6 SUMMARY AND CONCLUSION

This report has presented the results of a study to evaluate the impact of the Landcare Program in the Municipality of Lantapan and its relevance as a model for local and regional extension services in the uplands of Bukidnon Province. The study focused 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. The study drew on four sources of data, collected and analysed during July-December 2002: (1) project reports and statistics; (2) interviews with project staff and other key informants; (3) a questionnaire survey of 104 farm households in Barangay Sungco; and (4) twelve case studies of community Landcare groups. The sustainable rural livelihoods approach was used as a framework to organise and analyse these data. It has the advantage that it places the adoption of Landcare practices and the formation of Landcare groups within the context of the livelihood resources and strategies of farm households and local communities, thus explicitly linking rural development and natural resource management. This chapter summarises the main findings of the study and outlines some provisional conclusions as a basis for further discussion.

THE CONTEXT

The Municipality of Lantapan occupies 33,000 ha between the upper reaches of the Manupali River and the Mt Kitanglad Range. The landscape rises from river flats at 400-600 m in the south of the municipality to mountainous terrain at 1,100-2,200 m in the north. Soils are generally clayey, moderately acid, of low fertility, and susceptible to erosion. Rainfall averages 2,500 mm, 70 per cent falling in the wet season from May to October.

Lantapan has experienced major demographic, agroecological, economic, and institutional changes over the past half century. In that time, the indigenous Talaandig have become a minority as immigrants from the Visayas and Luzon have taken up land and introduced more intensive farming practices. The population increased from under 1,000 in 1948 to over 43,000 in 2000, resulting in a population density of 136 persons per sq. km and a modal farm size of 1-3 ha.

Hence shifting cultivation of rice and other crops for subsistence has given way to continuous cultivation of maize for both subsistence and sale, and the production of an array of vegetable crops such as beans, tomatoes, cabbages, and potatoes, destined exclusively for urban markets to the north. More recently, the spread of sugarcane cultivation and the establishment of two large banana plantations have further transformed the landscape in the more productive and favourably situated parts of the municipality.

The net effect of changes in land use is that forested land has declined while annual cropping has expanded, as the agricultural frontier has been pushed higher in the landscape. This has resulted in loss of forest biodiversity as well as the rapid degradation of soil and water resources.

In the 1990s three institutional changes began to impinge on natural resource management in Lantapan:

- the devolution of responsibilities for agriculture to the local government;
- the declaration of the Mt Kitanglad Range Natural Park and buffer zone;
- the lodging of an ancestral domain claim over an area including the entire protected area and buffer zone.

Within these overlapping jurisdictions, the local government has emerged as potentially a key player in promoting sustainable agriculture.

Though the agricultural and environmental sectors have been under-resourced, outside agencies have sought to have an impact on farming in Lantapan, both to reduce poverty and protect critical natural resources. In particular, a consortium of researchers within the SANREM program, including ICRAF researchers based at Sungco, helped pave the way for a community-based approach in partnership with local government. Hence, even before the Landcare Program was launched in Lantapan, there had been some progress in forming farmer groups, providing training in soil conservation and agroforestry, and developing local government plans for natural resource management.

THE LANDCARE PROGRAM

The Landcare Program in Lantapan built on ICRAF's earlier experience with Landcare in Claveria and the opportunities created by the SANREM program. Initially the strategy was to build Landcare into the municipal program for agricultural extension and natural resource management, but subsequent political shifts meant that ICRAF had to take most of the responsibility for the Landcare Program.

The Program required an additional investment of P1.2 million per year, mainly for a dedicated and well-qualified staff of two senior facilitators and four volunteer facilitators, but including sufficient support for travel and production of extension materials. These funds mainly came through project support mobilised by ICRAF. This figure does not include the crucial back-up provided by the ICRAF site office in Sungco and the wider network of technical and

One of the keys to Landcare's success is the exchanging of information between farmers during cross visits and training sessions

institutional support. On the other hand, the Program had a wider reach than Lantapan alone, supporting landcare efforts in other municipalities in Bukidnon and beyond.

The cost of the Program was equivalent to about 50 per cent of the total municipal budget for agriculture. This suggests that, from a purely financial point of view, it would be feasible for the municipality to take full responsibility for Landcare with some additional budgetary support. Whether it has the institutional capacity to do so is discussed below.

