed down because of financial problems. Consequently potential loaners have to go outside the municipality, mainly to San Jose, which is about 50 km to satisfy their credit needs.

Of the three main banks with agricultural loan copmponents only two land bank of The Philippines (LBP), and the development bank of the Philippines (DBP) provide unsecured loans to farmers. The Philippines National Bank (PNB) used to give non-collateralised agricultural loans before 1987 under the Marsagana 99 programme from which very few farmers from Valderrama benefitted. Since then the PNB accepts only collateral securities such as residential, commercial, and industrial landed properties with clean titles. This excludes tax declaration, which is the land title at the disposal of almost all farmers in Valderrama. Such farmers cannot therefore access PNB loans.

The Land Bank, which started operationin Valderrama in 1990, is the most important in terms of financing small borrowers. In theory, loans from Land Bank and DBP to small afrmers are channelled through registered farmers associations for onward lending to the individual members. Eighteen associations/co-operatives exist in the municipality, covering 15 barangay, as shown in annex IV. In practice only the LBP has so far disbursed credit to farmers association. The DBP also finances the purchases of land, such as agricultural land, and this activity links it to the Department of Agrarian Reform (DAR).

Table 8.5 shows the condition for access to credit for the three banks. Obviously the LB has the most favourable credit terms for farmers in Valderrama. In nominal term, the cumulative loans disbursed to Valderrama by LBP is the highest of the three banks. Two of the three loanees of DBP defaulted and this resulted to the foreclosure of the collateral land of one of them. This land was eventually handed over to DAR for redistribution to needy and interested farmers. The high default rate although less than a third on the average, is cited by bank as a basic problem in agricultural lending.

Table 8.5 Bank lending conditions for small borrowers

Requirements	Bank		
	Land Bank	Development Bank	PNB
Annual interest rate	12%	Based on cost of fund plus expenses (4-7%)	17%, 18% and 19% for 1, 2-3 and 5-year loans respectively
Loan period	6 months for annual crops with a grace period of 2 months after which the penal fee is 3%.	1 year	
Insurance	4.95% of palay loan and 2% of other crops	crop insurance required from corporation	for all improvements on collateral
Loan processing fee	none	yes	none
Preparation of project financial statements	none	none	yes
Notary fee	P 50 per folder	none	none
Other service charges	none		P 100-2500 for loans of P 10000- P 1 million

8.3.2 Development agencies

In this category, the ANIAD foundation is the most important. This foundation provides indirectly loans at 12% annual interest rate under the Community-based Economic Fund (CBEF) to registered peoples organisations. The CBEF is channelled through the Antique Federation of NGOs (AFON). The first disbursement of loans under the CBEF is pending. ANIAD also operates a development grant fund from which P1,564,100 has been released to the Tigmamale irrigation association (TIA) for the construction of water control structures.

The department of Agriculture under its animal and planting dispersal programme, also provide some form of loans to farmers. This programme became operational in 1980. Under the animal component improved breeds of cattle, carabao, goat, chicken, ducks, and swine have been dispersed to small farmers as indicated in table 8.6. These loans are repaid in animal offsprings, and these are subsequently dispersed to other farmers.

Table 8.6 Cummulative numbers of animals dispersed by DA, in Valderrama municipality since 1980 (Source: office of the MAO, Valderrama).

Type of animal	Number
Cattle	9
Carabao	7
Goat	8
Chicken	6
Ducks	44
Swine	8

8.3.3 Co-operatives and farmers associations

The Valderrama Co-operative and Credit Union is the only co-operative/association in the municipality providing savings and credit facilities for its members. The members are teachers, farmers and other workers coming from 15 barangay. Being a multi- occupational association the relative volume of agricultural loans is small. During the period 1989-1991, agriculture accounts for 18% of the P4,793,775 disbursed by the co-operative. The interest rates practised by the credit union are 2% for every quarter for savings, and 1.5% and 2% for loans below P5,000 and loans from P5,000 - P15,000 respectively.

Other farmers associations such as Tigmamale Primary Multipurpose, Inc., TIA, and Valderrama Irrigator Association (VIA) depend on external sources of funds to provide loans to their members. The three associations borrowed in 1990 and 1991 from the land bank the sum of P630,000 at 12% annual interest rate. This amount was relent to their members at an annual interest rate of 15%. The absence of savings mobilisation, limits the volume of loanable funds available to these associations. Moreover, the absences of the savings component does not cultivate savings habit in the members of the association.

8.3.4 Informal credit

Sources of informal loans, such as relatives, friends, landlords and traders/money lenders are common in the study area. Seventeen farmers in the Lublub study got money from relatives and friends, while four borrowed money from traders/money lenders.

Farmers obtain consumption as well as agricultural production credit. Of the 17 respondents in the Lublub survey ten, seven and one respectively used credit to purchase food items, fertilizer, and to hire labour. Both kind and cash loans exist in the study area. Twelve tenant respondents in the main survey got fertilizer credit in kind from their landlords during the 1991-1992 season.

Some loans do carry interest while others do not. Of the 17 credit respondents in Lublub, seven obtained interest free loans from their relatives, whereas the remaining ten had credit with interest from both relatives and non-relatives. Reported cash interest rates include 5 and 10% per month, 50 and 100% for a defined but flexible period.

For a 50 kg bag of urea and of 21:0:0, three and two cavans of palay are usually repaid respectively at the end of the harvest. Interest rates for this kind of fertilizer therefore vary from 50% to 167%. In the case of rice seeds the common repayment ranges from three cavans for two cavans, to five cavans for three cavans. Although the informal loans are unsecured and easily accessible to the farmers, the interest rates are usually relatively high. Such interests do obviously dampen the farmer's income. Moreover, they are limited to financing various farm expenses which are usually very low relative to needed long term capital investment.

With limited access to institutional credit, farmers in Valderrama have no option, but to frequent these sources of informal credit.

8.4 Agricultural markets

Table 8.7 below shows the markets most frequently visited by farmers in the study area for the purchase of inputs like chemicals (fertilizer and pesticides) and for the sale of farm produce, both crop and livestock.

