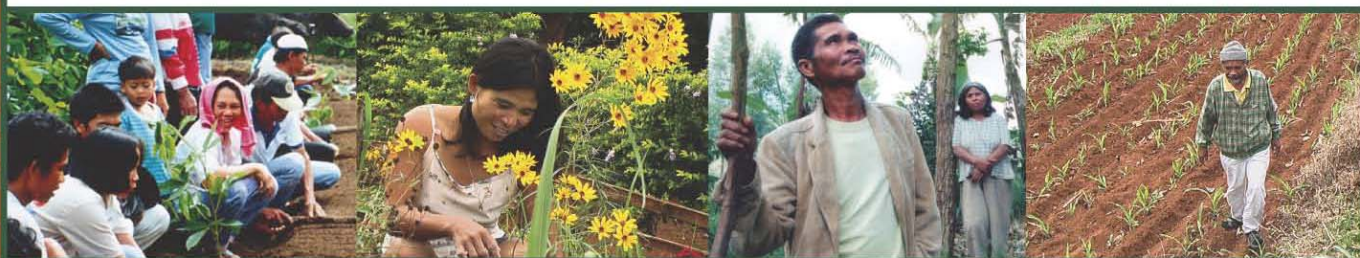




Philippines-Australia  
Landcare Project

# Scaling up Landcare in Misamis Oriental: The Case of Libertad

Working Paper Number 1



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## PREFACE

The Philippines-Australia Landcare Project Working Paper Series is intended to disseminate the results of research undertaken in the course of two successive action research projects funded by the Australian Centre for International Agricultural Research (ACIAR):

- ASEM/1998/052 *Enhancing Farmer Adoption of Simple Conservation Practices: Landcare in the Philippines and Australia* (1999-2004)
- ASEM/2002/051 *Sustaining and Growing Farmer-Led Landcare-Type Approaches to Natural Resource Management in the Philippines and Australia* (2004-2007).

For further information about these projects contact the project leader, Noel Vock, at [Noel.Vock@dpi.qld.gov.au](mailto:Noel.Vock@dpi.qld.gov.au) and about the working papers and other research outputs contact Rob Cramb ([r.cramb@uq.edu.au](mailto:r.cramb@uq.edu.au)) or Noelyn Dano ([noelyn\\_dano@yahoo.com](mailto:noelyn_dano@yahoo.com)).

This Working Paper reports the results of an evaluation study of a scaling-up site that was part of the first project. The report was previously only available as an electronic document circulated among project team members. Our thanks go to Aurora Laotoco who provided valuable advice and assistance in the design of this study, to Dolly Montejo and Erwin Albios who performed an admirable job as survey enumerators, to Courtney Chester who assisted with data analysis, to Delia Catacutan and Noel Vock for comments on the draft report, and to Loraine Chapman for assistance in layout and production.

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## ABSTRACT

Landcare began in Claveria in Misamis Oriental Province in 1996, facilitated by ICRAF staff based in the municipality. Starting in 2000, with support from the Philippines-Australia Landcare Project, the approach was scaled up to other municipalities in Misamis Oriental. This included Libertad, a small, coastal municipality at the western end of the province. The Libertad case provides an example of scaling up Landcare primarily through the municipal agricultural office, with limited backup from ICRAF. An evaluation of the Landcare program in Libertad was conducted in the second half of 2002 using both quantitative and qualitative methods. This working paper presents the results of the evaluation study.

The inland barangays of Libertad occupy undulating to steep land at 300-600 metres with calcareous soils of low fertility and high erodibility. Access is by an unsealed road in poor repair. The population density is around 230-240 persons per sq. km and is increasing. Hence farms are small and incomes are low. Maize and coconut are the dominant crops, with vegetable and fruit production on the increase. Poor soils, low input levels, and an ageing stock of coconut palms contribute to low productivity.

The municipal government was supportive of the Landcare Program, encouraging ICRAF's entry to the area and allocating two agricultural technicians (ATs) to act as Landcare facilitators with back-up from ICRAF. The involvement of ICRAF thus induced a temporary reallocation of agricultural staff-time to the inland barangays. The response of farmers was initially positive as they had been relatively neglected by agricultural extension services in the past. Two of the inland barangay (Lubluban and Sto. Niño) had an existing agrarian reform association that took on the functions of a Landcare group. The most remote barangay, Kimalok, formed three Landcare groups at the purok-level.

According to focus group participants, most members joined a Landcare group to learn about soil conservation measures – specifically, natural vegetative strips (NVS) – and to see what other benefits they might obtain, such as free planting materials. Some felt obliged to join to obtain a land title or because they were persuaded by the ATs. There was early interest generated by cross-site visits to Claveria and the training in NVS and nursery practices. However, the interest in group activity waned after the first year as visits by the ATs became infrequent. Group members expressed a need for on-going support from a Landcare facilitator if they were to remain active and cohesive.

A sample survey in Lublublan and Kimalok revealed the average farmer to be male, aged 45 years, with 7 years of education, originating in the same or a nearby barangay. All regarded farming as their main occupation but around a quarter had other work, mainly as farm labourers. Farms averaged only 1.2 ha. Half the households were owners or part-owners of their farms. In most cases, non-owners were borrowing rather than leasing or share-cropping their land.

The dominant crops were maize and coconut, usually found in combination with each other and with other crops such as bananas. Almost half the farmers had planted significant numbers of timber trees and over a third had planted fruit trees, especially mango. Most households had small numbers of livestock but over 40% had no draught animal for ploughing.

In general, farmers saw little trend in food supply or farm income, both of which rose and fell with climatic and market conditions. The area of tree crops was seen to be

stable or increasing. However, most saw the condition of their soil (especially soil fertility) and their output of maize as declining, mainly due to lack of fertiliser. Relatedly, the dominant farm problems were seen to be lack of capital for purchased inputs, especially fertiliser, and poor soil fertility. Soil erosion as such was scarcely mentioned.

About 43% of respondents were Landcare members. Those who had not joined felt they did not have enough time to participate or were restricted because they did not own their farm. The main benefits of membership were learning new farm practices, especially contour strips, and obtaining free seedlings and forage grasses. The problems were seen to be lack of participation among members and lack of follow up by the facilitator.

About 37% of respondents had adopted contour barriers, covering 21% of their farm area and 10% of the total farm area of survey farmers. The most common alley crop was maize. In most cases the vegetative strips had been enriched with bananas or other crops.

Adopters and non-adopters did not differ greatly in their personal, household, or farm characteristics. However, adopters were more likely to be landowners and full-time farmers, with larger, steeper farms, their own draught animals, more land under both maize and coconut, and an increasing area under tree crops. They were more likely to be Landcare members and to have undertaken technical training, especially in contour farming.

Non-adopters gave as their reason that their farm was fairly level and not eroding, that they did not own the land, or that they were too busy. Hence there seemed little prospect of further wide-scale adoption.

Focus group participants claimed adoption of contour barriers reduced their fertiliser requirements and increased their yield and income. However, a comparison of maize production between adopters and non-adopters failed to confirm this.

In conclusion, the study shows the initial responsiveness of farmers in such marginal upland environments to the scaling up of Landcare and the adoption of contour farming, particularly among those who are relatively better off. However, scaling up through the municipal agricultural office, without the provision of additional resources and incentives, can result in dissipation of enthusiasm and loss of direction. It appears that regular contact with a committed Landcare facilitator over an extended period is needed for local Landcare groups to be sustained.

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# 1. INTRODUCTION

Landcare in the Philippines grew out of efforts to promote soil conservation innovations among farmers in the upland municipality of Claveria in Misamis Oriental, Northern Mindanao (Arcenas 2002, Sabio 2002) (Fig. 1). The Department of Agriculture (DA) began promoting contour hedgerows of shrub legumes in the early 1980s, in the form of the Sloping Agricultural Land Technology (SALT) package developed by the Mindanao Baptist Rural Life Centre (MBRLC). In 1987, the International Rice Research Institute (IRRI) in collaboration with the DA initiated a farmer-to-farmer training program in Claveria to enhance adoption. Six farmers were sent to Cebu for training in the methods of establishing contour hedgerows and, between 1987 and 1989, these six trained another 175 farmers in seven farmer-to-farmer training sessions. By 1992 up to 80 farmers had adopted the technology. The International Centre for Research in Agroforestry (ICRAF) took over the IRRI research site in Claveria in 1993 and proceeded to conduct field trials on contour hedgerow systems.

In 1996 ICRAF identified a low-cost farmer adaptation of contour hedgerows – the use of natural vegetative strips (NVS) as an alternative to the more complex and labour-intensive method of establishing and maintaining hedgerows of shrub legumes or forage grasses (Stark 2000, Mercado et al. 2001, Arcenas 2002, Sabio 2002). An extension team, termed the Contour Hedgerow Extension Team (CHET), comprising a farmer who had adopted NVS, a DA extension agent, and an ICRAF technician, was formed to promote the NVS technology (though eventually the DA ceased to be involved). The CHET worked initially with individual farmers in various *barangay* but the interest was such that group sessions were organised, involving 20-25 participants. At one of these group training sessions in 1996, 20 farmer leaders, at the suggestion of one of the ICRAF facilitators, decided to form a farmer organisation to promote the NVS contour hedgerow system within the Claveria community. The organisation was named the Claveria Land Care Association (CLCA).

The CLCA, being a municipal-wide organisation, moved quickly to form local groups and recruit new members at the *barangay* level (chapters) and *sitio* level (sub-chapters) (Mercado et al. 2001, Arcenas 2002, Sabio 2002). ICRAF supported the CLCA in the conduct of training sessions and cross-farm visits, which were also used as a means of recruiting new members and forming chapters and sub-chapters. The recruitment drive initially raised suspicions among local government officials such as *barangay* captains who, as a consequence, were invited to become involved in meetings and other activities of the CLCA. This soon resulted in widespread support from local government units (LGUs), particularly at the *barangay* level, including financial contributions and even legislative backing for adoption of the NVS technology.

Thus the Landcare Program in Claveria had developed into a triangular partnership between the CLCA (a people's organisation, working to encourage conservation farming among its members), ICRAF (an international non-government organisation, providing technical and logistic support and facilitation), and the LGUs (providing government resources and official support for the Association). As a result of this partnership, by early 2000 the CLCA had grown to include 16 chapters, 105 sub-chapters, and about 800 individual farmer-members.

Adoption of NVS technology also increased dramatically, from about 75 ha in 1996 to more than 300 ha in 1999. Arcenas (2002) reports that all partners credit the farmer-to-farmer extension approach of the CLCA as the principal factor in this increased level of interest and adoption.

The success of Landcare in Claveria encouraged ICRAF in 1998 to introduce the approach at its Central Mindanao field site in the Municipality of Lantapan in Bukidnon (Fig. 1), and to seek external funding both to support the program and to evaluate its potential as a model for community-based natural resource management throughout the Philippine uplands. The Spanish Agency for International Cooperation (AECI) provided project support for Landcare activities in Claveria and Lantapan (as well as in the Visayas) from 1998. The Australian Centre for International Agricultural Research (ACIAR) funded an action research project from 1999 to 2004 to augment and help evaluate the Landcare approach in these and other sites (Vock 2002).

The ACIAR Landcare Project operated in Misamis Oriental (i.e., Claveria and extension sites), Bukidnon (i.e., Lantapan and extension sites), and in Barangay Ned in Lake Sebu, South Cotabato (Fig. 1). The principal aim of the project was to test the applicability of the Landcare approach as a tool to enhance the adoption of conservation practices suited to the needs of upland farming communities in Mindanao. The impact of Landcare implementation was to be evaluated in terms of

- the adoption of conservation practices (and the effect of these practices on natural resources), and
- the relevance of the approach as a model for local and regional extension services.