The recorded rate of adoption of natural vegetative strips (NVS) during the implementation of the Landcare Program was impressive at over 50 adopters per year, though this was similar to the preceding three years when ICRAF had been working informally with farmers as part of the SANREM Program. This suggests that the characteristics of the NVS technology itself and the use of practical, farm-level demonstrations were key elements in achieving rapid adoption. These elements were continued in the Landcare Program, along with more intensive training and organised cross-farm visits.

By the end of 2002 there were about 400 adopters of vegetative contour barriers, or 7 per cent of all farm households. The area of land under contour barriers averaged about 1.2 ha per adopter and totalled about 500 ha. This was about 3 per cent of agricultural land in Lantapan, 6 per cent of land used for maize and vegetables, and 10 per cent of land identified as "environmentally critical". On about 40 per cent of the area protected by NVS, adopters had enriched their contour strips by planting horticultural crops, forage grasses, shrubs or trees.

In addition, by 2002, 64 community nurseries had been established and 162,000 trees planted on farms. Though tree planting had also been underway during the preceding three years or so, the additional impact of the Landcare Program on tree planting was more marked than on NVS adoption. This reflects the particular interest of farmers in the income-earning potential of various fruit and timber tree species and hence the early emphasis on training in nursery management techniques.

There were 585 adopters of tree planting recorded by the end of 2002, or about 11 per cent of farm households. The area planted was around 660 ha, accounting for about 4 per cent of agricultural land, 8 per cent of maize and vegetable land, and 13 per cent of "environmentally critical" land.

Combining adopters of the two main conservation measures – contour barriers and agroforestry – there were about 862 adopters by the end of 2002, or 16 per cent of the total number of farm households in Lantapan (though not all households were potential adopters). The total area under conservation measures was about 1,150 ha (43 per cent under NVS and 57 per cent under agroforestry). This was 7 per cent of agricultural land, 14 per cent of maize and vegetable land, and 23 per cent of "environmentally critical" land, suggesting a significant impact at the landscape level. However, these figures do not account for any "dis-adoption" (failure to maintain NVS or planted tree seedlings), the rate of which has not been measured. Also, they can be only partially attributed to the Landcare Program as such, due to the prior activity of ICRAF and other SANREM partners.

There was also rapid formation of Landcare groups and a Landcare Association, soon growing to 62 local groups with 840 registered members (though in practice membership was quite informal). These groups were an important source of information on conservation practices for their local community and encouraged members and others to work together, especially in the establishment and maintenance of communal landcare nurseries. However, many groups became inactive once the initial adoption of NVS and/or tree planting had occurred, and especially in those barangay where plantation development and other agribusiness ventures had led to the demise of smallholder farming. The too-rapid expansion of the Program may also have been a

factor in the decline of group activity, limiting facilitators' capacity to follow up existing groups. By mid-2003 the number of active groups had dropped to 12 (20 per cent), while 45 groups (73 per cent) were reported to have disbanded (though individual members may still have participated in Landcare activities and some groups had the potential to re-form around new activities). Nevertheless, the Landcare Association remained reasonably active and had the potential to take on more aspects of the Landcare Program, especially the provision of training to outside groups.

The Landcare facilitators felt the key components of a Landcare program were information campaigns, farmer-to-farmer knowledge sharing, and the formation of links and networks between individuals and groups. They felt it was better to avoid too rapid group formation, high dependence on the supply of material inputs, and too great a focus on technology, in favour of spending time on group development. From the facilitators' point of view, the foremost impacts of Landcare were: the adoption of suitable and productive new technologies by farmers; increased cooperation between farmers; and an increase in conservation thinking among farmers and other community members.

Key informants from the municipal office all felt that Landcare was highly relevant to Lantapan, and that Landcare should be "mainstreamed" in the regular extension program of the local government. However, technical staff emphasised the need to rise above political factionalism, to reprogram the workload of the agricultural technicians to allow greater focus on Landcare, and to provide additional resources for Landcare activities, including fieldwork expenses.

