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Social capital and soil conservation: evidence from the Philippines*

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The formation of social capital is hypothesised to enhance collective efforts for soil conservation. The Landcare Program in the southern Philippines promotes simple conservation practices in upland environments by supporting community landcare groups and municipal landcare associations, thus augmenting social capital. A study was conducted in 2002–2003 to evaluate the Landcare Program, using a mix of quantitative and qualitative techniques. In the present paper, the relationship between social capital formation and adoption of soil conservation in the Municipality of Lantapan is investigated. It is concluded that the Landcare Program as a whole created a valuable stock of bridging social capital, rapidly accelerating the adoption of contour farming measures, but that on-going support is needed to maintain this capital stock.

Key words: landcare, social capital, soil conservation, the Philippines

1. Introduction

Despite the obvious importance of local communities to rural development and natural resource management, agricultural and resource economists have given little attention to their functioning and performance. The concept of 'social capital' has generated a new, cross-disciplinary interest in the role of community norms, networks, trust, reciprocity, and collective action in a wide range of fields, including economic development (Woolcock and Narayan 2000) and environmental management (Pretty and Ward 2001; Pretty 2003). This provides an opportunity to infuse agricultural and resource economics with insights on community life and governance from the broader social sciences.

In the present paper, the theory of social capital is introduced and its relevance to the issue of soil conservation in developing countries is explored in the context of a Philippines case study (Cramb 1998). The paper arises from an evaluation of the Landcare Program at three sites in the southern Philippines undertaken in 2002–2003,

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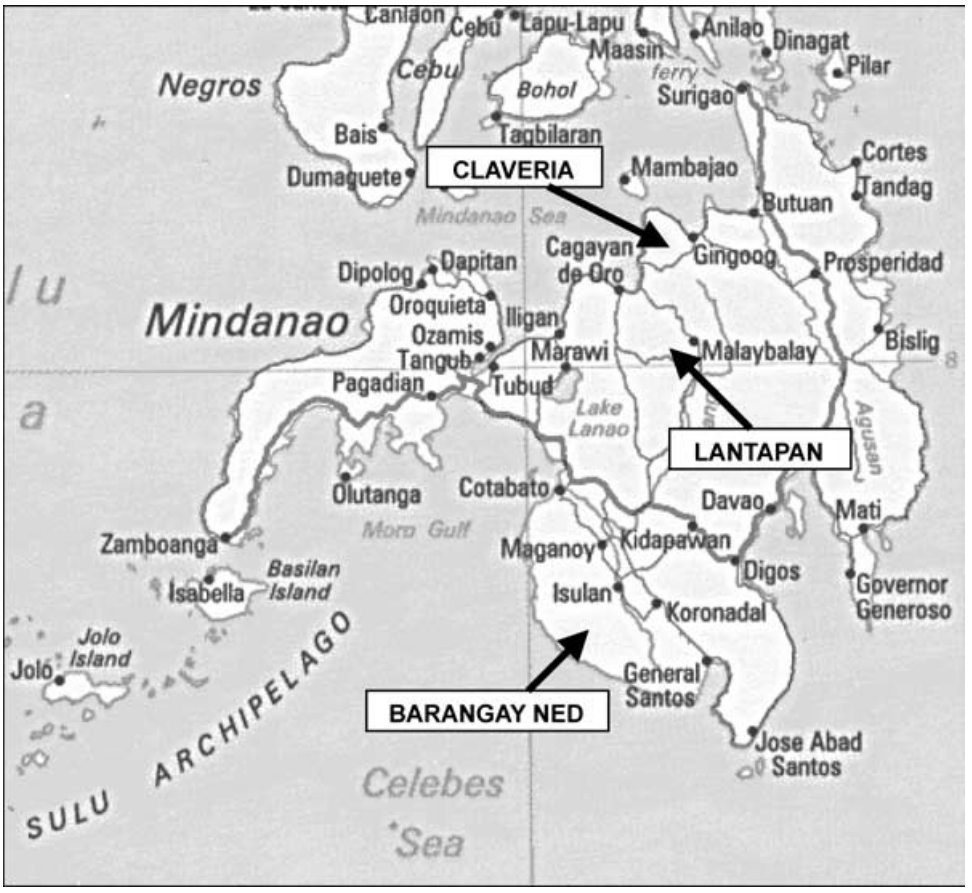