Table 8.7 Markets frequented by farmers

Market	Market day	Common farm produce
Valderrama	Friday	crops and animals
Bugason	Sunday, Wednesday	crops and animals
San Jose	Monday	crops
Sibalom	Tuesday	animals

8.4.1 Farm Input supplies

Apart from private input farm supplies in Valderrama poblacion and San Jose, nine farmers association/co-operatives are also engaged in buying and selling inputs, especially fertilizers and pesticides (see annex IV).

Such associations are absent in the majority of the barangay of the study area. Farmers in these barangay have, therefore, to rely mainly on markets in Valderrama town and San Jose for their input supplies. For remote barangay,

like Lublub, transportation is a big constrained. For instances, it costs P1.47/km more for moving a 50 kg bag of fertilizer or palay over the 9 km distance from Valderrama to Lublub, than the 50 km distance from Valderrama to San Jose. Middle men as input suppliers and farm produce buyers are therefore popular in this environment. Farmers in such areas are likely, therefore, to be squeezed by the high price of chemicals relative to low prices for their produce. Returns to farmers under these prevailing circumstances, may be very low.

Within Valderrama municipality no certified seed grower is found, for the nearest for palay is located in Bugason. Farmers tend to use their own seed stock, retained from previous harvest and/ or exchanged from other farmers. Out of 23 respondents in Lublub, nine, seven and seven respectively used own, exchanged, and purchased rice stock during the 1991-1992. Although the use of hybrid rice varieties by farmers is widespread in the study area, their purity is questionable, given the various sources of seeds mentioned above.

8.4.2 Farm produce

Crop produce market

Crop produce buying and selling is dominated by private traders. The National Food authority (NFA), a government subsidized agency, has a national mandate to support the prices of mainly palay and maize. Up to 1985 the coverage of NFA used to extend to sorghum, soya and mung beans. However, the government subsidy has gradually been phased out, with a view to make it self-sustaining. This scaling down of government support is reducing the purchasing power of NFA to the extend that it can at best absorb about five to ten percent of the national rice production. Notwithstanding this budgetary constraint of NFA, its coverage of Valderrama is very limited given the seasonality of some of the roads and the condition to be satisfied by the potential produce sellers. Farmers do not only have to be registered members of NFA but also have to abide by the NFA grain purity of 95% and moisture content of 14%. This then puts the private trader as the most popular farm produce outlet in the area. The traders are usually less demanding in quality and also provide credit, although their farm produce prices are relatively low.

In 1991 the palay price per cavan offered to farmers by the Taurus Rice Mill in Patnongon was about 67% of that of NFA. In fact during the 1991-'92 harvest period the price of palay per kilo was reported to fall below P3/kg. The high degree of reliance of farmers on private rice buyers for the disposal of their produce means lower farm income. For farmers indebted to banks, this will reduce their loan repayment capacity. Concerned with the depressed price of palay in the free market especially during harvest period, Land Bank of the Philippines extended a line of credit of about P200,000,000 to NFA. Under the proviso that the latter buys palay from Land Bank farm loanees. As the supply of palay far exceeds the effective demand of NFA, the farmers concerned can only then sell to NFA an amount of palay equivalent to the loan to be repaid.

Livestock market

The most important livestock market in Antique is found in Sibalom. But animals can also be bought during the market days of Valderrama and Bugasong. The Valderrama market was established in 1970 while that of Bugason in 1952. The animals common in both markets are cattle and carabao, but horses, are specific to Valderrama, as against piglets to Bugasong.

In Valderrama, pig owners do not need to take their animals to the market as they are frequently visited by potential buyers. The Valderrama and Bugasong market in effect are usually first points of exchange between farmers and middle men. Animal buying agents also purchase animals at the barangay level. These animals are then taken by the agent to the Sibalom market where animals buyers from other provinces and regions frequent. Valderrama and Bugasong market therefore act as feeder markets for Sibalom.

Unlike the Valderrama market, Bugasong and Sibalom have platform balances. Livestock price is therefore based on visual inspection, that is on the configuration and health signs, the bargaining power and the demand and supply situation. In the case of Bugasong and Sibalom, body weight is the most important price determining criteria.

All large ruminants have to be registered in the municipality before they attain the age of one year, P15 is paid per head in the case of Valderrama. This is to minimmize theft and to ensure the payment of P15 for the transfer of ownership whenever the animal is sold. At the market, a market fee of P10 is paid in Valderrama.

The sale of hybrid piglets is reported during the survey at a higher price (from P350 to 600) than natives (P300). In Bugasong market hybrid and native piglets carry the same unit price of P500, but at different weaning ages, natives being twice the age of hybrids.

During the month of June 1992 the reported live weight unit prices of cattle and carabao were respectively P20 and P30 per kg.

8.5 Farmer-extension-research linkage.

In the study area, institutions concerned with the agricultural knowledge and information system include DA, DENR, DAR, EBJ-UDP, NGO's, Peoples Organisations, farmers, and the Antique College of Agriculture (ACA). Co-ordination among these institutions is provided through the ANIAD foundation board, on which all the institutions but farmers and their associations are represented.

The ACA is the most important educational institute in Antique province, as it provides both short-term and long-term agricultural courses. The latter course programmes are meant for training agricultural personnel, including the DA frontline worker, that is the agricultural technologist/farm management technician. The short-duration training caters for the educational needs of farmers.

As far as research and development activities in agriculture and natural resources are concerned, Antique Province falls in the administration of region 6. The head office of this region is in Iloilo, where co-ordination is effected. At the regional level, DA, DENR, state colleges and universities and the national research centres are the most important research institutions.

Overall regional planning of research and development of the above institutions is done by the Western Visayas Agricultural Resources Research and Development Consortium (WESVARRDEC), a regional research policy consortium. WESVARRDEC minimizes the duplication of research effort, thereby ensuring the wise use of research and development resources. National agricultural research and development activity is co-ordinated by the Bureau of Agriculture (BAR), while overall research in the country falls within the mandate of the Philippine Council for Agricultural Resources Research and Development (PCARRD), which is under the Department of Science and Technology (DOST).