The scaling up of the Lantapan program to other municipalities in Bukidnon met with some initial success. In Manolo Fortich the influence of a strongly supportive mayor led to the mobilisation of agricultural technicians and barangay-level facilitators and the formation of 18 Landcare groups. Because of the availability of off-farm employment, farmer interest was more in agroforestry than NVS, but communal nurseries well not well maintained. Much of the impetus of the Landcare Program was lost with a change of administration following the 2001 elections.

Another important component of Landcare is the support and involvement of local government and community groups to create a local landcare identity

In Malaybalay the emphasis again was on working through the existing local government structures, providing initial orientation and training to agricultural technicians and other staff. Farmers here were more interested in learning how to implement NVS and adoption was encouraging. However, there was no formation of Landcare groups, the existing barangay-level or other community institutions being considered adequate for the task.

In both cases, the approach of embedding Landcare programs in municipal structures, with only limited, indirect support from ICRAF, meant the programs were less resilient to political and other changes than in Lantapan or Claveria, where a substantial ICRAF presence was maintained.

IMPACTS OF THE PROGRAM: THE FARM SURVEY

Barangay Sungco was chosen for the household survey because it was centrally located in the municipality and occupied a transect from the left bank of the Manupali River to the buffer zone, with a high proportion of steeply sloping or environmentally critical land. It also contained the highest number of adopters and had not been as affected by agribusiness developments as other barangays to the east, hence it provided an "upper bound" estimate of the impact of Landcare.

At the time of the survey, 60 per cent of farm households in the sample had adopted contour farming practices – in the form of NVS, enriched NVS, or established hedgerows. However, the area of land affected was only 31 per cent of adopters' farms and about 22 per cent of the total farm area in the sample. As indicated, this was the highest incidence of adoption in Lantapan; the proportion of farm land in the entire municipality treated with contour measures was considerably less.

Adoption had been occurring at an accelerated rate since the mid-1990s, when ICRAF first established a presence in Lantapan, but preceding the formal introduction of the Landcare Program. There were signs that adoption was beginning to plateau at the time of the survey. Adopters gained their knowledge of contour measures from ICRAF or other NGOs or, in nearly 40 per cent of cases, directly from other farmers. Most had no further advice or assistance to implement the measures, whether from extension staff or farmers.

Adopters differed from non-adopters in a number of respects, suggesting some of the key factors affecting the adoption decision. Adopters were significantly more focused on farming, had larger households with more farm workers, and were more likely to be owner-operators with titles to their holdings. They were also more likely to be involved in local farmer groups, including Landcare groups – 32 per cent of adopters were Landcare members compared to 12 per cent of non-adopters. (However, these figures indicate that most adopters were not Landcare members, hence Landcare membership in itself was not necessary to induce adoption.)

Adopters had larger farms and larger individual fields or parcels of land, meaning they could better afford to allocate part of their land to contour strips or hedgerows. Their farms tended to have steeper slopes, and adopters predominated in the upper zone of the catchment (hence the percentage of "critical land" with conservation measures was probably higher than the overall figure of 22 per cent cited above).

Adopters were more likely to cultivate maize, vegetables, and traditional root crops, and these were the dominant crops in the alleys of contoured parcels. Non-adopters were more likely to be potato or tomato farmers, crops perceived by farmers to require good drainage, which contour barriers might impede.

The perceived impacts of adoption at the farm level were that soil erosion was reduced, soil fertility was maintained, and terraces were formed. There was no perceived short-term impact on crop production or farm income. In the longer term, these impacts were likely to come about, first, because yields of field crops were maintained relative to yields from unprotected land and, second, because of a transition to agroforestry, as natural vegetative strips were progressively enriched with productive crops, including timber species.

Most survey respondents (adopters and non-adopters) saw Landcare in terms of learning about and adopting improved farming technologies. Landcare membership was positively associated with adoption of NVS. However, most adopters were not Landcare members and not all Landcare members were adopters. Hence, formally, Landcare membership was neither necessary nor sufficient for adoption. This reflects the non-exclusive nature of the training provided by the Landcare facilitators in each local community, as well as the spillover effect as farmers passed on their knowledge to others. It also reflects the informal nature of Landcare membership, with no registration form to be completed or fee to be paid. Hence many farmers regarded themselves as members by virtue of having adopted the NVS technology. It can be concluded that it was the Landcare Program as a whole (information sessions, training, cross-farm visits, follow-up by facilitators, farmer-to-farmer information exchange), not merely the formation of community Landcare groups, which was the key to the relatively high rate of adoption in Barangay Sungco.