Figure 1 Location of principal landcare sites in Mindanao, southern Philippines. Base map courtesy of University of Texas Libraries.

focusing in particular on the Municipality of Lantapan in central Mindanao (Figure 1). The Lantapan study drew on four main sources of data: project reports and statistics; interviews with project staff and other key informants; a questionnaire survey of 104 randomly selected farm households in one village (Barangay Sungco); and case studies of 12 community landcare groups from throughout the municipality (Cramb *et al*. 2003).

The paper is structured as follows. In Section 2 the concept of social capital is reviewed, comparing economic and sociological approaches. This is followed in Section 3 by an account of the origins, implementation, and impacts of the Landcare Program in Lantapan. Data from the evaluation study are then used to examine the relationship between the adoption of conservation practices and the formation and development of landcare groups and networks, that is, the growth of social capital. The survey data are used in a quantitative economic analysis (Section 4), while the case studies provide the basis for a qualitative sociological analysis with a historical dimension (Section 5). The concluding section draws on both types of analysis to get a more rounded view of the interaction between social capital and soil conservation.

2. Social capital

Though surfacing at various times in the social science literature, the concept of social capital received its greatest impetus from the seminal work of Coleman (1988) on education and Putnam (1993, 1996) on civic participation and governance. Coleman (1988) describes social capital as, not a single entity, but a variety of resources available to an actor, with two elements in common: 'they all consist of some aspect of social structures, and they facilitate certain actions of actors – whether persons or corporate actors – within the structure' (p. 98). He continues: 'Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible . . . . Unlike other forms of capital, social capital inheres in the structure of relations between actors and among actors. It is not lodged either in the actors themselves or in the physical implements of production' (p. 98). A wealth of empirical studies has ensued in many different fields (Woolcock 1998; Productivity Commission 2003).

Woolcock and Narayan (2000) review the implications of social capital for development. They define social capital succinctly as 'the norms and networks that enable people to act collectively' (Woolcock and Narayan 2000, p. 226). This definition emphasises the sources rather than the consequences of social capital (while recognising that certain dimensions of social capital such as trust and reciprocity are developed iteratively). Emphasising sources leaves open the possibility that the resultant collective action may be beneficial or harmful to the group or wider society – compare the impact on welfare of a microcredit group in Bangladesh with that of a drug cartel in Colombia or an al-Qaeda cell. The definition also focuses on the community as the primary unit of analysis while recognising: (i), that individuals and households can invest in and appropriate the benefits of social capital; and (ii), that a community's ability to develop and utilise social capital also depends on its relationship with the state.

Economists, imbued with methodological individualism, prefer to emphasise individual decisions about social capital. Glaeser *et al*. (2002) develop an investment model in which the individual's stock of social capital (and the flow of investment in social capital formation) is a function of his or her age, discount rate, expected mobility, opportunity cost of time, and occupational returns to social skills, as well as the aggregate stock of social capital in the specific community and the rate of social capital depreciation (including that caused by relocation). They test the predictions of the model with data from the General Social Survey in the USA. To measure individual social capital they use membership of organisations, which is reasonably well correlated with other measures of community-mindedness. Their results indicate that social capital (i) first rises then falls with age, (ii) declines with expected mobility, (iii) rises in occupations with greater returns to social skills, (iv) is higher among homeowners, (v) falls sharply with physical distance, and (vi) is correlated with investment in human capital. While their model allows for group-level effects on individual investment decisions, they find no robust evidence for such effects. Their overall conclusion is that 'individual incentives, not group membership, drive social capital accumulation decisions' (Glaeser *et al*. 2002, p. 456).