That is, the project was interested in the adoption of both *Landcare technologies* and *Landcare processes and institutions* (notably the formation and development of Landcare groups and networks).

The project provided resources and training for Landcare facilitators at each of the three sites, including the development of linkages with Landcare in Australia. In addition, the project funded a small monitoring and evaluation (M&E) component. Mid-way through the project it was realised that a more concentrated effort was needed to monitor and evaluate the Landcare approach, particularly through a comparative analysis of the three Landcare programs. Hence additional resources were allocated for an intensive six-month evaluation study in the second half of 2002. This report is one output of that study.

As in Australia (Campbell 1994, Lockie and Vanclay 1997, Cary and Webb 2000), Landcare in the Philippines means many things, making evaluation difficult. It is often taken to refer primarily to the adoption of “Landcare technologies”, especially the NVS version of contour farming promoted by ICRAF in Claveria. A feature of most conceptions of Landcare is the central role of community Landcare groups. The wider Landcare Program in the three provinces includes the activities of these local groups and associations, as well as the efforts of local government units and agencies such as ICRAF to promote Landcare – both Landcare technologies and Landcare groups. Then there is the ACIAR Landcare Project, which has sought to provide support to the on-going Landcare Program, especially in terms of evaluating its impact on adoption of conservation practices and its potential for wider application in Mindanao.

The approach of this evaluation study has been to focus on the Landcare Program in the three provinces, not on the ACIAR Landcare Project as such. In particular, it was agreed by the project partners to concentrate on two key indicators of impact – the adoption of conservation practices and the formation and development of Landcare groups. These impacts were seen to be critical to the achievement of the longer-term outcomes of rural poverty reduction and environmental conservation – in short, sustainable rural livelihoods (Scoones 1998; Ellis 2000).

In Misamis Oriental, it was decided to select two municipalities for case studies – Libertad in the west and Sugbongcogon in the east (Fig. 2). These represent contrasting environments (calcareous and acid soils respectively) and are the sites of longest exposure to landcare with the best response to date. The Mayor of Libertad was among the first in Misamis Oriental to express interest in Landcare, hence ICRAF staff considered this municipality a good prospect for extending the program. This began with a presentation about Landcare to municipal staff and officials, followed by a visit to a number of upland barangays. A presentation was also made to the municipal legislative body to inform them of the program and propose the appropriation of funds. It was decided to implement a pilot program in one interior barangay – Kimalok. This was later extended to include two neighbouring barangay, Sto. Niño and Lubluban. Two agricultural technicians (AT) of the Municipal Agricultural Office (MAO) were assigned to facilitate Landcare activities at the community level, with assistance from ICRAF if needed. Thus the Libertad program provides an example of scaling up landcare through the existing municipal government institutions.

Two of the three barangay were chosen for the evaluation study – Lubluban and Kimalok. Lubluban had 145 households, with one existing farmer association (shared with its neighbour, Sto. Niño), which doubled as a Landcare group. Kimalok had 71 households, with three purok-level Landcare groups totalling 48 members. The evaluation study relied on three main sources of data:

- Municipal and other reports were used to provide a brief profile of Libertad.
- Focus group discussions were held with Landcare members in each barangay.
- A household survey was conducted with a sample of 73 farmers drawn from the combined populations of the two barangays.

The following sections analyse each of these data sources in turn.



**Fig. 1** Location of principal landcare sites in Mindanao, Southern Philippines

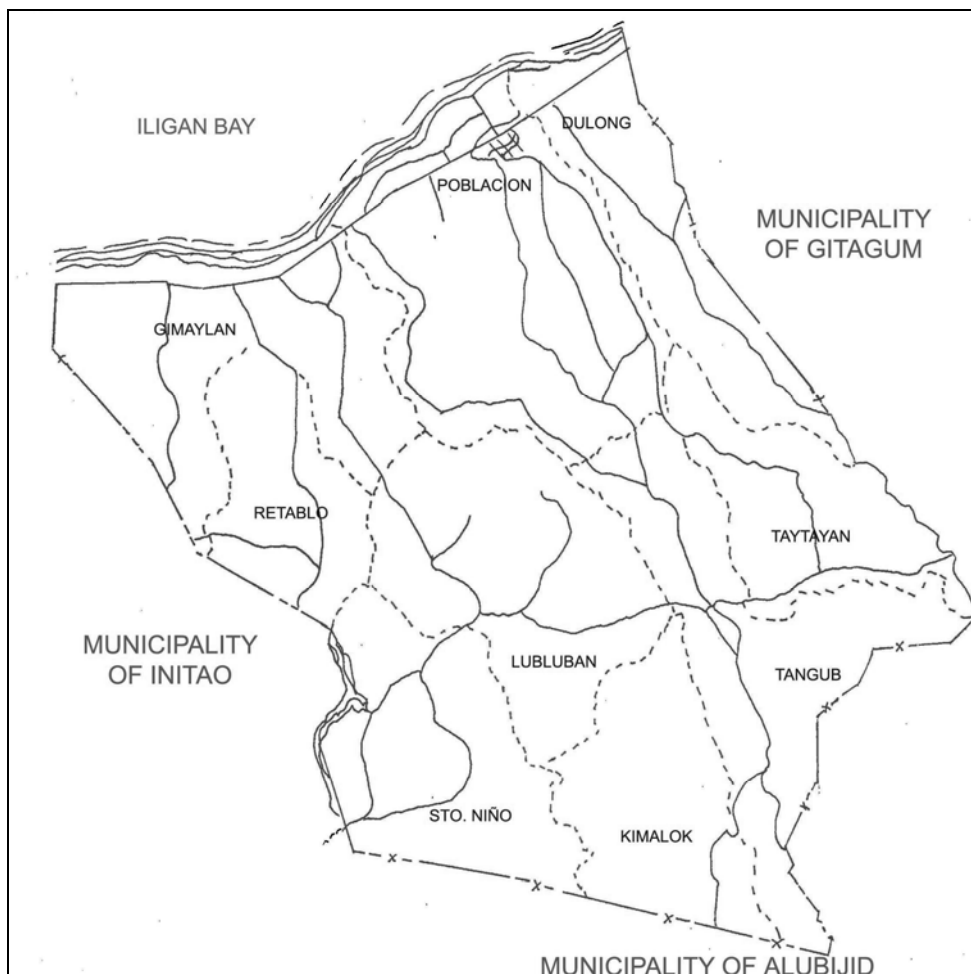


**Fig. 2** Location of Libertad Municipality at the western end of Misamis Oriental Province on the northern coast of Mindanao

## 2. A PROFILE OF LIBERTAD

### 2.1 The Bio-Physical Context

The Municipality of Libertad is situated on the northern coast of Mindanao between 8° 29' and 8° 34' north and 124° 15' and 124° 26' east, at the western end of Misamis Oriental Province (Fig. 2). It is bounded by the Municipalities of Gitagum, Alubijid, and Initao, and by Iligan Bay to the north. The capital is 40 km from Cagayan de Oro City to the east and 47 km from Iligan City to the west, both of which are growing commercial and industrial centres. The municipality is divided into nine barangays: Poblacion, Dulong, Gimaylan, Kimalok, Lubluban, Retablo, Sto. Niño, Tangcub and Taytayan (Fig. 3).



**Fig. 3** Libertad Municipality showing roads and barangay boundaries

Libertad has the smallest land area in Misamis Oriental with only 2,330 ha or 0.6% of the provincial total. About 85% of the land in the municipality is classified as alienable and disposable; only portions of Tangcub, Kimalok and Sto. Niño are classified as public lands. Among the nine barangays, the three urban and peri-urban barangays, Poblacion, Dulong and Gimaylan, have the largest land areas, while the hinterland barangays of Taytayan, Sto. Niño and Lubluban have the smallest areas.

The terrain of Libertad is not as rugged as that of the surrounding municipalities of Alubijid, El Salvador and Manticao. Libertad is characterised by gently sloping to undulating lands, with 68% of the land area within 0-3% slope and 64% within 0-100 metres elevation (Tables 1 and 2). These lands account for the whole of Poblacion, the major portion of Gimaylan, Retablo, Lubluban and Dulong, and a smaller portion of Sto. Niño, Taytayan, and Tangcub.

However, stretching inland from Macajalar Bay towards the eastern part of the municipality are undulating to rolling lands, with slopes ranging from 4-18%, rising from 300 to 600m. The major parts of Sto. Niño, Taytayan and Tangcub have 4-8% slope, while land with slopes of 9-18% accounts for about 90% of Kimalok and the easternmost part of Tangcub, bordering the Municipality of Alubijid. Libertad has a small area of high relief areas with 19-50% slope in the vicinity of Mt. Bandera.

**Table 1 – Distribution of Land by Slope in Libertad**

<b>Slope (%)</b>	<b>Area (ha)</b>	<b>Per cent</b>
0-3	1,579	67.8
4-8	546	23.4
9-18	201	8.6
19-50	4	0.2
<b>Total</b>	<b>2,330</b>	<b>100.0</b>

**Table 2 – Distribution of Land by Elevation in Libertad**

<b>Elevation (m)</b>	<b>Area (ha)</b>	<b>Per cent</b>
0-100	1,498	64.3
300-600	832	35.7
<b>Total</b>	<b>2,330</b>	<b>100.0</b>

The upland soils in Libertad are predominantly calcareous. There are two major soil types – Lourdes Clay Loam (35.5%) and Bolinao Clay (64.5%). The first type is found in the eastern part of the municipality at higher elevations, that is, in Sto. Niño, Lubluban, Kimalok, Tangcub and Taytayan. The second type occurs in the western part of the municipality towards Macajalar Bay, including portions of Taytayan, Lubluban, and Sto. Niño, and the whole of Retablo, Gimaylan, Poblacion, and Dulong.

The DENR vegetative cover map shows that the municipality is predominantly croplands mixed with coconut plantations. These croplands extend to areas with 18% slope or steeper. The former forest areas are mostly denuded and, if not cropped, are open grasslands.

## 2.2 The Socio-Economic Context

According to municipal data, the total population of Libertad was 8,487 in 1993, including 6,210 (73%) in largely urban barangays and 2,277 (27%) in rural barangays (Table 3). The population was growing at 1.75% between 1990 and 1995, about half the provincial growth rate of 3.26%, presumably reflecting out-migration to nearby urban centres, especially Cagayan de Oro and Iligan. The overall population density in 1993 was 364 persons per sq. km, reflecting the high urban population. In urban barangays the density was 671 persons per sq. km, and in rural barangays, 162 persons per sq. km. The population density was projected to increase to 784 persons per sq. km for the urban barangays and 186 persons per sq. km for the rural barangays by 2015. The workforce in 1993 was estimated to be 2,064, of whom 53% were farmers earning an estimated monthly (cash) income of P1,822 per person. Many were part-time farmers because of low crop production and the limited availability of agricultural lands.