IMPACTS OF THE PROGRAM: THE CASE STUDIES

The case studies indicate that the initial response to the Landcare campaign in 1999 was generally very positive, for a number of reasons:

- The Landcare facilitators were seen to be dedicated and enthusiastic and they made interesting presentations. This naturally generated positive feelings towards the Program and perhaps engendered a personal "debt of obligation" towards the facilitators.
- The environmental issues raised by the campaign were seen to be important, and the technologies promoted (NVS and agroforestry nurseries) were viewed as highly relevant and adoptable.
- The cross-farm visits and farmer-to-farmer training stimulated interest and were effective in communicating knowledge about the new technologies and bringing about their rapid adoption.

The formation of *sitio*-level Landcare groups was not difficult. In most cases, existing *sitio* and *barangay* structures were adequate to arrange the initial information session, cross-farm visits, and training sessions, and the subsequent formation of a group. Often the *sitio* leader or the chair of the agriculture committee would head up the group. In some cases an existing tribal or women's group took on Landcare functions.

In most cases, taking on Landcare activities was seen to add something of benefit to the local community or organisation and was not merely a formality (i.e., changing hats to satisfy different outsiders). Landcare was thought to be more beneficial and enduring than previous community-based efforts in the municipality, of which there had been many.

The primary interest was no doubt in gaining access to useful technology through the information, training, and support provided to Landcare members by ICRAF (though non-members were not in fact excluded from such benefits).

In addition, Landcare linked fairly isolated farming communities to a wider network of like-minded farmers and professionals within and beyond the municipality. Hence, even where there was already close social interaction within the local community, there was an incentive to link with Landcare to achieve this wider contact. Relatedly, there was also often a feeling of enhanced pride and purpose in being

part of Landcare, helping to confirm a traditional sense of stewardship and energise new efforts towards improving the farming system.

Those groups that had continued their Landcare activities tended to be in stable, cohesive communities and were led by a well-respected and dedicated local leader. They were highly focused on farming on their own land, with few off-farm activities, hence members had more time and incentive to be involved. They were also in regular contact with Landcare facilitators and continued to receive benefits from the Program.

Disbanded groups were often hampered by poor leadership, lack of follow-up, and a loss of interest or rationale once initial training and implementation of NVS was completed. One or two were perhaps less convinced to begin with, forming their group more to please outsiders (e.g., the ADRA project) than because of a genuine felt need. Political factionalism was an issue at the barangay level as well as the municipal level, hence loss of official support sometimes hampered the development of the Landcare group.

Clearly, many disbanded groups had been affected by the major and rapid change from smallholder farming to dependence on the banana plantations or the commercial poultry industry. Having leased or sold their land and taken up wage employment, there was no need or opportunity for them to continue in the Landcare Program. Others were too dependent on vegetable traders and financiers or lacked secure tenure, hence they felt locked in to their current farming practices.

Both continuing and disbanded groups felt that for Landcare groups to survive at the local level there was a need for on-going support from the Landcare Program, which in their experience primarily meant support from ICRAF through research, extension, and training. Even without an organised group, they hoped to continue to be informed and educated about new opportunities to improve their farming. They also looked to the municipal government for stronger and more consistent support.

CONCLUSION: LANDCARE AND LIVELIHOODS

Paraphrasing Scoones (1998) and Ellis (2000), the key research question in the analysis of sustainable rural livelihoods is: "Given a particular *context*, what combination of *livelihood resources* results in the ability to follow what combination of *livelihood strategies* with what *outcomes* for both livelihood security and environmental sustainability?" The impact of the Landcare Program on sustainable rural livelihoods in Lantapan can be summarised in terms of the four elements contained in this question – context, resources, strategies, and outcomes.

Context

The context in which the Lancare Program was implemented included a rapidly degrading natural environment, a rapidly changing economic environment, and a complex and dynamic institutional environment.