While providing useful insights, the individual investment model runs into grave difficulties in the aggregation process, which is extremely complex because of the pervasive interpersonal externalities generated by social capital (Glaeser *et al*. 2002). If social capital is thought of as networks, individual investment is likely to provide positive externalities for group members in that a decision to participate in a group will enlarge the network and enhance the benefits to other group members. Hence aggregate social capital will be more than the sum of the social capital of the constituent individuals. However, there may well be size effects such that beyond a certain group size an additional member may actually diminish the value of the network to existing members because of the increased difficulty of maintaining trust and reciprocity among a larger number of members (e.g., villages that grow too big to rely on regular face-to-face contact to monitor the use of a common property resource). To add to the complexity, while investment in social capital can result in positive externalities among group members, the impact on the social capital of non-members can be either positive (e.g., a farmer group that organises a field day for other farmers) or negative (e.g., Queensland's infamous Mounted Native Police that 'dispersed' aboriginal communities in the early twentieth century).

Because of the externalities involved, individual investment in social capital is also highly contingent on others' investment (or disinvestment) decisions, suggesting multiple equilibria, strategic behaviour, and path dependency (Bowles and Gintis 2002; Glaeser *et al*. 2002). Individual investment in a situation of low aggregate investment can lead to a low social capital equilibrium point, while individual investment in a situation of high aggregate investment can lead to a high level of social capital over time (Glaeser *et al*. 2002). Conversely, though social capital is more easily destroyed than it is created (Woolcock 1998), individual acts that tend to undermine trust and cooperation (e.g., absenteeism, shirking, theft) may have a greater effect when a community's social capital is low than when it is high (Bowles and Gintis 2002). Game theory and experimental economics have been used to shed light on these phenomena (Runge 1986; Bowles and Gintis 2002). The results suggest the importance of dynamic, historical factors in explaining differences in a community's social capital. Thus Bowles and Gintis (2002) conclude that 'a heterogenous population with some civic-minded members, ready to punish those who violate norms, and some self-interested members, may exhibit high or low levels of cooperation depending not on the distribution of types in the population but rather on the recent history of the group' (Bowles and Gintis 2002, p. 430).

Hence greater understanding of success and failure in building social capital requires moving beyond the approach of methodological individualism and adopting the community as the primary unit of analysis. As Woolcock (1998) argues, 'a more fruitful approach invokes a social-structural explanation of economic life and seeks to identify the types and combinations of social relations involved, the institutional environments shaping them, and their historical emergence and continuity' (p. 185). Woolcock (1998) has provided a useful starting point by distinguishing different forms of social capital and examining the changing combinations between them as development proceeds. At the micro level (the level of individuals, households, small groups and communities) he distinguishes two types. 'Integration' or 'bonding social

Table 1 Dimensions of social capital at the community level

Extra-community networks (bridging)	Intra-community ties (bonding)	
	Low	High
Low	Outcasts	Poor villagers
High	Recent rural-to-urban migrants	Successful members of microfinance programs

Source: Woolcock and Narayan (2000, p. 231).

capital' refers to the intracommunity ties that enable poor people in a village setting to 'get by' (e.g., monitoring of property rights, labour exchange, emergency assistance, rotating savings groups, provision of communal facilities). 'Linkage' or 'bridging social capital' refers to the extra-community networks that enable individuals and groups to tap outside sources of information, support, and resources, not just enabling them to 'get by' but to 'get ahead' (e.g., links to traders and financiers, extension agents, non-governmental organisations). Table 1 illustrates how different combinations of these dimensions of social capital can account for a range of development outcomes.

Focusing on only one kind of social capital, and assuming that more is always better, can be seriously misleading (Woolcock 1998; Woolcock and Narayan 2000). In particular, a community with a high level of bonding social capital, while it may provide essential support to its members, could also be holding them back in other ways (e.g., by restricting opportunities for innovation, education or engagement with markets) or imposing costs on other groups (e.g., those excluded from membership on ethnic or religious grounds). For development to proceed, Woolcock and Narayan (2000) suggest there is a need, not only to mobilise bonding social capital, but also to develop new linkages, or bridging social capital, opening up new opportunities for individuals and communities. This has been the basis of successful group-based credit programs (Table 1). The dilemma is that the formation of this latter type of social capital may well undermine the former type over time, both because success increases demands on existing social bonds (e.g., as more community members seek to join a credit group, diminishing its value to existing members) and as individuals within the community pursue a greater diversity of linkages and activities (e.g., long-term members of a credit group might seek to escape some of their social ties to take advantage of more remunerative opportunities beyond their community).