**Table 3 – Population of Libertad by Barangay, 1993**

<b>Barangay</b>	<b>Area (ha)</b>	<b>Population</b>	<b>Density (persons per sq. km)</b>
<b>URBAN</b>			
Poblacion	426	3,732	877
Dulong	159	919	577
Gimaylan	340	1,559	459
<b>RURAL</b>			
Kimalok	155	224	144
Lubluban	332	631	190
Retablo	156	385	246
Sto. Niño	267	326	122
Tangcub	329	549	167
Taytayan	167	162	97
<b>TOTAL</b>	<b>2,330</b>	<b>8,487</b>	<b>364</b>

The total area of titled cropland is 2,456 ha, occupied by 1,162 farmers with an average farm size of 2.1 ha. From 1989 to 1994, the Department of Agrarian Reform, under the Comprehensive Agrarian Reform Program (CARP), distributed 217 ha of land (more than double the target area) to 180 farmer-beneficiaries at an average of 1.2 ha per farmer (Table 4). Most of these lands were distributed to actual occupants or landowners who had owned untitled agricultural lands for more than the retention time limit and had taken the opportunity of DAR's titling program. Only a small proportion of these lands were within the urban barangay, adjacent to the settlement expansion areas. A further 50 ha were targeted for distribution in 1995, located within public lands of more than 18% slope and already planted to coconut.

**Table 4** – Land distribution in Libertad under CARP, 1989-1994

<b>CARP Activity</b>	<b>Land targeted (ha)</b>	<b>Land distributed (ha)</b>	<b>No. of beneficiaries</b>	<b>Area per beneficiary (ha)</b>
Voluntary land transfer	75.3	169.9	143	1.2
Voluntary offer to sell	9.3	32.2	26	1.2
Certificate of land acquisition	-	10.9	7	1.6
Government-owned lands	19.8	4.0	4	1.0
<b>Total</b>	<b>104.4</b>	<b>217.0</b>	<b>180</b>	<b>1.2</b>

As in all other municipalities within the coastal corridor of Misamis Oriental, coconut is the major crop in Libertad in terms of area, followed by maize (Table 5). However, in terms of production, coconut ranks second to maize. Tobacco has also been an important crop in some barangay, though it is now declining, while fruit production is expanding. Although annual crops are often inter-cropped with cash crops, intercropping is not intensive due to climatic conditions, limited water supply, and limited farm inputs. Except for maize, which is used mainly for domestic consumption, other crops are sold in Initao, Iligan, and Cagayan de Oro City.

**Table 5** – Crop area and production in Libertad, 1994

<b>Crop</b>	<b>Area (ha)</b>	<b>Production (tons)</b>
Rice	3	12
Maize	765	2,259
Legumes	63	38
Fruit	35	510
Coconut	1,438	1,007
Tobacco	230	161
Root crops	10	80
Vegetables	5	15
<b>Total</b>	<b>2,549</b>	<b>4,177</b>

Livestock is dominated by cattle, pigs, goats, and poultry (Table 6). Livestock numbers and output were increasing in all these categories in the 1990s. In particular, pigs were sold every weekend at markets in nearby Initao, Laguindingan, and Cagayan de Oro City. Carabao and horses were raised as work animals but were declining in number due to the decrease in rice fields and buffalo wallows, and the development of farm-to-market roads and public utility motor vehicles. Fish are caught in Macajalar Bay by around 500 full- and part-time fishers. Flying fish is the most common species caught within the western waters and sold daily at the local market. However, most of the catch is intercepted by traders at the fish landing area and sold outside the municipality. Stingrays are common and when dried are sold at higher prices as a delicacy.

**Table 6** – Livestock numbers and production in Libertad, 1994

<b>Livestock</b>	<b>Number</b>	<b>Production (tons)</b>
Cattle	1,880	94.0
Carabao	47	-
Horses	9	-
Pigs	2,092	41.8
Goats	2,201	11.0
Chickens	14,535	8.7
Ducks, geese	306	0.2
<b>Total</b>	<b>21,070</b>	<b>155.7</b>

According to municipal plans, agricultural land adjacent to the existing built-up areas will be used for urban expansion, except for protected agricultural land. In order to meet the demand for crop production within the next 20 years, the municipal government plans to intensify intercropping and multi-cropping activities within existing coconut and maize lands, especially for fruit, vegetable, and root-crop production. Existing maize and rice lands will be retained, but coconut lands will be reduced to allow for reforestation of forest areas. Specifically, agricultural areas within Dulong, Poblacion, Gimaylan, Retalbo, and the lower part of Lubluban will be utilised for the production of annual crops such as maize, tobacco, legumes, vegetables and root-crops. The northern part of Dulong towards the lower portion of Taytayan on the east and part of Retalbo are to be planted to perennials such as coconut and fruit trees. Agricultural lands of 15-18% slope – the uncultivated hills and mountain slopes of Taytayan, Kimalok, and Sto.Niño – are intended to be used for grazing.

The municipality supports the following agricultural programs and projects: cattle and goat dispersal; artificial insemination; poultry raising; planting fruit trees (agroforestry); crop diversification; animal health management; establishment of barangay nurseries; artificial reef management; peanut and sweet corn production; development of model farms; and construction of post-harvest facilities. Of these, the agroforestry and barangay nursery programs are most relevant to Landcare.

### 3. LANDCARE GROUPS IN LIBERTAD

#### 3.1 The Lubluban (Purok 3) Landcare Group

Barangay Lubluban is an inland barangay, located six km from the municipal centre. The road is unsealed and in poor condition, hence the main means of transportation is by motorcycle (*habal-habal*). Four-wheel-drive vehicles can also access the area. Lubluban has a land area of 332 ha, with rolling to mountainous terrain and calcareous soils dominated by Bolinao clays. It comprises four sub-villages (purok) with a total of 145 households and a population of 799 in 2000. This represents a 27% increase over the 1993 figure of 631, indicating a degree of in-migration. The major cultural groups are Cebuano and Camiguignon. Farming is the main source of income, the dominant crops being coconut, maize, banana, and tobacco. Lubluban is one of the Agrarian Reform Communities assisted by the Department of Agrarian Reform (DAR). The Lubluban Agrarian Reform Beneficiaries Association (LARBA), which is facilitated by DAR as a necessary part of the agrarian reform process, is the largest and the most influential group in the barangay, with most of the households listed as members.

Landcare was first introduced in Lubluban in January 2000 with the assistance of ATs from the Municipal Agricultural Office. The Lubluban (Purok 3) Landcare group was formed in November 2000 after a series of activities including orientation and cross-site visits. There were no records of the initial membership and activities of the group, but activities had included meetings, cross-site visits, training, tree planting, and implementation of soil conservation measures (NVS) on farms. However, members considered the group as only moderately active because they no longer had group activities. Lack of facilitation by the AT assigned to the area was seen to have led to this state of affairs. Nevertheless, individual members continued to establish contour barriers on their farms.

Focus group participants perceived Landcare as a program to provide a good future for the community through financial assistance and protection against soil erosion. Most said they had joined the Landcare group to obtain the benefits of soil conservation, but a few had joined because it was seen as a requirement to obtain a title (Certificate of Land Ownership Award or CLOA) from DAR, and hence to access credit, or they were persuaded to do so by the AT. They believed that Landcare was relevant to their circumstances, giving them the knowledge to help protect the soil against erosion and retain soil fertility. Others expected to get financial assistance and free seedlings.

They were initially motivated to participate in Landcare activities by the clear explanation given by the AT and the perceived benefits of the activities, including training, seminars and cross-site visits, all of which helped members learn new farming technologies like contour farming. Through contour farming the farm income of adopters was said to have increased and less fertiliser was used. The factors limiting people from joining were lack of information and the pressure of other commitments, especially farm work.

The focus group felt that Landcare development in the area would be enhanced by the regular meeting of the group, close cooperation among members, and the benefits to be obtained from the soil conservation technologies. However, the lack of meetings, blamed on the inactivity of the AT, was viewed as a major constraint to

the development of the Landcare group. Participants saw the requirements for success as support from the local government, responsible leaders, and unity and cooperation among members. The needed support from government (or other institutions) included provision of farm inputs, financial assistance, training, and group facilitation. During the focus group discussion, Landcare members expressed their interest in making their group active again but felt they needed continued facilitation from the AT to guide them in the early stages of their group. Without this they had no direction and did not know what to do.

### **3.2 The Kimalok Landcare Groups**

Kimalok is the most remote barangay, located 16 km from the municipal centre along a road that is not accessible to motor vehicles except during the dry season. Motorcycles are the only form of public transportation and a few private four-wheel-drive vehicles traverse the road. The total land area is 378 hectares of mostly rolling to steeply sloping hills. The soils are shallow calcareous soils classified as Lourdes clay loams. The main crops are maize and banana, with some coconut plantations also found in the area. The barangay is divided into three purok with 71 households and a population of 352. This represents a 57% increase over the 1993 population of 224, reflecting significant in-migration. Most of the residents migrated into the area in the 1980s from other barangays both within and beyond the municipality, presumably due to population pressure in those areas. The major cultural group is Cebuano.

Barangay Kimalok, being classified as a poor barangay, is included in a nationwide anti-poverty program known as Kalahi-CIDSS (Kapit-Bisig Laban sa Kahirapan - Comprehensive and Integrated Delivery of Social Services), which is funded by the World Bank and administered by the Department of Social Welfare and Development. This program emphasises grass-roots initiatives and organisation. A number of other government and non-government projects have also been implemented in the area, including a micro-finance program (Self-Employment Assistance (SEA) – Kaunlaran) and a women's association. Hence Landcare was not the first community-based program to be initiated.

As mentioned above, Kimalok was the pilot barangay for the Landcare Program in Libertad. A presentation on the Landcare Program was conducted in December 1999 by the ICRAF Landcare Coordinator, together with the ATs from the Municipal Agricultural Office, who then served as the Landcare facilitators in the area. At the time of the study, there were three Landcare groups with a total of 38 members. These Landcare groups had a high profile in the barangay because they were involved in planting trees along the road as well as applying soil conservation practices on their farms. For the evaluation study, representatives from each of the three groups were invited to participate in the focus group discussion.

All participants had learned about Landcare from the orientation conducted in the barangay by ICRAF staff. Most saw Landcare as a good program that helped farmers to protect their soil against erosion through contour farming. This is what had motivated them to form or join a Landcare group. Some had been convinced by other farmers, while some were just curious to see what Landcare was all about. In joining Landcare, most expected to learn new conservation farming practices, both

to reduce soil erosion and maintain or improve fertility. Some also hoped to benefit from any farm inputs and financial assistance.

Accordingly, most participants believed that Landcare was relevant to them and their community in that it provided them with knowledge about contour farming and tree planting, which improved the farming system and helped protect the soil against erosion. This had encouraged them to participate in Landcare activities. However, lack of time due to other commitments had limited the involvement of some.

The participants identified access to free planting materials and participation in cross-site visits and training as the main benefits they had obtained from joining Landcare. As a result they had gained more friends and their knowledge of farming technologies was enhanced. This had helped them to improve their farms by reducing soil erosion, retaining crop residues, and reducing their use of purchased fertiliser. Most claimed that their farm income had increased.

The focus group regarded the Landcare groups in Kimalok as active because their members still participated in Landcare activities, including establishment of contour barriers, cross-site visits, training, and other related activities. However, most were also critical of the AT assigned to the groups in that he seldom visited and provided little supervision or facilitation. The factors encouraging the development of Landcare in the area were said to be good facilitation, knowledge of improved farming technologies, and support from the barangay officials. Limiting factors were the lack of unity among members, lack of support from the government, other work commitments, and in some cases lack of ownership of the land.