The extent of environmental degradation, and the attention given to it by national and international agencies, meant that awareness and concern among farming communities and local government was high. Hence the emphasis of the Landcare Program on practical solutions to the problem was widely welcomed.

The changing economic environment provided conflicting incentives with regard to involvement in the Landcare Program. The growth in market demand for maize and vegetable crops had encouraged farmers to expand the cultivation of these more erosive crops, but also increased the incentive to adopt the soil conservation practices the Program was promoting, in order to maintain crop yields and returns in the future. The emerging markets for fruit and timber encouraged farmers to learn the techniques required to establish trees on their farms, again providing a strong incentive to participate in the Program. However, these incentives were overwhelmed in many *barangay* by the growth of large-scale agribusiness ventures, diverting land and labour from smallholder farming and thereby undermining interest and involvement in Landcare. More generally, the rising opportunity cost of farm labour favoured less labour-intensive conservation measures such as tree planting over measures such as hedgerows.

The institutional framework was complex due to the overlapping claims of local government, protected area management, and ancestral domain. However, it was to local government that farmers mainly looked for legitimation of their access to resources and the provision of needed infrastructure and services. Hence local political dynamics were a major influence on efforts to initiate and sustain Landcare activities, at both municipal and *barangay* levels. The Landcare Program sought to engage with local government but continued to rely mainly on ICRAF for its momentum. The institutional framework was also

Landcare aims to provide long-term benefits to future generations

complicated by the many other actors and programs in Lantapan, but the Landcare Program was perceived by farmers to provide something of additional value, because of its practical, technical orientation and its long-term presence.

In brief, the local context was generally favourable for the implementation of the Landcare Program. However, the intermittent nature of political support (in Lantapan and other municipalities) required an actively interventionist role by a well-resourced external agency (in this case, ICRAF). The main threat to the success of the Program was from the rapidly changing economic environment, though whether this change was a threat or a boon to sustainable rural livelihoods is a matter for debate.

Assets

The second element in the research question relates to livelihood assets – natural, physical, financial, human, and social capital. Farmers in Lantapan possessed a limited stock of these assets.

In terms of natural capital, their farms were mostly small and not very productive, and were being rapidly degraded through continuous cultivation, resulting in soil erosion and loss of fertility. Natural capital was also being degraded at the community level due to loss of forest cover and declining water quality in streams and rivers. The focus of the Landcare Program was on maintaining and augmenting the stock of natural capital through simple, effective soil conservation practices and the accumulation of valuable stocks of productive trees, hence it met a genuine need among most farmers.

There was also a lack of physical capital, especially transport infrastructure, many farmers being remote from the main road that traversed the municipality (though market access in general had been improving since the 1980s). Farmers looked to local government to invest in this form of capital, but saw Landcare as providing a basis for increased material wealth in the future.

Farmers were clearly constrained by a lack of financial capital. A high proportion of their income was spent on food and other household necessities, limiting their capacity to invest in farm improvements. Their need for cash was seen in their willingness to enter into contracts with vegetable traders and the readiness with which those with suitable land leased it to the banana plantations and sought work as wage labourers. The adoption of Landcare practices did not have an immediate impact on farmers' financial capital, though their limited cash flow spurred their interest in the potential returns from commercial tree crops.

In terms of human capital, most farmers had received a basic education, had lived in the locality for all or most of their lives, and were knowledgeable and skilful in many aspects of farming. However, they were mostly lacking in the specific knowledge and skills required to adopt contour farming or to establish nurseries for tree seedlings. The Landcare Program provided effective farmer-based extension and training in these areas, thus significantly augmenting the human capital, not only of Landcare members but also of other trainees and their neighbours to whom they imparted this knowledge.

Likewise, the existing stock of social capital – in the sense of the integration or bonding between members of the local community (*sitio*) – was high, especially among the indigenous communities with their traditional leadership structures and social customs. However, the networks linking them to other communities and to outside agencies were not so well developed. The Landcare Program built successfully on the existing bonds by organising group training, the formation of Landcare groups, and the establishment of group nurseries at the *sitio* level. Crucially, the Program also helped create new linkages by organising cross-site visits and supporting the formation and activities of the Lantapan Landcare Association. That most of the local Landcare groups subsequently became inactive does not necessarily signify the loss of social capital; most of the communities that had formed these groups continued to be well integrated and capable of collective action when required. The sustainability of the Landcare Program depended more on the maintenance of the social capital linking the members of these communities to other actors (other communities, farm leaders, entrepreneurs, researchers, facilitators, political actors) within and beyond Lantapan. This form of social capital required on-going expenditure on "repairs and maintenance" if it was not to be depleted.