The research focus of the seven state colleges and universities is technology generation. Whereas DA and DENR undertake development research, which incorporates the generation, adaptation, verification, and dissemination of technologies. For this both DA and DENR have research and extension sections. The approach being pursued especially by DA is such that the influence of extension in technology generation is very minimal, but it increases with the progression towards technology utilization. The six national research centres in the region concentrate mostly on basic research of national importance in crops, livestock and fisheries resources. The DA provincial research has carried out technology verification and adaptation trials on cropping patterns, fertilizer management of different crops, varietal and animal improvements in two municipalities of Antique (Hamtic and San Jose). The emerging recommended cropping patterns include;
- upland rice - corn + peanut/ipil-ipil,
- wet land rice for tripple cropping on lowlands.
Independent of the DA research, EBJ-UDP also started in 1991 adaptive research on upland inter-cropping systems in the study area, but this has been discontinued because of the lack of research resources.

Research under the DENR is done by the eco-systems research division (ERD), which has replaced the Forest Research Institute (FORI). The ERD focuses its activities on the regeneration, management, protection and conservation of the dipterocarp forests and other soft woods and their bio-ecological characteristics. As most of the forest lands are under agricultural production, other research activities undertaken ERD include; aqua-silviculture, agric-livestock and the establishment of sericulture. Matured DENR technologies concern sericuture, sloping agricultural land technologies (SALT), vermi-composting, forest pest and disease management, and agric-livestock just to mention a few.

Within the agricultural domain there is an on-going devolution process of research and extension in the entire country, and this is expected to be completed, in theory, in July 1992. For region 6, this rationalization will lead to the reduction of research and extension stations/facilities from 55 to 13, all of which will fall under the Western Visayas Integrated Agricultural Research Centre (WESVIARC). Under the WESVARC six research

outreach stations and six provincial service stations are planned. WESVIARC is to be the centre for technology generation, while the outreach stations will validate technologies on the basis of on-farm trials, and will therefore serve as the farmer-extensionist-researcher interaction point. The provincial service stations which will serve as the source of improved farming inputs, will be devolved to the provincial government unit.

The use by farmers, of some of the technologies being generated and propagated by the institutions mentioned above, is evident in the study area. The farmer-to-farmer contact remains the common mode of spread of these technologies. Methods used by frontline agricultural technologists include personal visits, training, workshops, seminars, demonstration plots and posters. In our main survey most farmers, especially those in the remote and hilly areas, reported no contact with agricultural technicians. Twenty four (32%) of 74 respondents reported visits by technicians in the 1991/92 farming season. The common reason often cited by the technicians is the peace and order situation. Moreover, the distances that technicians have to cover to visit farmers are usually great, given the wide degree of dispersion of farmers in Valderrama. Given the resource constraint of the extension agencies, only a very limited number of farmers can benefit from the individual approach to farm visits by technicians. To have a greater coverage of farmers, the cluster approach practised by the EBJ-UDP for the delivery of farm innovations seems quite opportune. Technicians usually represent DA, EBJ-UDP, AFCCUI, DAR and ANIAD according to the respondents who were visited by technicians. This is obvious as DA and EBJ-UDP respectively operate in 16 and 9 of the 22 barangay of Valderrama municipality, as is depicted in annex 4. No respondent in our sample mentioned visits by DENR personnel, although DENR is, in theory, present in 4 barangay. This can be attributed to the bias of DENR towards forestry and the integrated social forestry approach.

Some of these technicians usually advise on farming practices such as fertilizer use, pest control, water and terrace management. As regards training, 31 (42%) of 74 interviewees reported to have received some agricultural training, which include crop and livestock practices, Napier grass and tree planting along contours, use of soil test kit, co-operativism and community development.

9 CONCLUSION AND RECOMMENDATIONS

9.1 Annual crops

The survey results clearly show that the production and productivity of arable crops in the study area is low. This situation is due to a combination of several factors which include shortage of land, insufficient moisture supply, below optimal and in some cases inappropriate use of fertilizers and other inputs and with regard to upland crops, lack of proper care. The unreliability of rainfall at both ends of the growing season makes the cultivation of crops with relatively lower moisture requirements imperative on lands where irrigation cannot be practised due to physical constraints.

As there is virtually no new land left for expanding production, the solution to the problem of increasing crop production lies in increasing productivity. Improvements in the yields of these crops are necessary if the problems of food insufficiency and poverty are to be alleviated. For annual crops therefore the following recommendations are made:

1) Fertilizer use in rice and other crops

Justification

Farmers applied fertilizers to only rice because of the importance attached to this crop and the awareness of the benefit of fertilizer to this crop. The survey results however showed that most farmers lacked the knowledge of how much fertilizer should be applied under their soil conditions. As concluded already in section 6 the inherent soil fertility differences pertaining in the area makes a general fertilizer recommendation irrelevant. It would therefore seems reasonable to suggest the introduction to more farmers the already existing idea of analysing for soil nutrients before fertilizer application. This should be combined with on farm fertilizers trials on strips of land by farmers to determine the quantity of fertilizers needed under their conditions.

Farmers have neglected the other crops with regard to fertilizer application. Even with legumes like groundnut and mungbean which are supposed to fix nitrogen, an application of some amount of inorganic fertilizer is essential. On farm trials involving the use of both inorganic and organic fertilizers should be conducted to determine the appropriate types and quantities of fertilizers useful for the upland crops.

Actors

-Researchers and farm management technicians of the Department of Agriculture and EBJ-UDP.

2) Improvement in cultural practices in crops other than rice

Justification

Observations of fields of most of the crops grown after rice revealed a high

infestation of weeds. Farmers grow crops like mung bean because they claim it can grow with very little care. The adverse effect of weed competition on the growth and yield of cultivated crops is a well known fact. Farmers neglected these crops probably because of competition for labour between the growing of these crop and off-farm activities. As most of these crops are used directly or otherwise to supplement insufficient rice production, the need to increase their yields cannot be overemphasized. It is therefore recommended that on farm trials to test the possibilities and economic viability of herbicide use in these crops be carried out. It is anticipated that there are already a host of candidate herbicides that can be looked into.

Actors
Researchers of the Department of Agriculture.