To sustain Landcare in Kimalok was seen to require greater unity and cooperation within the groups and improved assistance from the municipality. These were considered the essential elements of Landcare. In particular, there was a need for some members to change their negative and sceptical attitudes and for more regular meetings and training events to be conducted. Assistance was sought from the government and other agencies in terms of financial support, planting materials, training, cross-site visits, and the appointment of a permanent facilitator.

## 4. THE HOUSEHOLD SURVEY

### 4.1 Introduction

As Lubluban and Kimalok were contiguous barangay and occupied very similar landscapes, it was decided to treat them as one survey population and to randomly sample one third of the farm households in each purok (sub-village). This resulted in a sample of 73 households – 52 from Lubluban and 21 from Kimalok. The survey was conducted during August-September 2002 by two trained enumerators who were recent graduates of the Misamis Oriental State College of Agricultural Technology (MOSCAT). The reference year for data on farm production was May 2001-April 2002.

Statistical analysis was conducted using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS). The analysis mainly involved comparisons between adopters and non-adopters of contour barriers using t-tests for means and chi-square tests for proportions. Three levels of significance were considered, indicated by asterisks in the tables below – 0.01 (\*\*\*), 0.05 (\*\*), and 0.10 (\*).

### 4.2 Household Characteristics

The heads of adopting and non-adopting farm households displayed few differences in socio-economic characteristics (Table 7). On average they were aged around 45 years and had completed seven years of formal education. The incidence of female-headed households was slightly higher among non-adopters (11%) than adopters (4%), but low overall.

Both groups had been resident in the barangay for an extended period, averaging 34 years. Around 55% had been born in the same barangay and 75% in the same municipality, hence there was a good deal of local farming experience. That 45% originated outside the barangay reflects the in-migration in recent decades referred to above, especially in Kimalok. There was also little difference in the ethnic composition of the two groups, with Cebuano accounting for 56% overall, and Boholano 33%. The indigenous Higaonon were very much in the minority (4%).

All household heads depended on farming as their main occupation. However, a slightly higher proportion of non-adopters had a secondary occupation (43%) than adopters (30%), perhaps indicating a lack of time for implementing conservation measures. The most common secondary occupations involved labouring and trades, including work as a coconut harvester, blacksmith, carpenter, driver, chainsaw operator, tailor, or market vendor. Two had their own small business, running a local store (*sari-sari*), and six were barangay officials.

As would be expected, the incidence of Landcare membership was significantly higher among adopters (82%) than non-adopters (20%).

**Table 7 – Characteristics of Household Head**

<b>Characteristic</b>	<b>Adopters (n=27)</b>	<b>Non- adopters (n=46)</b>	<b>Total (n=73)</b>
Mean age (years)	43.9	46.3	45.4
Gender (% male)	96.3	89.1	91.8
Mean education level (years)	7.7	6.9	7.2
Mean period of residence (years)	31.7	35.9	34.3
<b>Place of origin (%)</b>			
- same barangay	48.2	58.7	54.8
- other barangay	29.6	15.2	20.6
- other municipality	3.7	10.9	8.2
- other province	18.5	10.9	13.7
- no response	0.0	4.4	2.7
<b>Cultural group (%)</b>			
- Cebuano	63.0	52.2	56.2
- Boholano	22.2	39.1	32.9
- Higaonon (indigenous)	3.7	4.4	4.1
- Other	11.1	4.4	6.9
<b>Main occupation (%)</b>			
- Farming	100.0	100.0	100.0
- Other	0.0	0.0	0.0
<b>Secondary occupation (%)</b>			
- barangay official	11.1	6.5	8.2
- labourer, tradesperson	14.8	32.6	26.0
- business (e.g., storekeeper)	3.7	2.2	2.7
- none	70.4	58.7	63.0
Landcare member (%) ***	81.5	19.6	43.8

Households averaged only 4.9 members, with little difference between adopters and non-adopters. The modal household size was 4 with over 50% of households having 3-5 members (Table 8). Likewise the number of farm workers did not differ between the two groups, the average household having one full-time worker and one part-time worker (usually the husband and wife respectively). The proportion of dependants was high at 58% (Table 9), reflecting a young and growing population.

Members of adopter households were significantly more involved in local groups (89%) than non-adopters (65%), especially in Landcare groups (67% compared with 20%), but the level of group membership was high overall – 74% of households had at least one member involved in one or more type of group (Table 10).

Members of adopter households were also significantly more likely to have undertaken some form of training (Table 11). This was especially the case for training in contour farming (59% compared with 9%) but also applied to other

training in crop production (26% compared with 9%). However, non-adopters had been more exposed to training in integrated pest management (IPM).

**Table 8** – Distribution of Household Size by Adoption Category

No. in household	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
1	0	0.0	1	2.2	1	1.4
2	4	14.8	2	4.4	6	8.2
3	4	14.8	7	15.2	11	15.1
4	6	22.2	15	32.6	21	28.8
5	4	14.8	7	15.2	11	15.1
6	4	14.8	3	6.5	7	9.6
7	3	11.1	5	10.9	8	11.0
8	1	3.7	3	6.5	4	5.5
9	0	0.0	1	2.2	1	1.4
10	0	0.0	2	4.4	2	2.7
11	1	3.7	0	0.0	1	1.4
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

**Table 9** – Economic Activity of Household Members by Adoption Category

Economic activity	Adopters (n=27)		Non-adopters (n=46)		Total (n=73)	
	Mean no.	%	Mean no.	%	Mean no.	%
Full-time farming	1.04	21.4	1.09	22.0	1.07	21.8
Part-time farming	0.78	16.1	1.11	22.5	0.99	20.2
Non-working	3.04	62.7	2.74	55.5	2.85	58.2
<b>Total</b>	<b>4.85</b>	<b>100.0</b>	<b>4.93</b>	<b>100.0</b>	<b>4.90</b>	<b>100.0</b>

**Table 10** – Participation in Local Groups by Adoption Category

Type of group	% adopters (n=27)	% non-adopters (n=46)	% total (n=73)
Landcare ***	66.7	19.6	37.0
Other agricultural/forestry *	51.9	37.0	42.5
Other	25.9	37.0	32.9
One or more***	88.9	65.2	74.0

**Table 11** – Participation in Training by Adoption Category

Type of training	% adopters (n=27)	% non-adopters (n=46)	% total (n=73)
Contour farming ***	59.3	8.7	27.4
Crop production ***	25.9	8.7	15.1
IPM	7.4	17.4	13.7
One or more ***	70.4	26.1	42.5

### 4.3 Farm Characteristics

Though farms were generally small – the modal farm size was 1.0-1.4 ha for both groups – adopters’ farms were significantly larger than non-adopters’, averaging 1.5 ha compared with 1.0 ha (Table 12). Fifty six per cent of adopters had farms of 1.5 ha or more, whereas only 22% of non-adopters’ farms exceeded this size. Larger farms provide more scope for sacrificing land to contour barriers.

On average each farm comprised 1.5 separate fields or parcels, adopters averaging 1.7 and non-adopters 1.3. Hence parcel size was similar (0.9 ha for adopters and 0.8 ha for non-adopters). Almost all adopters’ parcels (96%) were in the moderately to steeply sloping category, whereas 28% of non-adopters’ parcels were relatively level (Table 13). This suggests that adopters may have had a greater need for contour measures. Surprisingly, 25% of adopters’ parcels were 1.5 km or more from the homestead, compared with only 5% for non-adopters (Table 14). Distance in itself was thus not a barrier to adoption, presumably because NVS require little maintenance once installed.

**Table 12** – Distribution of Farm Size by Adoption Category

Farm size (ha)	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
0.1 - 0.4	3	11.1	8	17.4	11	15.1
0.5 - 0.9	2	7.4	12	26.1	14	19.2
1.0 - 1.4	7	25.9	16	34.8	23	31.5
1.5 - 1.9	6	22.2	2	4.3	8	11.0
2.0 - 2.4	6	22.2	5	10.9	11	15.1
2.5 - 2.9	2	7.4	1	2.2	3	4.1
3.0 +	1	3.7	2	4.3	3	4.1
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>
Mean size (ha) **		1.5		1.0		1.2

There was a somewhat higher incidence of land ownership among adopters (54% of adopters’ parcels were owned, formally or informally, compared with 45% for non-adopters). Non-owned parcels were mostly borrowed rather than leased or share-cropped, presumably from close kin or neighbours (Table 15), but this may still have been an obstacle to installing contour measures. The plot-wise tenure status

**Table 13 – Slope Class of Parcels by Adoption Category**

Slope class	Adopters		Non-adopters		Total	
	No. of parcels	% of parcels	No. of parcels	% of parcels	No. of parcels	% of parcels
Level	1	2.1	17	28.3	18	16.7
Moderate	38	79.2	36	60.0	74	68.5
Steep	8	16.7	7	11.7	15	13.9
n.a.	1	2.1	0	0.0	1	0.9
<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>60</b>	<b>100.0</b>	<b>108</b>	<b>100.0</b>

**Table 14 – Distance of Parcels from House by Adoption Category**

Distance (km)	Adopters		Non-adopters		Total	
	No. of parcels	% of parcels	No. of parcels	% of parcels	No. of parcels	% of parcels
0	9	18.8	24	40.0	33	30.6
0.1-0.4	14	29.2	17	28.3	31	28.7
0.5-0.9	8	16.7	8	13.3	16	14.8
1.0-1.4	5	10.4	8	13.3	13	12.0
1.5-1.9	3	6.3	1	1.7	4	3.7
2.0+	9	18.8	2	3.3	11	10.2
<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>60</b>	<b>100.0</b>	<b>108</b>	<b>100.0</b>

**Table 15 – Tenure Status of Parcels by Adoption Category**

Tenure status	Adopters		Non-adopters		Total	
	No. of parcels	% of parcels	No. of parcels	% of parcels	No. of parcels	% of parcels
<b>OWNED</b>						
Titled	15	31.3	13	21.7	28	25.9
Tax dec.	11	22.9	12	20.0	23	21.3
No document	0	0.0	2	3.3	2	1.9
Total	26	54.2	27	45.0	53	49.1
<b>NOT OWNED</b>						
Borrowed	14	29.2	25	41.7	39	36.1
Sharecropped	2	4.2	2	3.3	4	3.7
Leased	2	4.2	3	5.0	5	4.6
Mortgaged	3	6.3	3	5.0	6	5.6
<b>Total</b>	<b>21</b>	<b>43.8</b>	<b>33</b>	<b>55.0</b>	<b>54</b>	<b>50.0</b>
n.a.	1	2.1	0	0.0	1	0.9
<b>Grand total</b>	<b>48</b>	<b>100.0</b>	<b>60</b>	<b>100.0</b>	<b>108</b>	<b>100.0</b>

was reflected in the tenure status of the farm as a whole, with 56% of adopters classified as full or part-owners, compared with only 46% of non-adopters (Table 16), though this difference was not significant at the 0.10 level.

**Table 16 – Tenure Status of Farms by Adoption Category**

<b>Tenure status</b>	<b>Adopters</b>		<b>Non-adopters</b>		<b>Total</b>	
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
Owner	10	37.0	18	39.1	28	38.4
Non-owner	12	44.4	25	54.4	37	50.7
Mixed	5	18.5	3	6.5	8	11.0
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

## **4.4 Farming System**

### **4.4.1 Cropping Patterns**

Though maize and coconut were the dominant crops, land-use patterns on individual farms were complex. Each parcel of land, averaging less than a hectare, supported one or more distinct land-use plots (1.4 on average), and each land-use plot supported one or more crops (Table 17). Maize-only plots accounted for just 10% of adopters' plots and 22% of non-adopters' plots. However, maize, whether planted on its own or combined with coconut, banana, and other crops, accounted for over 50% of plots in both adoption categories. These maize plots were the ones most likely to be treated with contour strips.