In summary, the Landcare Program involved targeted investment to augment the stocks of both human and social capital, achieving important complementarities between them. There was evidence that this investment was beginning to have an impact on farmers' natural capital and would in time have an impact on financial and physical capital stocks.

Strategies

The third element in the research question concerns the livelihood strategies of farm households and local communities, often classified as migration, intensification, extensification, and diversificiation (on- and off-farm). In Lantapan these strategies were constrained by the available stocks of livelihood assets just described, and were

continually evolving in response to the changing context outlined above.

The indigenous farming system had undergone a process of gradual intensification from the traditional system of shifting cultivation to one of continuous cultivation, necessitated by rapid population growth and emulating the more intensive farming practices of the immigrant groups.

The farming system had also been diversified as a range of commercial vegetable crops were introduced, combined in various rotations with the staple crop, maize. Farmers practising a maize-vegetables rotation were more responsive to NVS technology, while those cultivating tomatoes or potatoes were less likely to adopt contour farming.

The unsustainability of many of these intensive, commercial farming systems on steeply sloping lands resulted in a strategy of extensification, in which degraded, infertile plots were fallowed while the cultivation frontier was pushed further up-slope. The Landcare Program sought to counter this strategy by offering more sustainable methods of intensifying production on existing fields.

The uncertain and declining returns to many of the commercial vegetable crops encouraged further diversification into tree crops, including fruit and timber species, a strategy that the Landcare Program directly supported.

The recent opportunities to diversify into off-farm activities, notably wage employment in large-scale agribusiness ventures, had dramatically altered the livelihood strategies of many households, resulting in declining emphasis on farming and a consequent loss of interest in the Landcare Program.

In summary, the Landcare Program was consistent with the livelihood strategies of many smallholder farmers, especially those looking for ways to sustain their intensive maize-vegetable farming system and/or to diversify into productive tree crops. However, the strategies pursued by commercial potato and tomato farmers tended to make them resistant to Landcare initiatives, and the emerging strategy of taking up wage employment took farm households beyond the scope of the Program.

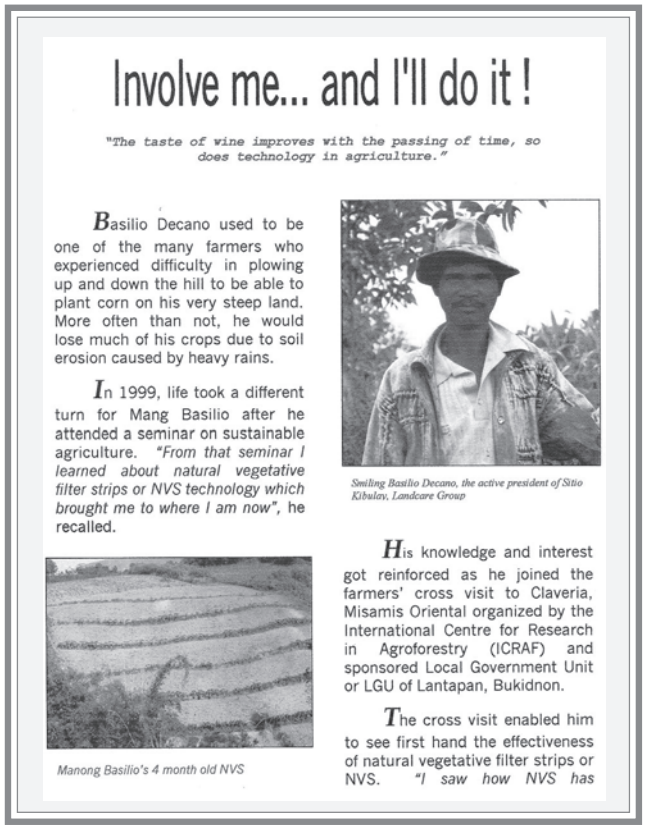
Outcomes

The final element in the research question concerns the outcomes for both livelihood security and environmental sustainability. The impacts of the Landcare Program on these two sets of outcomes could not be evaluated directly but were assessed in terms of various intermediate impacts that have been discussed in part in the preceding paragraphs.