3) Improvement of drought resistance/tolerance in upland crops.

Justification

Most often upland crops are grown towards the end of the rainy season when soil moisture conditions are deteriorating. Some of these crops fail because of drought. To increase the performance of these crops under adverse moisture conditions therefore requires crop types that have the ability to grow and produce remarkably under such conditions. Breeding or screening for drought resistant/tolerant varieties of crops already grown in the study area should be a component of the strategy to be used in increasing the productivity of these crops. When such materials are found they should be tried in on farm trials to test their performance under local conditions.

Actors
Researchers of Department of Agriculture and EBJ-UDP.

4) Introduction of irrigation systems

Justification

In Lublub, Binanugan and Buluangan II, farmers could plant only two crops because of insufficient soil moisture. In some case only one crop could be grown. Under such conditions it becomes very difficult to be self sufficient in food production. Irrigating the datag lands can inprove the sustainability of agriculture in these areas by lowering the pressure on the banglid/bantod lands. As a matter of development recommendation therefore, irrigation facilities should be introduced into these areas wherever feasible.

Actors
Development agencies and Peoples organisations

9.2 Perennial/ tree crops

In the present study, information on the productivity of perennial/tree crops could not be obtained as farmers were not able to estimate the yield of these crops. Most of these crops are supposed to be grown on sloping land for the

dual purpose of controlling erosion and serving as source of cash income. The result shows that there is a lot to be done in promoting this ideas. To achieve some results in this venture, efforts should be made to promote the growing of tree crops especially coffee which seems be better suited for the environment. For the cultivation of coffee a few suggestions are made below:

1) Rejuvenation of old coffee trees.

Justification

The coffee tree requires constant training to develop a structure that will facilitate maintenance operation and harvesting and prevent the production of unproductive vegetative materials.
Most of the old coffee trees encountered during the survey were of heights which make harvesting difficult. Coffee trees can be rejuvenated through coppicing. It is recommended that these old trees are coppiced and the new shoots allowed to develop to take the place of the old ones. These new shoots should be capped when they reach a height that could be easily reached from the ground. As farmers are not aware of this technique, it has to be demonstrated to them.

Actors
Farm management technicians of Department of Agriculture.

2) Shade/Spacing studies in coffee.

Justification

Inter-plant competition affects both the growth and yield of crops. Although in certain crops provision of shade is necessary in the early stages of establishment, improper use of shade can retard the growth of the young seedling. In the mature crop, excessive shade can also be unfavourable to yield. Such a situation was observed on a visit to a farmer's farm in Lublub and to a mature coffee farm in Magdungao in Iloilo province. It is therefore recommended that trials on the interaction between shade and spacing be studied in coffee. The role of Glyricidia sepium and banana as permanent and temporary shade species respectively should be investigated.

Actors
Researchers of Department of Agriculture.

9.3 Livestock

Livestock makes an important contribution to the household economy of the upland farmers in Valderrama municipality, providing draught power, food, cash and employment opportunities, for women and children particularly. However, there is still potential scope for its improvement to increase economic benefits. In order to achieve these benefits the following recommendations are made.

1) Large ruminants (Carabao and cattle)

Limited supply of forage during the dry season has been considered to be the most critical factor in improving productivity of large ruminants in the area. To overcome this problem the following activities are recommended.

- Improvement of pasture land by introducing tropical pasture legumes and pasture grassess suitable to this climate.
- Encouraging farmers to grow more multi-purpose species of trees like Leuceana leucocephala and Gliricidia sepium in the marginal land particularly in banglid and bantod.

- Stacking of rice straw as a reserve for dry season feeding.
- Conduct mass vaccination programmes for controlling Haemorrhagic septicaemia. Vaccination programmes could also be handled by training two to three members of the people's organization (PO) on first aid treatment and vaccination including animal husbandry practices.

2) Pig

Crossbreeding programmes in pigs are encouraging, but management practices need to be improved. Good quality stock for breeding should be made available for potential breeders. Research into specific areas should focus on:

- Identifying the causes of long farrowing intervals in breeding pigs.
- Effects of internal and external parasites on growth rate of fattening pigs.

3) Poultry

The vaccine available at present for the control of Newcastle disease (Aratay) is not heat resistant and requires completion of strategic regimes and is therefore difficult to administer on farms. There is a heat resistant vaccine developed in Malaysia, which can be given mixed in feed (V4 food based oral vaccine). This would be worth testing for its effectiveness in Antique by the concerned authorities.

9.4 Policy Recommendations

1. Given the character of Valderrama in terms of slope, the government should reconsider the 18% criterion as limitng constraint to land use classification as in practice farmers have shown to be able to cultivate steeper slopes successfully.

2. The government should give serious effort in its land use classification programme for Valderrama with the end in-view of awarding certificate of

stewardship contract and title to the upland forest occupants and the delineation of permanent forest zones. Probably, these occupants have in most cases tax declaration to show some form of ownership.

3. Community-based forestry project should be undertaken with the existing reforestation project at barangay Binanugan as pilot area. As a micro-watershed, this project has the potential to provide irrigation water in the barangay downstream, such as Takas and the wood material requirement of the municipality, among others. With the implementation of the local government code, this project should be handled by a local NGO, preferably based at Binanugan. Species used for the reforestation should include fast growing ones like Gliricidia sepium from which farmers could be allowed to make charcoal which provide an interesting economic activity.

9.5 Institutional and organisational

The internal structure of some farm households, is associative, given that decisions are most often shared. This is reflected in the flexibility in the allocation of farm tasks. But the decision making authority of the household is reduced in share tenancy. In essence two types of land tenures, co-exist , one recognized by the people and the other by the government. The tax declaration as land title, share cropping and land mortgage are all practised by the people, but considered by the state as illegal. To pursue its objective of land titling notwithstanding the difficulties in accessing the titles, the government is putting a lot of pressure on the people through its institutions like the banks. However, the progress of the CARP in Valderrama is rather slow given that ownership certificates have so far only been issued for 6% of the 464 hectares alreadey earmarked by DAR under CARP. Share tenancy as practised in the study area, functions as a sort of social security system for many landlords and it therefore keeps the system on march. Though less advantageous for the tenants, share cropping is practised due to the close intimate relationship between the tenant and landowner.