Likewise, coconut trees were widely spaced and rarely planted as a monocrop, but were mixed with maize, banana, fruit trees, and other crops. Coconut-based land uses (including the coconut-maize pattern reported above) accounted for 43% of adopters' plots and 34% of non-adopters' plots. Maize-based and coconut-based cropping patterns between them accounted for two thirds of land-use plots in both categories.

Banana was also an important crop, occasionally planted on its own but more frequently in combination with maize and/or coconut. Other crops (vegetables, root crops, fruit and timber trees) were less frequently planted on their own, and occupied a smaller proportion of each mixed-cropping plot.

### **4.4.2 Maize Production**

As discussed, maize was the dominant crop in most land-use patterns and provided the major source of food and income (see Table 23 below). Maize cultivation is also a highly erosive activity and the primary target for implementation of contour barriers. Hence it is important to analyse the productivity of the maize activity, with and without conservation measures.

**Table 17 – Land Use by Adoption Category**

Land-use	Adopters		Non-adopters		Total	
	No. of plots	%	No. of plots	%	No. of plots	%
Maize	7	10.1	19	22.4	26	16.9
Maize-coconut	4	5.8	5	5.9	9	5.8
Maize-coconut-other	15	21.7	15	17.7	30	19.5
Maize-banana	5	7.3	7	8.2	12	7.8
Maize-banana-other	4	5.8	3	3.5	7	4.6
Coconut	0	0.0	1	1.2	1	0.7
Coconut-other	11	15.9	8	9.4	19	12.3
Banana	8	11.6	2	2.4	10	6.5
Mangoes	3	4.4	8	9.4	11	7.1
Tobacco	1	1.5	3	3.5	4	2.6
Peanut	3	4.4	1	1.2	4	2.6
Root crops (cassava, taro, sweet potato)	2	2.9	4	4.7	6	3.9
Vegetables	2	2.9	4	4.7	6	3.9
Trees	0	0.0	1	1.2	1	0.7
Idle	4	5.8	4	4.7	8	5.2
<b>Total</b>	<b>69</b>	<b>100.0</b>	<b>85</b>	<b>100.0</b>	<b>154</b>	<b>100.0</b>
Plots per parcel	1.4		1.4		1.4	
Plots per farm	2.6		1.9		2.1	

Table 18 analyses data for the first maize crop in the 2001-2 farming year. Most farmers (86%) cultivated maize in this season, whereas the proportion dropped to less than half in subsequent seasons. Four sets of responses were discarded due to incompleteness, leaving 59 usable responses – 23 adopters and 36 non-adopters.

The mean area cultivated was only 0.6 ha, but the mean for adopters (0.7 ha) was significantly larger than that for non-adopters (0.5 ha), probably reflecting their larger average farm size. Adopters also used significantly more fertiliser, but there was no difference in the mean fertiliser rate between the two groups (237 kg/ha). Although the types of fertiliser were not recorded, it is likely this aggregate rate represents a very low application of essential nutrients (e.g., around 30 kg N/ha). Eight maize farmers (14%) applied no fertiliser.

The output of maize grain was significantly higher for adopters (560 kg) than non-adopters (390 kg), but this was entirely due to the difference in area cultivated. The average yield was low at 835 kg/ha and did not differ significantly between the two groups. For those who sold grain, the prices received varied from 4.00 to 7.00 pesos/kg, but were mostly around 6.00 pesos/kg. Using these prices to value the output, the mean value for adopters was 3,426 pesos and for non-adopters, 2,431 pesos, again reflecting the difference in area cultivated. The value of production per unit area was not significantly different between the groups and averaged around 5,000 pesos.

This analysis shows the low productivity and income generated by the main agricultural activity, attributable to the poor soils, low level of inputs, and no doubt the constraints imposed by weather and crop pests and diseases. There was no evidence that the adoption of contour barriers had as yet had any impact on fertiliser use, crop yields, or income.

**Table 18** –Maize Production Analysis in First Season by Adoption Category

<b>Variable</b>	<b>Adopters (n=27)</b>	<b>Non- adopters (n=46)</b>	<b>Total (n=73)</b>
No. cultivating maize in first season	25	38	63
% cultivating maize in first season	92.6	82.6	86.3
No. of usable responses	23	36	59
Area cultivated (ha) **	0.7	0.5	0.6
Fertiliser rate (kg/ha)	237	236	237
Maize output (kg) *	560	390	457
Yield (kg/ha)	811	851	835
Value of production (pesos)	3,426	2,431	2,819
Value per area cultivated (peso/ha)	4,896	5,117	5,031

#### 4.4.3 Tree Crops

Tree crops were an important component of the farming system, with around 89% of households cultivating one or more tree species (Tables 19 and 20). In particular, coconut (*Cocos nucifera*) was a traditional crop in this region and, though coconut trees were mostly old and in decline, coconut production was ranked second after maize as a source of income (see Table 23 below). Over 60% of households in both adopter and non-adopter categories had coconut trees. However, adopters averaged just over 100 trees while non-adopters averaged only 30. This is consistent with the finding that adopters had more land on average than non-adopters. The low number may also reflect the cutting down of trees for sale as “coco lumber”.

Other trees cultivated included fruit- and nut-producing trees and various timber species. The main fruit tree was mango (*Mangifera indica*). About half the adopters and a third of non-adopters had mango trees, averaging around 23 trees per household. Thus mangoes could make a significant contribution to the income of these households. Other fruit trees included sereguelas (*Spondias purpurea*), which was cultivated by only 12% of households but in significant numbers, averaging around 94 trees per household, and jackfruit (*Artocarpus heterophyllus*), cultivated by only a few households (7%) who averaged around 13 trees each. Nut-producing trees included cashew (*Anacardium occidentale*), cultivated by 10% of households who averaged 18 trees each, and talisay (*Terminalia catappa*), which only one household reported.

**Table 19** – Cultivation of Tree Crops by Adoption Category

Tree crop	Adopters (n=27)		Non-adopters (n=46)		Total (n=73)	
	No.	%	No.	%	No.	%
Coconut	17	63.0	28	60.9	45	61.6
Mahogany	14	51.9	19	41.3	33	45.2
Mango	13	48.1	15	32.6	28	38.4
Gmelina arborea	12	44.4	13	28.3	25	34.3
Sereguelas	2	7.4	7	15.2	9	12.3
Cashew	5	18.5	2	4.4	7	9.6
Jackfruit	1	3.7	4	8.7	5	6.9
Acacia mangium	2	7.4	1	2.2	3	4.1
Bagras	1	3.7	0	0.0	1	1.4
Molave	0	0.0	1	2.2	1	1.4
Talisay	0	0.0	1	2.2	1	1.4
Narra	1	3.7	0	0.0	1	1.4
Ipil-ipil	1	3.7	0	0.0	1	1.4
Rubber	0	0.0	1	2.2	1	1.4
Any tree crop	24	88.9	41	89.1	65	89.0

**Table 20** – Average Number of Trees per Household by Adoption Category

Tree crop	Adopters	Non-adopters	Total
Coconut	104	30	58
Mahogany	35	38	37
Mango	19	27	23
Gmelina arborea	22	17	19
Sereguelas	79	99	94
Cashew	17	20	18
Jackfruit	5	15	13
Acacia mangium	1	na	na
Bagras	60	0	60
Molave	0	na	na
Talisay	0	na	na
Narra	2	0	2
Ipil-ipil	0.25 ha	0	0.25 ha
Rubber	0	na	na
All tree crops	114	65	83

The most important timber tree was Philippine mahogany (*Shorea* spp.), a slow-growing rainforest hardwood cultivated by 45% of households, with an average of 37 trees per household. This tree is widely viewed as an investment for one's children. The fast-growing exotic, *Gmelina arborea*, was grown by around a

third of households, averaging 19 trees each. This species was widely planted in Misamis Oriental in the 1990s as an alternative source of timber for the domestic market. Other timber species were planted by only one or two households and mostly in small numbers, including *Acacia mangium*, bagras (*Eucalyptus deglupta*), molave (*Vitex parviflora*), narra (*Pterocarpus indicus*), and ipil-ipil (*Leucaena leucocephala*).

Taking all tree crops together, adopters averaged 114 trees per household compared with 65 for non-adopters. This difference was almost entirely due to the difference in the size of coconut holdings, which, as noted above, was a reflection of the difference in landholding. This implies that, in general, adopters had more land and were relatively better off than non-adopters, though within the context of a highly impoverished rural economy.

Tree planting materials were mostly derived from within the farm or from neighbours' or relatives' farms. Only eight households reported obtaining planting materials from public agencies (ICRAF, DENR or DA) or from a Landcare nursery, and only three had purchased materials from a private nursery.

The majority of both adopters (78%) and non-adopters (65%) indicated a desire to plant more trees. Of those who did not, the overwhelming reason was that they did not own the land (77%). In addition, some had too little land or felt they were too old. Of those intending to plant, 73% specified mahogany and 24%, mango. Other species mentioned by a few households were bagras, *Gmelina arborea*, *Acacia mangium*, cashew, coconut, and narra. The main reasons given for wanting to expand the area under these tree species were to produce timber (37%), to provide for the future (28%), and to generate cash (18%). Protection of the soil resource was mentioned only three times (4%).

#### **4.4.4 Livestock**

Livestock played a generally minor part in the farm economy (Table 21). Almost all households reared chickens (15 on average) and pigs (4 on average), and more than half kept goats (2 on average). Around 73% of households kept cattle, again averaging around two head, mainly for draught power. Less than 20% had a carabao and only two households had a horse. From the point of view of the adoption of contour farming measures, the ownership of draught animals is important as NVS and related measures rely on ploughing for their implementation. Table 22 shows that 78% of adopters had one or two draught animals, compared with only 44% of non-adopters. These proportions were significantly different at the 0.01 level. While it is true that draught animals can be borrowed or rented, not owning a draught animal appears to be a constraint to adoption.

#### **4.4.5 Farm Income**

Two thirds of farmers ranked maize as their main source of farm income and a further 22% ranked it second, with little difference between adopters and non-adopters (Table 23). Coconut was ranked first by 15% and second by 33%, making it the second most important source of farm income overall. Other minor sources included banana (ranked first by 15% of adopters), cassava, groundnut, mangoes, and tobacco.