Livelihood security is a function of income levels, income stability, seasonality, and risk, which in turn can be related to the adoption of conservation farming practices. The Landcare Program had a major impact on the adoption of vegetative contour barriers. On-farm experiments in Claveria and Lantapan have shown that such barriers significantly reduce soil erosion and runoff, and adopters' accounts confirmed this. Both sources of evidence suggest that the impact on crop production is neutral or even negative in the short term, due to the loss of productive area, but that yields and production are maintained in the medium to long term, relative to the declining output from unprotected fields. Thus farm income from field crops will likely be secured as a consequence of adoption. The Program has also had a major impact on the adoption of tree planting on farms. As well as helping to conserve the hillsides on which they are planted, fruit and timber trees are expected to provide higher and more stable incomes once they reach maturity. However, it should be recognised that there are both production and market risks with tree crops, such as the risk of short-term oversupply of a particular species, as experienced in the late 1990s with plantings of *Gmelina arborea* in Claveria.

Environmental sustainability is a function of impacts on soil and land quality, water, forests, and biodiversity. There is both an on-site and an off-site dimension to this set of outcomes. The on-site dimension has been discussed in the paragraph above in relation to soil conservation. The Landcare Program (and its precursors) has had a major impact on this dimension of environmental sustainability, affecting more than 20 per cent of environmentally critical land in Lantapan over a period of 6-7 years, and a higher percentage in upper-catchment *barangay* such as Kibangay, Victory, Cawayan, and Sungco. In the absence of suitable catchment models it is difficult to extrapolate from these farm-level impacts to catchment-wide effects. However, it is highly likely that this level of on-farm conservation (much of it involving a shift from annual cropping to agroforestry) will have significantly reduced sediment delivery to streams and reversed the trend of declining tree cover in the catchment as a whole.

Thus the Landcare Program in Lantapan has been a cost-effective intervention that has enhanced the prospects for sustainable rural livelihoods, contributing substantially to the livelihood security of participating farmers and the environmental sustainability of the wider landscape in which those farmers are situated. However, the sustainability of the Program itself will depend on the changing economic context and on continuing support from an extra-municipal agency such as ICRAF for the individuals and groups that constitute the Landcare Association.



Involve me... and I'll do it !

"The taste of wine improves with the passing of time, so does technology in agriculture."

Basilio Decano used to be one of the many farmers who experienced difficulty in plowing up and down the hill to be able to plant corn on his very steep land. More often than not, he would lose much of his crops due to soil erosion caused by heavy rains.

In 1999, life took a different turn for Mang Basilio after he attended a seminar on sustainable agriculture. *"From that seminar I learned about natural vegetative filter strips or NVS technology which brought me to where I am now"*, he recalled.

Manong Basilio's 4 month old NVS

Smiling Basilio Decano, the active president of Sitio Kibulay, Landcare Group

His knowledge and interest got reinforced as he joined the farmers' cross visit to Claveria, Misamis Oriental organized by the International Centre for Research in Agroforestry (ICRAF) and sponsored Local Government Unit or LGU of Lantapan, Bukidnon.

The cross visit enabled him to see first hand the effectiveness of natural vegetative filter strips or NVS. *"I saw how NVS has*

7 REFERENCES

Alexander, F., Brittle, S., Ha, A., Gleeson, T., Riley, C., 2000. *Landcare and Farm Forestry: Providing a Basis for Better Resource Management on Australian Farms.* ABARE Report to the Natural Heritage Trust. Canberra: Australilan Bureau of Agricultural and Resource Economics.

Arcenas, A., 2002. Farmer-Led Soil Conservation Initiative in a Developing Country Setting: The Case of the Claveria Land Care Association in Claveria, Misamis Oriental, Philippines. PhD dissertation, Michigan State University.

Campbell, A., 1994. *Landcare: Communities Shaping the Land and the Future.* Sydney: Allen and Unwin.