The peoples' law tenure has been in existence for several decades. A much more social CARP may be necessary. With the limited access to bank loans and government support for farm produce, farmers have to depend mostly on private traders and to a lesser extent on their own associations for input supply and sale of farm produce. The dependence on the informal sources, farmers suffer a cost-price squeeze, which tends to bond them to these sources. Without external assistance, farmers implicated in this type of bondage may find it extremely difficult to free themselves. Land parcels are rather fragmented. This fragmentation reduces the parcel size, and it can be attributed to the high population growth rate and the practice of both paternal and maternal system of land inheritance.

The focus should be on the improvement of the flow information from the various institutions/departments to the farmers. The following suggestions are therefore presented:

1. Continue to strengthen existing peoples organization already formed in a number of barangay and, where they do not exist, facilitate their formation. These organizations should be made to perform a number of functions either specific or otherwise: information dissemination, supply of inputs and sale of farm produce.

2. Encourage in other barangay, bank lending to farmers through their registered associations which is currently being done by the Land Bank.

3. Enhance the availability at the farmer's disposal, of information on the appropriate provisions in CARP, innovations and credit, through PO's, technicians/development workers and radio broadcasts.

10 REFERENCES & BIBLIOGRAPHY

ANIAD (1990)
Plan of operations phase 1, 1991-1993 - main report - Antique, The Philippines, 121pp.

Bouis H.E. and L.J. Haddad (1990)
Effects of agricultural commercialization on the land tenure, household resource allocation, and nutrition in The Philippines. International Food Policy Research Institute - Research report 79, Washington D.C., pp72.

Calimbas, F., F.B. Lopez, J. Tingzon and A.E. Mojica (1962)
Soil survey of Antique province, Philippines, Soil Report 30, republic of The Philippines, Department of Agriculture and Natural Resources, Bureau of Soils, Manila, 87pp.+ map.

Driessen P.M., R. Dudal - editors (1991)
The major soils of the world, lecture notes on their geography, formation, properties and use, Agricultural University Wageningen/ Katholieke Universiteit Leuven, 310pp.

FAO (1982)
A study of the agroclimatology of the tropics of Southeast Asia - Technical report, FAO/UNESCO/WMO interagency project on agroclimatology, 221pp + annexes.

Garrity D.P. (1991)
Sustainable land use systems for the sloping uplands of Southeast Asia. Technologies for Sustainable Agriculture in the Tropics, American Society of Agronomy.

ICRA (1981)
Agricultural research and development relating to the Kabsaka project, Iloilo, The Philippines - ICRA bulletin 3, Wageningen, The Netherlands, 83pp.

ICRA (1981)
The identification of agricultural research priorities, with particular reference to rainfed rice in Capiz settlement, Panay Island, The Philippines, Icra bulletin 3, Wageningen, The Netherlands, 70pp + annexes.

ICRA (1982)
The farming system in the uplands of the south of Antique province, Panay island, The Philippines - Wageningen, 61pp + annexes.

ICRA (1982)
Farming systems in Miag-ao, Iloilo, The Philippines, ICRA Bulletin 5, Wageningen, The Netherlands, 44pp + annexes.

ICRA (1983)
Farming systems in the Maoit river catchment areas, Antique, The Philippines, ICRA bulletin 13, Wageningen, The Netherlands, 50pp. + annexes.

ILACO (1985)
Agricultural Compendium for rural development in the tropics and subtropics, 738pp.

MCD (1991)
Mémento de l'Agronome, République Française, Mininistère de la Coopération et du Développement, 1635pp.

Menz, K.M. (ed.) (1989)
Rainfed rice production in The Philippines: a combined agronomic/economic study in Antique province - ACIAR Technical report No 13, Canberra, 90pp.

OIDCI (1991)
Antique strategic upland study, report prepared by the Orient Integrated Development Consultants, Inc., for ANIAD.

Oli, K.P. and A.M. Morel (1985)
Livestock production in the Eastern hills of Nepal. In Morel, A.M. and K.P. Oli (eds), Livestock in the hills of Nepal, pp 1-28. Pakhribas Agricultural Centre, Dhankuta, Nepal.

Otsuka, H., A.A. Brioness, N.P. Dauido and F.A. Evangelio (1988)
Characteristics and genesis of volcanic ash soils in the Philippines, Technical Bulletin of the Tropical Agriculture Research Center No 24, 119pp.

Tasic R.C., C. Fazekas de St. Groth, J.F. Angus (1987)
PHARLAP: A cropping systems study on rainfed rice farms in Antique province, Philippines. Commonwealth Scientific and Industrial Research Organization (CSIRO), Canberra, Australia, 91pp.

Rhoades R.E. (1982)
The art of the informal agricultural survey. International Potato Center (CPI), Lima, Peru.

Wolters W.G., V. Fitzgerald, R. Vos and Van Raay (1989)
The Philippines background document: development trends and needs - Institutes of social studies advisory service, The Hague 58pp + annexes.

WORLD BANK (1989)
Philippines: Forestry and agricultural resource management study (ffARM study), report No 7388-PH, World Bank, Washington D.C., 170pp +annex.