**Table 21 – Ownership of Livestock by Adoption Category**

Type of livestock	Adopters			Non-adopters			Total		
	No. hh	% hh	Avg. no. stock	No. hh	% hh	Avg. no. stock	No. hh	% hh	Avg. no. stock
Cattle	21	77.8	2.6	32	69.6	1.8	53	72.6	2.1
Carabao	8	29.6	1.0	5	10.9	1.0	13	17.8	1.0
Horses	0	0.0	0.0	2	4.4	1.0	2	2.7	1.0
Goats	17	63.0	2.1	24	52.2	1.9	41	56.2	2.0
Pigs	25	92.6	3.0	39	84.8	5.1	64	87.7	4.3
Chickens	25	92.6	15.8	41	89.1	14.4	66	90.4	15.0

**Table 22 – Number of Draught Animals by Adoption Category**

No. of animals	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
0 ***	6	22.2	26	56.5	32	43.8
1	19	70.4	20	43.5	39	53.4
2	2	7.4	0	0.0	2	2.7
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

**Table 23 – Ranking of Farm Income Sources by Adoption Category**

Income source	Adopters (n=27)		Non-adopters (n=46)		Total (n=73)	
	Rank 1 (%)	Rank 2 (%)	Rank 1 (%)	Rank 2 (%)	Rank 1 (%)	Rank 2 (%)
Maize	63.0	22.2	67.4	21.7	65.8	21.9
Coconut	18.5	37.0	13.0	30.4	15.1	32.9
Banana	14.8	0.0	2.2	10.9	6.9	6.9
Cassava	0.0	11.1	0.0	2.2	0.0	5.5
Peanut	0.0	7.4	0.0	0.0	0.0	2.7
Tobacco	3.7	0.0	2.2	2.2	2.7	1.4
Mangoes	0.0	7.4	2.2	8.7	1.4	8.2
Seniguelas	0.0	0.0	4.4	0.0	2.7	0.0
Livestock	0.0	0.0	4.4	0.0	2.7	0.0
n.a.	0.0	0.0	4.4	0.0	2.7	0.0
<b>Total</b>	<b>100.0</b>	<b>85.2</b>	<b>100.0</b>	<b>76.1</b>	<b>100.0</b>	<b>79.5</b>

#### 4.4.6 Farm Problems

Respondents were asked to list up to three problems affecting their farming (Table 24). Adopters identified 2.7 problems on average, and non-adopters, 1.5. For

both groups, however, lack of working capital for farm inputs, especially fertiliser, was by far the most frequently mentioned problem (53% overall). Poor soil fertility was also commonly identified (16%), reflecting the nature of the soils in the area, the degree of degradation that had occurred, and the lack of inputs. However, soil erosion as such was only mentioned once. The destructive nature of climatic events (strong winds, heavy rain) and outbreaks of crop pests and diseases were also general characteristics of the farming environment that reduced yields unpredictably. Individual respondents suffered from lack of a draught animal or lack of ownership rights to land, both of which were shown above to be associated with non-adoption of conservation practices.

**Table 24** – Farm Problems by Adoption Category

Problem	Adopters (n=27)		Non-adopters (n=46)		Total (n=73)	
	No.	%	No.	%	No.	%
Lack of capital for inputs	36	57.1	35	49.3	71	53.0
Poor soil fertility	11	17.5	11	15.5	22	16.4
No draught animal	4	6.3	9	12.7	13	9.7
Climate (strong wind, heavy rain)	4	6.3	8	11.3	12	9.0
Crop pests and diseases	4	6.3	6	8.5	10	7.5
No land	1	1.6	2	2.8	3	2.2
Soil erosion and degradation	1	1.6	0	0.0	1	0.7
Poor farm-to-market roads	1	1.6	0	0.0	1	0.7
Lack of irrigation	1	1.6	0	0.0	1	0.7
<b>Total</b>	<b>63</b>	<b>100.0</b>	<b>71</b>	<b>100.0</b>	<b>134</b>	<b>100.0</b>

#### **4.4.7 Farming Trends**

Respondents were asked to comment on the direction of change in some key farming variables in the time since the introduction of the Landcare Program (Table 25). The options included an increase, a decrease, no change, fluctuating (i.e., up and down), or not applicable. The “net trend” was calculated as the percentage of respondents reporting an increase, less the percentage reporting a decrease. Where this number was large (say, more than 30%) it was taken to indicate a significant trend in the variable in question.

The net trend in maize output was highly negative for both adopters and non-adopters; in fact, more adopters reported a decrease in maize output than non-adopters. The main reasons given for this decline included lack of fertiliser and increased incidence of pests and diseases. Nevertheless, this perceived downward trend in maize production was not reflected in food supply, which most respondents in both groups (62%) saw as fluctuating with maize yield and seasonal conditions.

Both groups saw a positive net trend in the area under trees, with 44% of adopters reporting an increase. This was mainly due to recent plantings, partly due to the Landcare Program. There was no clear trend in livestock numbers, with increases and decreases roughly cancelling out. This reflected the small numbers of livestock and was mainly due to births and sales.

For most respondents (69%), labour requirements had remained unchanged and were still manageable due to the small farm size. However, a significant number in both categories (26%) saw labour requirements as having increased. This was attributed to expanded farm area and increased ploughing rather than more intensive practices. Farm income was mostly seen to fluctuate with seasonal and market conditions, with no net trend apparent in either group.

One would expect that land condition would be seen by adopters to show an improvement due to the impacts of contour barriers and reduced soil erosion, but 63% of adopters saw a decline in this variable, almost as many as among non-adopters (74%). Hence, overall, there was a net trend of -58%, the largest trend of any variable considered. The main explanation was that soil fertility was declining due to lack of fertiliser. A number of adopters commented that soil erosion was still occurring, despite the implementation of contour barriers. Those who saw maintenance or improvement in soil condition referred to the retention of organic matter. Only three respondents mentioned the impact of contour barriers.

**Table 25 – Perceived Farming Trends by Adoption Category**

Category	Trend (% of respondents in each category)					
	Incr.	Decr.	Stable	Fluct.	n.a.	Net
<b>Maize output</b>						
Adopters	14.8	74.1	3.7	3.7	3.7	- 59.3
Non-adopters	17.4	52.2	10.9	8.7	10.9	- 34.8
<b>Total</b>	<b>16.4</b>	<b>60.3</b>	<b>8.2</b>	<b>6.9</b>	<b>8.2</b>	<b>- 43.9</b>
<b>Food supply</b>						
Adopters	22.2	11.1	7.4	59.3	0.0	+ 11.1
Non-adopters	15.2	10.9	8.7	63.0	2.2	+ 4.3
<b>Total</b>	<b>17.8</b>	<b>11.0</b>	<b>8.2</b>	<b>61.6</b>	<b>1.4</b>	<b>+ 6.8</b>
Area of trees						
Adopters	44.4	0.0	25.9	0.0	29.6	+ 44.4
Non-adopters	26.1	2.2	54.4	0.0	32.6	+ 23.9
<b>Total</b>	<b>32.9</b>	<b>1.4</b>	<b>34.3</b>	<b>0.0</b>	<b>31.5</b>	<b>+ 31.8</b>
<b>Livestock nos.</b>						
Adopters	40.7	44.4	11.1	0.0	3.7	- 3.7
Non-adopters	28.3	45.7	23.9	0.0	2.2	- 17.4
<b>Total</b>	<b>32.9</b>	<b>45.2</b>	<b>19.2</b>	<b>0.0</b>	<b>2.7</b>	<b>- 12.3</b>
<b>Labour</b>						
Adopters	25.9	0.0	74.1	0.0	0.0	+ 25.9
Non-adopters	26.1	6.5	65.2	0.0	2.2	+ 19.6
<b>Total</b>	<b>26.0</b>	<b>4.1</b>	<b>68.5</b>	<b>0.0</b>	<b>1.4</b>	<b>+ 21.6</b>

Category	Trend (% of respondents in each category)					
	Incr.	Decr.	Stable	Fluct.	n.a.	Net
<b>Farm income</b>						
Adopters	14.8	22.2	7.4	55.6	0.0	- 7.4
Non-adopters	15.2	19.6	2.2	58.7	4.4	- 4.4
<b>Total</b>	<b>15.1</b>	<b>20.6</b>	<b>4.1</b>	<b>57.5</b>	<b>2.7</b>	<b>- 5.5</b>
<b>Soil condition</b>						
Adopters	14.8	63.0	22.2	0.0	0.0	- 48.2
Non-adopters	10.9	73.9	13.0	0.0	2.2	- 63.0
<b>Total</b>	<b>12.3</b>	<b>69.9</b>	<b>16.4</b>	<b>0.0</b>	<b>1.4</b>	<b>- 57.6</b>

#### 4.5 Adoption of Contour Barriers

There were 27 adopters of contour barriers, or 37% of the households in the survey. In addition, a third of the 46 non-adopters said they may adopt in the future, indicating a potential for 42 adopters – a little over half the sample (58%). Adopters implemented contour measures on a total of 32 parcels, therefore averaging 1.2 parcels per adopter, or 67% of their total of 48 parcels. The total area contoured was 8.5 ha, which was 23% of those parcels treated, 21% of the total farm area of adopters, and 10% of the total farm area of survey farmers.

Most adopters (59%) learned about contour barriers from ICRAF, confirming the importance of the Landcare initiative in accelerating the diffusion of this technology (Table 26). A small proportion (15%) had been informed by the Landcare president or other farmers. Some had learned of contour hedgerows during field trips to the Mindanao Baptist Rural Life Centre in Davao del Sur or to Bukidnon. In two cases the knowledge was derived from the farmer himself. Specific advice on how to implement contour barriers was mostly received from ICRAF staff, but the ATs of the Department of Agriculture (DA) played a role in some cases. Interestingly, in 37% of cases the Landcare president or other farmers provided this specific advice, reflecting an important degree of farmer-to-farmer training. Assistance with the actual work of implementing contour barriers was provided by ICRAF in 85% of cases, with the Landcare president also assisting some farmers. However, there seemed to be a general lack of group work to implement the measures. ICRAF was also the overwhelming source of materials for tree planting on farms.

Data were collected for the 32 parcels on which contour barriers had been implemented. Interestingly, only 25% of parcels were contoured with NVS only (Table 27). Around two thirds used hedgerows, including NVS that had been enriched with productive crops. The most common hedgerow species was banana, accounting for 44% of all contoured parcels and 67% of parcels with hedgerows. *Gliricidia sepium*, pineapple and forage grasses were also used in a few cases. Some parcels (9%) were contoured with traditional *balabag*, involving the placement of rocks and crop trash across the slope. In one case banana was also planted along these rock barriers.

Table 28 shows that maize was the most common crop grown in the alley between contour barriers, accounting for 69% of parcels. Other alley crops included various vegetable crops, peanuts, and sweet potato, and, in two cases, mango trees.

In most cases less than half the parcel was contoured (Table 29), perhaps due to intra-parcel variation in slope and land use, with many parcels used for both coconut and maize. The distance between contour strips varied widely, but was seven metres or less in 59% of cases (Table 30). The optimal spacing depends on the slope and the crops planted, but a spacing of 5-7 metres is likely to be effective in this context. Given the proportion of the parcels contoured and the spacing between strips, it is not surprising that the total length of contour strips per parcel was generally low (Table 31), with 84% having less than 80 metres (i.e., 89 metres per ha for an average parcel of 0.9 ha).

All adopters identified the main benefit of contour barriers as minimising soil erosion. Of these, 30% also pointed to the link between reducing erosion and maintaining or enhancing soil fertility and crop production. A few (11%) saw an additional benefit in the scenic attractiveness of their terraced farms. Most (74%) reported no problems with their contour barriers, while 26% complained of the difficulty in ploughing and furrowing because the rows were not continuous.

Most of the 46 non-adopters gave cogent reasons for their decision (Table 32). Some (22%) had relatively level land with minimal soil erosion, hence did not see the need for contour barriers. This is consistent with the finding in Table 13 that adopters had a higher proportion of moderately to steeply sloping land. Others (17%) did not own their farm and so did not have the incentive or the discretion to install barriers, again consistent with the finding in Table 16 that adopters were more likely to be owners or part-owners. A number were too busy (17%) or simply not interested (15%), perhaps related to the higher incidence of off-farm work among non-adopters, reported in Table 7. A few were uninformed about the technology (9%) or were still observing adopters' farms to assess the impacts (7%), suggesting again that some further adoption might occur. However, the reasons given by most non-adopters imply that the overall adoption rate is unlikely to rise much above 50%.