Cary, J., and Webb, T., 2000. *Community Landcare, the National Landcare Program and the Landcare Movement: The Social Dimensions of Landcare.* Canberra: Bureau of Rural Sciences.

Coxhead, I., and Buenavista, G., eds. 2001. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD.

Coxhead, I., and Buenavista, G., 2001. Seeking sustainability. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 1-30.

Cramb, R.A., 2000. Agricultural land degradation in the Philippine uplands: an overview. In R.A. Cramb, ed. *Soil Conservation Technologies for Smallholder Farming Systems in the Philippine Uplands: A Socio-Economic Evaluation*, pp. 23-37. ACIAR Monograph No. 78. Canberra: Australian Centre for International Agricultural Research.

Deutsch, W.G., Busby, A.L., Orprecio, J.L., Bago-Labis, J.P., and Cequina, E.Y., 2001. Community-based water quality monitoring: from data collection to sustainable management of water resources. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 138-160.

Edgerton, R.K., 1982. Frontier society on the Bukidnon plateau: 1870-1941. In A.W. McCoy and E.C. de Jesus, eds. *Philippine Social History: Global Trade and Local Transformations*, pp. 361-389. Manila: Ateneo de Manila University Press.

Ellis, F., 2000. *Rural Livelihoods and Diversity in Developing Countries.* Oxford: Oxford University Press.

Gatmaytan, A.B., 2002. Tenure and Community Resource Management: Case Studies from Northern Mindanaw. Unpublished paper.

Koffa, S.N., and Garrity, D.P., 2001. Grassroots empowerment and sustainability in the management of critical natural resources: the Agrofrestry Tree Seed Association of Lantapan. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 197-217.

Lockie, S., and Vanclay, F., eds., 1997. *Critical Landcare*. Wagga Wagga: Centre for Rural Social Research, Charles Sturt University.

Mercado, A.R., Patindol, M., and Garrity, D.P., 2001. The Landcare experience in the Philippines: technical and institutional innovations for conservation farming. *Development in Practice* 11: 495-508.

Midmore, D.J., Nissen, T.M., and Poudel, D.D., 2001. Making a living out of agriculture: some reflections on vegetable production systems in the Manupali watershed. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 94-111.

Mogg, J.M., 2001. Evaluating the Success of an Upland Sustainable Agricultural Development Program: The Case of SANREM-CRSP in Lantapan, Bukidnon, Philippines. Fullbright Exit Report to the Philippine-American Educational Foundation. University of Wisconsin, Madison.

Paunlagui, M.M., and Suminguit, VG., 2001. Demographic development of Lantapan. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 69-93.

Rola, A.C., and Coxhead, I., 2001. Soil conservation decisions and non-farm economic conditions: a study of the rural labour market in the Philippine uplands of Bukidnon. In Coxhead, I., and Buenavista, G., eds. *Seeking Sustainability: Challenges of Agricultural Development and Environmental Management in a Philippine Watershed.* Los Banos: PCARRD, pp. 31-46.

Sabio, E.A., 2002. Social Capital and Transformative Learning: Linkages and Dynamics in Inter-Organisational Relations within the Landcare Approach in the Philippines. PhD dissertation, Cornell University, Ithaca.

Saway, V.L., 2002. The Talaandig. Manila: National Commission for Culture and Arts. http://www.ncca.gov.ph/culture&arts/cularts/ccta/southern/southern-talaandig.htm#saway (accessed October 31 2003).

Scoones, I., 1998. *Sustainable Rural Livelihoods: A Framework for Analysis.* IDS Working Paper 72. Brighton: Institute of Development Studies, University of Sussex.

Stark, M., 2000. *Soil Management Strategies to Sustain Continuous Crop Production between Vegetative Contour Strips on Humid Tropical Hillsides: Technology Development and Dissemination based on Farmers' Adaptive Field Experimentaiton in the Philippines*. Bogor: Southeast Asia Regional Research Program, International Centre for Research in Agroforestry,

Vock, N., 2002. Enhancing Farmer Adoption of Simple Conservation Practices: Landcare in the Philippines and Australia. Project ASEM/1988/052 Annual Report 1 July 2001 to 30 June 2002. Queensland Department of Primary Industries.

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References