ANNEX

I. CONVERSION TABLE OF SELECTED AGRICULTURAL CROPS

1 liter palay (rough rice)	0.58 kilograms
1 liter milled rice	0.75 kilograms
1 ganta palay	1.76 kilograms
1 ganta milled rice	2.24 kilograms
1 cavan palay	44.00 kilograms
1 cavan palay	27.984 kilograms (milled rice)
1 cavan palay	0.4997 cavan (milled rice)
1 cavan milled rice	23.5 gantas (milled rice)
1 cavan milled rice	50.0 kilograms
1 cavan milled rice	2.001 cavans palay
1 metric ton palay	22.727 cavans palay of 44 kgs.
1 metric ton milled rice	11.357 cavans milled rice of 50 kgs.
1 metric ton milled rice	35.734 cavans palay
1 metric ton milled rice	17.857 cavans milled rice
1 liter shelled corn	0.77 kilograms
1 ganta shelled corn	2.32 kilograms
1 cavan shelled corn	57.00 kilograms
1 sack milled corn	22.63 gantas
1 sack milled corn	45.5 kilograms
1 cavan mungbean	58.5 kilograms
1 ganta mungbean	2.34 kilograms
1 liter mungbean	0.78 kilograms
1 cavan unshelled groundnuts	25.0 kilograms
1 ganta unshelled groundnuts	0.98 kilograms
1 ganta shelled groundnuts	2.0 kilograms
1 sack groundnuts	20 kilos
1 can groundnuts	6.67 kilograms

II. GLOSSERY OF KINARAY-A TERMS

alibangbang/tataro	-	butterfly/caterpillar (Melanitis ledaismene)
alusiman	-	Potolaca oleraceae
aratay	-	Newcastle disease
barangay	-	smallest political unit headed by barangay captain
barrio	-	village
sitio	-	small neighbourhood in village
kaingin	-	slash and burn method in agriculture; indiscriminate burning of forest vegetation
bungotbungot	-	Fimbristyllis litoralis
parayparay	-	Echinochloa crus-galli
payongpayong	-	Cyperus iria
mungo	-	mung bean (Vigna radiata)
wayawaya	-	planthopper (Nilaparvata lugens)
tamasok	-	stemborers (Chilo sp., Rupella albinella, Scirpophaga sp., Sesamia inferens)
tanangaw	-	rice bug (Leptocorisa oratorius)
langaw/kusim-	-	whorlmaggots (Hydrella philippina)
tagustos	-	armyworm (Mythimna separata)
maramara	-	mole cricket (Gryllotalpa africana)
hukaw	-	weevil (Sitophilus sp.)
sodsod	-	Cyperus rotundos
visayan	-	native breed of animals
cogon	-	Imperata cylindrica
ipil-ipil	-	Leucaena leucocephala
madre de cacao	-	Gliricidia sepium
tigbao	-	Saccharum spontaneum
uhot	-	rice straw
mani	-	groundnut (Arachis hypogea)
tangkong	-	Ipomea aquatica
palawan	-	Xanthosoma sp.
camote	-	sweet potato (Ipomea batatas)
ubad	-	inner part of banana stalk
lansang-lansang	-	Haemorrhagic septicaemia
carabao	-	water buffalo (Bubalus bubalis kerebau)
pasagod	-	system in which the tenant looks afterfemale animals and shares the offspring alternatively with the owner depending on the arrangement made earlier
pahonol	-	system in which mainly male animals are given to the caretaker for fattening
lagaklagak	-	Echinocloa colonum
laawlaaw	-	Paspalum conjugatum
agsa	-	land tenure contract with either 50:50, 75:25 or 70:30 sharing of net produce between landowner and tenant
dagyaw	-	contractual arrangement where equal amounts of labour and/or carabao services are exchanged

pakyaw	-	contract labour group, e.g. for harvesting rice or ploughing a field
prenda	-	mortgagee
owned	-	pagpanag-iya
owner	-	tag-iya
ganta	-	volume measure equal to 1/25 of a cavan
cavan	-	volume measure equal to 44 kilograms of unmilled rice
palay	-	unmilled rice grains
pasapar	-	'open' participation in labour for harvesting
aryendo	-	mortgaged

III. QUESTIONNAIRES AND CHECKLISTS

A. DATA COLLECTION CHECKLIST

LAND

Do you have/ use?	Area	Tenure	Land use
- home-lot:			
- grass land			
- forest land			

Do you have/ use? (Area, Tenure, Land use)
- flat irrigated land
- flat not-irrigated land
- sloping terraced irrigated land
- sloping terraced not-irrigated land
- sloping not-terraced land (not irrigated)

HOUSEHOLD PROFILE
* No of persons
* Off-farm income
* Labour allocation, time, hire (in/out)
* Source of energy, fuel wood, kerosine, gas...

FARMING & SOURCE AND USE OF INPUTS
* Crops planted
* Cropping calender
* Fertilizer, organic manure, composting,
* Pesticides
* Arrangements concerning irrigation
* Management practices (contour planting, terracing)
* Animals - type, number, gender, use
  - tenure/ ownership (sagod system), T.O.R of -
  - health status
* Purchase of animal feed, drugs,
* Feeding practices

* Farm machinery/ equipment: plough, thresher,...
*

EXTENSION LINKAGES...

FARMING PRACTICES IN UPLANDS AND EROSION PROBLEMS

Date: Number sample:

Barangay: Sitio: Location:

Physiographic position
(alluvium/valley, colluvium/foot-hill, slope, crest,...)

Landform type Datag/ Datag hagdan[2]/ Banglid/ Bantod/ ...

Cropping practices

- crop species/ vegetation:
- sole or intercropped:
- land tillage system:
- anti-erosion practices:
- ...

PARENT MATERIAL: SLOPE: ORIENTATION:

SOIL DEPTH: PREDOMINANT SOIL COLOUR: dry | moist

EVIDENCE OF PAST EROSION &	TYPE OF EROSION	SOIL TEXTURE
- none	- sheet	- sandy/loamy sand
- slight	- rill	- sandy loam
- moderate	- gully	- loam/silt
- severe	- land slide	- light clay
- very severe		- sandy clay
		- clay

STONINESS	ROCKINESS
- <5%	-
- 5-15	-
- 15-30	-
- 30-50	-
- >50	-

Name:

Age: Barangay:

Tenurial Status:

- How long have you been using fertilizers

-Is there any effect of fertilizers according to your observations

-Which crops were grown on the land before you put it to rice production in the 1991-1992 growing season for each land type.....

Land type	Crop RICE	Var	Area in	Seed Rate gts	Method of Establ. (cvs)	D	T	BW	Date of Plant. Harv BD	Yield harvested (cavans)
Datag	1st									
	2nd									
	3rd									
Datag H	1st									
	2nd									
	3rd									
Datag tub	1st									
	2nd									
	3rd									

Land type	Crop	Type & Qty of fert. 21:0:0	Urea	T14	Date Applied (DAY)	Qty if split 1	2	Infestation of WEEDS H	M	L	INSECTS H	M	L	DISEASES H	M	L
Datag	1st															
	2nd															
	3rd															
Datag H	1st															
	2nd															
	3rd															
Datag tub	1st															
	2nd															
	3rd															

In case of weeds state species:. ....
observed insects by the farmers:.....
observed diseases by the farmers:.....