**Table 26** –Information and Assistance Sources for Adopters of Contour Barriers

Source	Information		Advice		Implementation		Materials	
	No	%	No.	%	No.	%	No.	%
ICRAF	16	59.3	12	44.4	23	85.2	23	85.2
DA	2	7.4	4	14.8	0	0.0	1	3.7
Landcare pres.	1	3.7	2	7.4	3	11.1	3	11.1
Others farmers	3	11.1	8	29.6	0	0.0	0	0.0
Other	5	18.5	1	3.7	0	0.0	0	0.0
n.a.	0	0.0	0	0.0	1	3.7	0	0.0
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>27</b>	<b>100.0</b>	<b>27</b>	<b>100.0</b>	<b>27</b>	<b>100.0</b>

**Table 27** – Type of Contour Barrier by Parcel

Type of barrier	No. of parcels	% of parcels
Natural vegetative strips (NVS)	8	25.0
Hedgerows	21	65.6
- Banana	9	28.1
- Banana and other crops	5	15.6
- Gliricidia sepium	3	9.4
- Pineapple	2	6.3
- Forage grasses	2	6.3
Balabag (rocks, trash)	3	9.4
<b>Total</b>	<b>32</b>	<b>100.0</b>

**Table 28** – Crops Grown in Alley, by Parcel

Alley crop	No. of parcels	% of parcels
Maize	22	68.8
Eggplant and bell peppers	1	3.1
Peanut and sweet potato	1	3.1
Vacant	3	9.4
No response	3	9.4
<b>Total</b>	<b>32</b>	<b>100.0</b>

**Table 29** – Proportion of Parcel with Contour Strips

Proportion of parcel (%)	No. of parcels	% of parcels
< 20	11	34.4
20-39	11	34.4
40-59	6	18.8
60-79	1	3.1
80-99	0	0.0
100	3	9.4
<b>Total</b>	<b>32</b>	<b>100.0</b>

**Table 30** – Distance Between Contour Strips by Parcel

Distance (m)	No. of parcels	% of parcels
< 5	7	21.9
5-7	12	37.5
8-10	10	31.3
> 10	3	9.4
<b>Total</b>	<b>32</b>	<b>100.0</b>

**Table 31** – Total Length of Contour Strips per Parcel

<b>Length (m)</b>	<b>No. of parcels</b>	<b>% of parcels</b>
< 40	13	40.6
40-79	14	43.8
80-119	5	15.6
120+	0	0.0
<b>Total</b>	<b>32</b>	<b>100.0</b>

**Table 32** – Reasons for not adopting contour barriers in farm

<b>Reason</b>	<b>No. of respondents</b>	<b>% of respondents</b>
Level land, minimal erosion	10	21.7
Do not have own farm	8	17.4
Too busy	8	17.4
Not interested	7	15.2
Uninformed	4	8.7
Still observing adopters	3	6.5
Have difficulty ploughing	2	4.3
Too old	2	4.3
Not a landcare member	1	2.2
Not permanent in barangay	1	2.2
<b>Total</b>	<b>46</b>	<b>100.0</b>

#### 4.6 Landcare Membership

Almost all the adopters (93%) and almost half the non-adopters (48%) identified “Landcare” with protecting their land against soil erosion through contour farming (Table 33). That is, their perception was that Landcare referred to a specific, farm-level soil conservation technology – the establishment of contour barriers. Only one articulated a broader concept of “protecting nature” and none referred to the role of groups or networks. Over half the non-adopters had no idea what Landcare meant, indicating that even in a small community the communication of concepts such as Landcare runs into barriers.

For adopters, information about Landcare came primarily through the visits by the ICRAF Landcare Coordinator (67%) as well as through the Department of Agriculture (DA) (19%) (Table 34). Non-adopters, on the other hand, were more likely to have learned about Landcare from neighbours and friends (41%) or, as indicated above, not to have any knowledge of Landcare (20%). This suggests that most non-adopters, perhaps because of the factors limiting their need or capacity to adopt conservation measures, were disinclined to attend community meetings about Landcare or have direct contact with visiting Landcare facilitators.

As shown in Table 35, 43% of households surveyed had one or more member who currently belonged to a Landcare group, and a further 15% were considering joining. The proportion of current members was significantly higher (at the 0.01 level) for adopters (82%) than non-adopters (20%). However, it is interesting to

**Table 33** – Perceptions of Landcare by Adoption Category

Perception	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
Protection against soil erosion	15	55.6	12	26.1	27	37.0
Contour farming	10	37.0	10	21.7	20	27.4
Protecting nature	1	3.7	0	0.0	1	1.4
No idea	1	3.7	24	52.2	25	34.3
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

**Table 34** – Sources of Information about Landcare by Adoption Category

Sources	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
ICRAF	18	66.7	12	26.1	30	12.3
DA	2	7.4	5	10.9	7	9.6
DA and ICRAF	3	11.1	1	2.2	4	5.5
Neighbour/friend	4	14.8	19	41.3	23	31.5
No answer	0	0.0	9	19.6	9	12.3
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

**Table 35** – Membership in Landcare by Adoption Category

	Adopters		Non-adopters		Total	
	No.	%	No.	%	No.	%
Current member	22	81.5	9	19.6	31	42.5
- chairman/secretary	3	11.1	1	2.2	4	5.5
- ordinary member	19	70.4	8	17.4	27	37.0
Not a member	5	18.5	37	80.4	42	57.5
- past member	1	3.7	0	0.0	1	1.4
- may join in future	0	0.0	11	23.9	11	15.1
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

note that 19% of adopters did not consider themselves to be Landcare members. Moreover, 20% of Landcare members were not adopters. Clearly, although there was a strong association between Landcare membership and adoption, reflecting the perception that Landcare meant learning about and implementing contour barriers, the decision to join a Landcare group and the decision to adopt contour barriers could be taken independently.

This is seen in the reasons for joining Landcare given by members and intending members (Table 36). Most (56%) referred to the “Landcare technology” and its impacts on soil conservation. Over a third (35%) were also involved to keep informed of any benefits that might accrue to farmers through the Landcare Program. This might seem a slightly cynical motivation, but in a remote, poor community with little outside support, it could be viewed as a prudent course of action. The reasons given for not joining a Landcare group are also instructive (Table 37). Over a third of those who had never joined (37%) had no time and found that Landcare meetings and activities were an interruption to their work. Others (22%) were unwilling because they did not own their farms, hence felt that they could not apply the practices promoted by Landcare. A small number had already adopted contour barriers and saw no need to join.

Adopters saw the benefits of Landcare membership primarily in terms of the implementation of contour measures on their farms and the consequent reduction in soil erosion (Table 38). Access to free planting materials was also seen as a clear benefit. Non-adopters, being mostly non-members, saw little or no benefit. Problems in Landcare (again mainly perceived by adopters) were lack of active participation and cooperation among group members and a lack of follow-up by facilitators.

**Table 36 – Reasons for Joining Landcare**

Reason	Current/past members		Intending members		Total	
	No.	%	No.	%	No.	%
Good farming technology	13	40.6	2	18.2	15	34.9
Keep informed of benefits	9	28.1	6	54.6	15	34.9
Soil conservation, soil fertility	6	18.8	3	27.3	9	20.9
Nursery management, free seedlings	1	3.1	0	0.0	1	2.3
Good advice from ICRAF	1	3.1	0	0.0	1	2.3
Make farm more beautiful	1	3.1	0	0.0	1	2.3
Invited by neighbour	1	3.1	0	0.0	1	2.3
<b>Total</b>	<b>32</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>	<b>43</b>	<b>100.0</b>

**Table 37 – Reasons for Not Joining Landcare**

Reason	No.	%
No time, meetings interrupt work	15	36.6
Do not own land, not permanent in barangay	9	22.0
Still observing	3	7.3
Already have contour barriers, know technology	2	4.9
Not interested in joining a landcare group	4	9.8
No response	8	19.5
<b>Total</b>	<b>41</b>	<b>100.0</b>

**Table 38** – Benefits and Problems of Landcare Membership by Adoption Category

<b>Benefits</b>	<b>Adopters</b>		<b>Non-adopters</b>		<b>Total</b>	
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
Farm contoured, erosion minimised	5	18.5	0	0.0	5	6.9
Free seedlings, forage grasses	4	14.8	2	4.3	6	8.2
Learn new farm practices	4	14.8	4	8.7	8	11.0
Free fertilisers, chemicals from DA	1	3.7	0	0.0	1	1.4
Learn cooperation	1	3.7	0	0.0	1	1.4
None	6	22.2	40	87.0	46	63.0
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>
<b>Problems</b>						
Lack of cooperation, participation	6	22.2	2	4.3	8	11.0
No facilitation, follow-up	6	22.2	3	6.5	9	12.3
Group not organised	2	7.4	1	2.2	3	4.1
None	13	48.2	40	87.0	53	72.6
<b>Total</b>	<b>27</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

## 5. SUMMARY AND CONCLUSION

Libertad is a small (2,300 ha), coastal municipality at the western end of Misamis Oriental, roughly halfway between Cagayan de Oro and Iligan Cities. Hence 40% of the land area is classified as urban, and around two thirds is flat to gently sloping (0-3%) and below 100 metres in elevation. However, the landscape rises sharply in the interior of the municipality. Hence the inland rural barangays occupy undulating to rolling land (mostly 4-8% slopes but increasing to 18% in some barangays) at 300-600 metres elevation. The soils are calcareous clays and clay loams of low fertility and high erodibility. Maize and coconut are the dominant crops, with tobacco of declining importance and vegetable and fruit production (bananas, mangoes, etc) on the increase. Poor soils, low input levels, and an ageing stock of coconut palms contribute to low productivity.

The three inland barangays that have been involved in the Landcare Program make up around a third of the municipality by area (754 ha) and about 14% of the population. Access is by an unsealed road in poor repair, using motorcycles and four-wheel-drive vehicles. Nevertheless, the upland population has been increasing steadily in recent decades as security improves and poor farmers from elsewhere in the province seek out land to occupy. The population density in these rural barangays is around 230-240 persons per sq. km. Hence farms are small, averaging less than 2 ha, and incomes are low. Only 44% of the rural land is classified as alienable and disposable (A&D), the remainder being public land. However, the Department of Agrarian Reform (DAR) has been progressively issuing titles to land occupants under the Comprehensive Agrarian Reform Program (CARP).

Two of the barangay in the Landcare Program (Lubluban and Sto. Niño) were designated an Agrarian Reform Community and had formed an association as required under CARP. It was decided that this association would double as a Landcare group. The third Landcare barangay, Kimalok, being the most remote, has been the target of several recent anti-poverty programs focusing on community-based initiatives to provide social services and micro-finance. Hence farmers were familiar with group-based activities and readily formed three Landcare groups at the purok-level.

The municipal government was supportive of the Landcare Program, encouraging ICRAF's entry to the area and allocating two agricultural technicians (ATs) to act as Landcare facilitators, with back-up from ICRAF. The involvement of ICRAF thus induced a reallocation of agricultural staff-time to the inland barangays. The response of farmers was initially positive as they had been relatively neglected by agricultural extension services in the past. According to participants in the two focus groups, most members joined a Landcare group to learn about soil conservation measures – specifically, natural vegetative strips (NVS) – and to see what other benefits they might obtain, such as free planting materials. Some felt obliged to join to obtain a land title from DAR or because they were persuaded by the ATs. There was early interest generated by the cross-site visits to Claveria and the training in NVS and nursery practices. However, the interest in group activity waned after the first year as visits by the ATs became infrequent. Group members expressed a need for on-going support from a Landcare facilitator if they were to remain active and cohesive.