Name of used insecticide:.....
herbicide:.....
others:.....
What is the soil type of the different land types (ie lupa, lao, baras[2]) .....

What was the water condition of the soil when applying fertilizer....

HAs there been any drought/ flood during the growing season....

Give the period when water stood on the land for each land type.....

PRESENCE OF TECHNICIANS

- How do you determine the quantity of Fertilizer you are using?

- How often do you come into contact with agric. technicians..... and which technicians.....

- What type of technical advice do you receive from them....

- Have you ever attended any agric. training (yes/no). If yes what was it about? .....

STRATEGIES TO COPE WITH INSUFFICIENT RICE PRODUCTION

-* Which crops do you normally grow on your land parcels? (PROBE!!)

-* What is the cropping sequence for each land type?

- Why the sequence?

- What are the individual crops used for?

- Are you able to always produce enough rice for your household consumption? (yes/no) If yes how much did you have to get from outside the household (buying, borrowing,...) during the last cropping season.....

- Which crops are do you use to supplement rice either directly or after selling?

- Which of these crops apart from rice would you like to produce in large quantity and why?

- Apart from crop production what other sources/ activities do you depend on:
  - sales of animals:
  - sale of firewood/ charcoal
  - working as a labourer
  - receive remittances
  - other of farm work:...

- How do you compare their contribution with that of crops in terms of supplementing rice production

- If rice is bought where do you get the money from?

- Have you put new land under cultivation (Datag/ Banglid/ Bantod/ Labangan,...) to supplement your rice in the last 3 years.

*For annual crops apart from rice, ask for seed rates, yield and varieties.

* For perennials ask for number of plants, bearing plants, area (if possible) and yields.

LAND TENURE

Farmer.....Barangay/Sitio.....
Interviewers.....Date.....
Age of Farmer.....Educational level.....
Number of members in the household (including farmer).....

LAND TENURE

Land parcel	Type of Tenure	Duration	For mortgaged/ Leased.AMT(P)	Relation to owner	Title (Inher/Purc/Tax D) (specify)	Area Gt/Ha
Datag						
Datag H						
Datag Tubig						
Banglid/Bantod						
Others (specify						

For land operated under share tenancy who makes decision on the following;

Farming aspects	Decision Maker(tick where appropriate) Landowner	Tenant	Both(owner+ tenant)
Crops grown-1st crop			
- others			
Tree planting			
Terracing			
Use of fertilizer			
use of pesticide			
Hired labour/Equipment			
Sharing of input cost			
Sharing of harvest			
Transfer of land to a third party			

Which crops/trees are not allowed on the parcel by landowner
.....

Sharing arrangements of input cost and harvest.

Land parcel	Crops	Inputs		Harvest		Remarks (Is the harvest gross/net)
		Owner	Tenant	Owner	Tenant	
1	crop 1 only all crops					
2	crop 1 only all crops					

Which inputs are provided by the landowner:

Input provided by the landowner	Amount repaid (cash/kind) for the input provided	Remarks (specify the type of fertilizer)
Fertilizer(type		
Pesticide		
Seeds		
Repair of bunds/ terraces/canals		
others(specify)		

What other services do landowners provide for their tenants .....

credit..... terms.....

housing/accommodation..... gifts.....

schooling for kid(s).....

other(specify).....

Partial crop production expenses incurred on the tenanted land during the last season (May 1991-April 1992)

Crop	Seeds Qty	P	Fertilizer Qty	P	Pest. Qty	P	Hired labour cost (P) Plghg	Hrwg	Plting	Wding	Hrving (cash)	Thhing (cash)
1												
2												
3												
4												

specify which are provided by the OWNER .....

and those taken on credit: seeds..... amount repaid:.....
fertilizer..... .....
pesticides..... .....
cash..... .....

Sharing of harvest

Crop	Amount of Harvest					
	Retained by Tenant total	sold	Landowners share	Paid to Thresher	Harvester	Total Harvested
1						
2						
3						
4						

Institutional membership
Are you a member of the Peoples organization.. yes/no...
If no, why.....
Are you aware of the existence of the agrarian reform council in your Barangay?.....yes/no.....
Would you prefer to have lease holding agreement to share tenancy... yes/no
and if no why?

IV. FARMERS ASSOCIATIONS/COOPERATIVES IN VALDERRAMA

Association	Type	Focus/Activities	Membership	Barangays Covered
VCCI/VCCI	cooperative	thrift + credit + marketing	603	15 brgy.
VIA	association	credit/dev.	-	Valderrama
AKK	association	hog fattening/ vending	36	Valderrama
TIA	association	credit/dev.	-	Tigmamale
TMPC	cooperative	credit/marketing	-	Tigmamale
KKMB2D	association	access to land resource/dev.	34	Buluangan II, sitio Dugman
AMAKA	association	rehabilitation assistance	30	Kansilayan
MAKA	association	credit/dev.	35	Manlacbo
LBMB	association	development	-	4 brgy
AKUB	association	credit/dev.	30	Boroc-boroc
APOLU	association	credit/dev.	35	Lublub
Pandanan FA	association	fertilizer dealing	70	Pandanan
Boroc-boroc FA	association	fertilizer dealing	50	Boroc-boroc
Bunsod FA	association	fertilizer dealing	50	Bunsod
Buluangan I FA	association	fertilizer dealing	60	Buluangan I
Mango Producers	association	fertilizer dealing	50	Buluangan I
Takas FA	association	fertilizer dealing	70	Takas
Canipayan FA	association	fertilizer dealing	40	Canipayan
Lublub FA	association	fertilizer dealing	-	Lublub
TSCFA	association	coconut dev.	-	Tigmamale