The sample survey in Lublublan and Kimalok revealed the average farmer to be male, aged 45 years, with 7 years of education, originating in the same or a nearby barangay. All regarded farming as their main occupation but around a quarter had other work, mainly as farm labourers. Hence there was considerable experience in and commitment to farming. Households averaged only 5 members, including 3 dependants, hence the farm workforce typically comprised the household head working full-time, assisted by his wife part-time. Three quarters of households participated in one or more local group and over 40% had participated in agricultural training events.

Farms averaged only 1.2 ha, comprising one or sometimes two separate parcels. Half the households were owners or part-owners of their farms, and the other half were non-owners. In most cases, farmers in the latter category were borrowing rather than leasing or share-cropping their land. The dominant crops were maize and coconut, usually found in combination with each other and with other crops such as bananas. These were also the major sources of income. Up to two or three crops of maize were cultivated in a year, though the likelihood of planting maize declined in the second and third seasons. Almost all farmers (86%) cultivated maize in the first season. This crop of maize was cultivated on about 0.6 ha (i.e., half the farm), received little fertiliser (about 30 kg of N per ha), produced under 1 t/ha of grain, and generated revenue of around 5,000 pesos/ha. Coconut palms occupied about 0.5 ha on average and were of low productivity. Almost half the farmers had planted significant numbers of timber trees, especially mahogany and gmelina, and over a third had planted fruit trees, especially mango. Most households had small numbers of cattle, goats, pigs, and chickens, but over 40% had no draught animal for ploughing.

In general, farmers saw little trend in food supply or farm income, both of which rose and fell with climatic and market conditions. The area of tree crops was seen to be stable or increasing, with mahogany and mango the favoured species. However, most saw the condition of their soil (especially soil fertility) and their output of maize as declining, mainly due to lack of fertiliser. Relatedly, the dominant farm problems were seen to be lack of capital for purchased inputs, especially fertiliser, and poor soil fertility. Soil erosion as such was scarcely mentioned.

As noted, Landcare was generally welcomed by farmers as a way of obtaining access to, and support for implementing, improved farming technology. There was genuine interest in NVS technology in particular, though there had already been some exposure to contour hedgerows and some farmers practised the traditional *balabag* technique of placing rocks and trash across the slope. There was also interest in learning nursery techniques and obtaining planting materials from ICRAF.

About 43% of respondents were Landcare members. Those who had not joined felt they did not have enough time to participate or were restricted because they did not own their farm. The main benefits of membership were learning new farm practices, especially contour strips, and obtaining free seedlings and forage grasses. The problems were seen to be lack of participation among members and lack of follow up by the facilitator.

About 37% of respondents had adopted contour barriers, covering 21% of their farm area and 10% of the total farm area of survey farmers. This implied a total

contoured area of around 26 ha in the two surveyed barangays, representing 5% of the total area of these barangays. The contour barriers were mostly 5-10 metres apart and totalled less than 80 metres per parcel. In most cases the vegetative strips had been enriched with bananas or other crops – only a quarter of them were contoured with NVS alone. The most common alley crop was maize.

In focus group discussions, participants claimed adoption of contour barriers reduced their fertiliser requirements and increased their yield and income. However, a comparison of maize production between adopters and non-adopters failed to confirm this. While on average adopters cultivated a significantly larger area and hence produced more maize, the average reported fertiliser rates and yields were not significantly different between the two groups.

Adopters and non-adopters did not differ greatly in their personal, household, or farm characteristics – they could all be considered resource-poor farmers in a marginal environment for agriculture. However, adopters

- had larger farms, with more land under both maize and coconut;
- were more likely to be landowners;
- had more steeply sloping land;
- were more likely to have their own draught animals;
- more often reported an increase in the area under tree crops;
- were less likely to have off-farm employment;
- were more likely to be Landcare members; and
- were more likely to have undertaken technical training, especially in contour farming.

When non-adopters were asked the reasons for their decision, the most common answers were that their farm was fairly level and not eroding, that they did not own the land, or that they were too busy. These explanations are consistent with the observed differences between the two groups. They also suggest that, although some uptake and extension of NVS was still occurring, there was little prospect of further wide-scale adoption.

The study shows the initial responsiveness of farmers in such marginal environments to the scaling up of Landcare and the adoption of contour farming, particularly among those who are relatively better off. However, scaling up through the Municipal Agricultural Office, without the provision of additional resources, can result in dissipation of enthusiasm and loss of direction. It appears that regular contact with a committed Landcare facilitator over an extended period is needed for local Landcare groups to be sustained.

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## SURVEY QUESTIONNAIRE

Interviewer: \_\_\_\_\_ Date: \_\_\_\_\_ Questionnaire No: \_\_\_\_\_ Checked by: \_\_\_\_\_  
 Name of respondent: \_\_\_\_\_ Sitio: \_\_\_\_\_ Barangay: \_\_\_\_\_

### A. INFORMATION ABOUT HOUSEHOLD HEAD

1. Name (if different from respondent): \_\_\_\_\_
2. M / F \_\_\_\_\_ 3. Age: \_\_\_\_\_ 4. Education level: \_\_\_\_\_
5. No. of years living in sitio: \_\_\_\_\_ 6. Cultural group: \_\_\_\_\_
7. Main occupation: \_\_\_\_\_ 8. Other occupations: \_\_\_\_\_

### B. INFORMATION ABOUT HOUSEHOLD

1. How many members in this household (including head): \_\_\_\_\_
2. How many are full-time farm workers: \_\_\_\_\_ part-time farm workers: \_\_\_\_\_
3. How many are non-workers/dependants (children, elderly, sick): \_\_\_\_\_
4. What is the highest education level of any resident member? \_\_\_\_\_
5. Local groups or organizations to which one or more household members belong:
  - (i) \_\_\_\_\_
  - (ii) \_\_\_\_\_
  - (iii) \_\_\_\_\_
6. What types of agricultural and related training have household members received in the past 5 years?

Provider of training	Topic of training
(i)	
(ii)	
(iii)	

### C. LAND OWNERSHIP AND USE

1. How many land parcels in this farm:

	Parcel 1	Parcel 2	Parcel 3	Parcel 4
Area (ha)				
Own land or rented/borrowed?	O / R	O / R	O / R	O / R
- If owned, type of title <sup>#</sup>				
- If rented, type of agreement <sup>*</sup>				
Distance from house (km)				

	<b>Parcel 1</b>	<b>Parcel 2</b>	<b>Parcel 3</b>	<b>Parcel 4</b>
Slope - level, moderate, steep	L / M / S	L / M / S	L / M / S	L / M / S
Land uses (list each current use, e.g., houselot; maize; maize/coconut; mangoes; coffee; eucalyptus, etc.)	% of parcel	% of parcel	% of parcel	% of parcel

# TD = tax declaration; CSC = certificate of stewardship contract; CLOA = certificate of land ownership award; LC = leasehold contract; NONE = no tenure instrument; if other specify.

\* S = sharecropping; B = borrowing; M = mortgaging; L = leasing; if other, specify.

2. Please give details of field crop production for the 2001-2002 farming year (e.g., maize, sweet potato, mungbean, peanut, tobacco, etc.).

<b>Season</b>	<b>Crop (incl. variety, e.g., hybrid maize)</b>	<b>Area planted (ha)</b>	<b>Fertilizer applied (kg)</b>	<b>Output (kg)</b>	<b>Price (P/kg)</b>
First					
Second					
(Third)					

3. Please give details of any tree crops and other perennial crops planted in your farm.

<b>Species</b>	<b>Hectares/ Number</b>	<b>Purpose</b>	<b>Source of planting material<sup>#</sup></b>

Species	Hectares/ Number	Purpose	Source of planting material <sup>#</sup>

\* e.g., food, timber, cash, investment for future, soil protection, etc.

# e.g., private nursery, landcare nursery, DENR, ICRAF, etc.

4. Do you intend to increase the number/area of tree crops in the near future?

YES/NO

IF NO (4.1) – Why not?

IF YES (4.2) – Which species and why?

Species	Reason

#### D. LIVESTOCK

1. How many farm animals do you own?

Cattle: Buffalo: Horses:

Goats: Pigs: Chickens: Other (specify):

2. Of the cattle/buffalo, how many are used as draught animals (i.e., for ploughing):

#### E. INCOME

1. Using the table below:

- list the sources of income for this household (including farm and non-farm income, whether consumed or sold);
- indicate what proportion of each income source is consumed and sold for cash;
- indicate the three most important sources of income (in order of importance).

<b>Farm income sources</b>	<b>% consumed by household</b>	<b>% sold for cash</b>	<b>Rank (1, 2, 3)</b>
<b>Non-farm income sources</b>			

### **F. FARMING TRENDS AND PROBLEMS**

1. What are the three major problems facing your farming activities?

- (i)
- (ii)
- (iii)

2. Over the past five years what are the major trends or changes in your farm? (tick box)

	<b>Incr</b>	<b>Decr</b>	<b>No change</b>	<b>Do not know</b>	<b>Reason</b>
Maize output					
Overall food supply					
Tree crop area					
Livestock nos.					
Labour requirement					
Farm cash income					
Condition of land					

### **G. USE OF CONTOUR BARRIERS**

1. Have you adopted contour barriers YES/NO IF NO

(1.1) – (a) Why not?

(b) Are you planning to adopt contour barriers? YES/NO

(c) Why or why not?

## NOW GO TO SECTION H

IF YES (1.2) – Give details of adoption by parcel (as numbered in land use table).

Type of contour barrier	Parcel 1	Parcel 2	Parcel 3	Parcel 4
NVS				
Hedgerow (specify species)				
Balabag (specify material)				
% of parcel with barriers				
No. of barriers				
Distance between barriers (metres)				
Total length of barriers (metres)				
Any crops planted along barrier? (specify crops)				
Specify crop(s) grown in alleys				

2. How did you learn about these contour barriers? (e.g., neighbours, training at Claveria)
3. Who assisted you to implement these contour barriers on your farm, with:
  - (a) advice?
  - (b) labour?
  - (c) planting materials?
  - (d) other? (specify)
4. What have been the advantages or benefits of adopting these contour barriers?
  - (i)
  - (ii)
  - (iii)
5. What have been the disadvantages or problems with adopting these contour barriers?
  - (i)
  - (ii)
  - (iii)

## H. LANDCARE

1. What does the word “landcare” mean to you?

IF NO IDEA – GIVE A BRIEF EXPLANATION, THEN FINISH INTERVIEW  
HERE

2. How did you hear about “landcare”?

3. Have you ever been a member of a Landcare group? YES/NO

IF NO (3.1) – (a) Why not?

(b) Would you like to join in the future? YES/NO

(c) Why or why not?

IF YES (3.2) –

(a) What were your reasons for joining?

(b) Do you hold any position in the group? YES/NO

(Specify: )

(c) In what landcare activities did you participate in the past year (if any)?

(i)

(ii)

(iii)

(d) What are the benefits you have gained from joining the landcare group (if any)?

(i)

(ii)

(iii)

(e) What problems have you experienced in the landcare group (if any)?

(i)

(ii)

(iii)

(f) Are you still a member of the Landcare group? YES/NO

(g) Why or why not?

THANK YOU FOR PARTICIPATING IN THIS INTERVIEW!