VCCI - Valderrama Credit Cooperative Inc.
VCCI - Valderrama Consumers Cooperative Inc.
VIA - Valderrama Irrigators Association
AKK - Asosasyon ng Kababaihan sa Kaunlaran
TIA - Tigmamale Irrigators Association
TMPC - Tigmamale Multi-Purpose Cooperative
KKMB2D - Katilingban kang mga Mamumugon sa Buluangan II kag Sitio Dugman
AMAKA - Asosasyon sang mga Mangunguma sa Kansilayan
MAKA - Manlacbo aton Kauswagan Asosasyon
LBMBIA - Lublub, Boroc-boroc, Manlacbo and Bunsod Irrigators Association
AKUB - Asosasyon kang mga Kubos sa Boroc-boro
APOLU - Asosasyon sang mga Pomuluyo sa Lublub

Barangay Coverage by DA, EBJ-UDP, DENR and DAR in Valderrama Municipality

Barangay	Institution Present
Takas	DA, DAR
Ubos	DA, DAR
Canipayan	EBJ-UDP, DA, DAR
Buluangan I	EBJ-UDP, DA, DAR
Buluangan II	EBJ-UDP, DA, DAR
Pandanan	EBJ-UDP, DA, DAR
Iglinab	EBJ-UDP, DA, DAR
Bunsod	EBJ-UDP, DA, DAR
Manlacbo	EBJ-UDP, DA, DAR
Boroc-boroc	EBJ-UDP, DA, DAR
Lublub	EBJ-UDP, DAR
Binanogan	DA, DAR, DENR
Tigmamale	DA, DAR, DENR
Bugnay	DA, DENR
Igmasandig	DA, DAR
Buri	DENR

V. DIARY OF ICRA FIELD STUDY IN THE PHILIPPINES

3 April - departure from Schiphol, Amsterdam
4 April - arrival at Kuala Lumpur, flight to Manila cancelled
5 April - flight from K.L. to Singapore
6 April - Singapore (shopping)
7 April - arrival in Manila
8-9 April - attempt to get information and make bookings for flight or boat to Iloilo
10 April - meeting with officers from DENR, bureau of Integrated Social Forestry; bureau of CFP; with officers of DA, bureau of Soil and Water conservation
- meeting with prof. P.E. Sajise of UPLB
11 April - booking flight to Iloilo
12 April - visit to Los Baños, IRRI and UP
13 April - flight to Iloilo and travel to San José, Antique
14 April - meeting with ANIAD and with persons from 2 NGOs and DENR
15 April - travel to Valderrama, courtesy visits to local officials at the municipality, military camp,
- window survey towards Lublub
16 April - 3 persons went to San José, others read + chatted with neigbours
17 April - visits to market, to catholic priest (father Iling)
18 April - informal survey
20 April - DENR office, VCCI, and DAR office
21 April - informal surveys: Boroc-Boroc and to Buluangan II
22 April - informal survey to Binanugan, interview with DAR officer in Valderrama
23 April - visits to Lublub, Manlacbo, Tigmamale for window survey and meeting with Barangay captains
24 April - work discussion in Valderrama
25 April - planning meeting in Valderrama
26 April - visit to Lublub to prepare informal survey
27 April - Roberto to Iloilo for passports, visit to Bureau of Soils and statistics in San José for information on agricultural survey
28-30 April - informal survey and mapping in Lublub
1 May - evaluation of collected data
2 May - summary and planning
3 May - summary and planning
4 May - formulation of informal questionnaire
5 May - start of interviews in Lublub
6 May - interviews and soil tests in Lublub
7 May - planning meeting in Valderrama
8-9 May - interviews in Lublub
11 May - national elections, data summary in Valderrama
12 May - data summary
13 May - discussion on workshop, Hal Mettrick arrived
14 May - planning meeting, first methodology summary
15 May - visit to Lublub with Hal Mettrick, data summary
16 May - Hal Mettrick visited barangay, preparation of workshop
17 May - preparation of workshop
18 May - ICRA arrival in San José (Autajay) for workshop, finalization of workshop
19 May - workshop in San José (Autajay)
20 May - Hal Mettrick left Antique, ICRA proceeded to DA and DENR in Iloilo for meetings with officials, then to the Sloping Agriculture Land Technology (SALT) project in Magdungao

21 May - visit to SALT farm areas
22 May - planning meeting in Magdungao in the morning
- visit to NAMRIA and DA in Iloilo, then return to Valderrama
25 May - planning meeting in Valderrama
26 May - planning meeting, Causal Tree Analysis evaluation
27 May - formulation of questionnaire for main survey
28 May - questionnaire tested, visit to MAO
29 May - Roberto and Stefaan to DA library in Iloilo for information, Cécile and Olivier to San José for visits to ATI, NIA, NFA and Robert Trading for prices, Kwabena and Narayan to livestock market in Valderrama for survey
30 May - planning meeting
31 May - Narayan to livestock market in Bugasong
1-5 June - main survey in Buluangan II, Tigmamale, Binanugan
2 June - Olivier to San José for information from NIA and NFA, Roberto to Iloilo for logistics
6 June - planning meeting and review
8-12 June - week two of main survey: interviews in Binanugan, Lublub, Manlacbu, Pandanan and Takas
11 June - Narayan and Cécile to Iloilo for livestock information and delivery of soil samples to the Bureau of Soils for analysis
12-14 June - Roberto on home visit
15-17 June - data analysis of main survey
17 June - Foday to OPA in San José for information
18 June - planning and review meeting
19 June - morning meeting for report outline, data analysis, Roberto to San José to get additional computer
20 June - data analysis
22 June - Roberto to Iloilo for soil results, return next day only due to heavy rainfall and flooded riverbed, ICRA data analysis
23 June - data analysis
24 June - planning meeting, cancellation of final workshop on 26 June due to bad weather conditions, unable to cross flooded river
25 June - data analysis and report writing
26 June - meeting to discuss draft report
27-28 June - report writing
29 June - departure from Valderrama, report writing
30 June - report writing
1 July - report writing
2 July - final presentation to ANIAD and other organizations, editing
3 July - report editing and printing, final copy handed in to ANIAD
4-11 July - individual study tour
11 July - departure to the Netherlands