Woolcock and Narayan (2000) conclude that the challenge for social capital research and policy is 'to identify the conditions under which the many positive aspects of bonding social capital in poor communities can be harnessed and its integrity retained (and, if necessary, its negative aspects dissipated), while simultaneously helping the poor gain access to formal institutions and a more diverse stock of bridging social capital' (p. 233). They note, however, that the process 'is fraught with multiple dilemmas, ... especially for external non-governmental organisations, extension services, and development agencies, because it may entail altering social systems that are the product of longstanding cultural traditions or of powerful vested interests' (p. 233). Thus, these

and other writers do not see the formation and evolution of a community's social capital as entirely a 'grassroots' or 'bottom-up' phenomenon but recognise a crucial, if difficult, role for the state and/or other outside actors in facilitating positive social change at the community level.

In this paper, both the individual approach of economics and the group-level approach of sociology are used to analyse the relationship between social capital and soil conservation in the Philippines.

3. The Landcare Program in the Philippines

The landcare approach emerged in the mid-1980s in Australia (Campbell 1994; Lockie and Vanclay 1997; Cary and Webb 2000) and in the mid-1990s in the Philippines (Mercado *et al*. 2001; Arcenas 2002; Sabio 2002) as an important strategy for developing collective action at the local level to deal with problems of agricultural land degradation. The approach centres on the formation of community landcare groups, supported to varying degrees through partnerships with government and non-government agencies. Such groups identify problems at the local level and mobilise information, community effort, and finances to help improve the management of their soil, water, vegetation, and other natural resources. They can, therefore, be viewed as a means of investing in both bonding and bridging social capital.

Landcare in the Philippines grew out of efforts by a succession of agencies to promote soil conservation innovations, especially contour hedgerows, among smallholder maize and vegetable farmers in the upland municipality of Claveria in Northern Mindanao (Figure 1). In the early 1990s, the International Centre for Research in Agroforestry (ICRAF) began to conduct field trials on contour hedgerow systems in Claveria and identified a low-cost, less labour-intensive farmer adaptation of contour hedgerows – the use of natural vegetative strips (NVS) (Fujisaka 1993; Nelson and Cramb 1998; Stark 2000; Mercado *et al*. 2001). An extension team was formed to promote the NVS technology to other farmers. The interest was such that group sessions were organised and at one such session in 1996 it was decided to form the Claveria Landcare Association (CLCA) to promote the technology throughout the municipality. By early 2000 the CLCA had grown to include 16 village-level groups, 105 subvillage groups, and approximately 800 individual farmer-members. Adoption of NVS technology also increased dramatically, from approximately 75 ha in 1996 to more than 300 ha in 1999. This rate of expansion was almost unprecedented in the Philippines.

The success of landcare in Claveria encouraged ICRAF in 1998 to introduce the approach at its Central Mindanao field site in Lantapan (Figure 1) as well as other locations that shared similar conditions and farming systems (Cramb and Culasero 2003). The Lantapan program built on ICRAF's experience in Claveria and the prior interventions of an array of organisations under the USAID-funded Sustainable Agriculture and Natural Resource Management (SANREM) Program (Coxhead and Buenavista 2001). The ICRAF landcare team comprised two experienced facilitators and four 'intern' facilitators. The program began with a broad information campaign on environmental issues and conservation technologies, especially NVS. This campaign was implemented in all 14 villages of the municipality. A survey was then conducted

to determine the level of farmers' interest. As a result, seven villages in the upper part of the municipality were given priority. Major activities in these villages included slide shows, cross-farm visits, and training. The training involved half-day or whole-day sessions that usually began with hands-on training in establishing NVS or with training in nursery management. This training was supported by visits to farms where the practices had been adopted. The first landcare group was formed 6 months after the information campaign, in May 1999.

The recorded rate of adoption of NVS and tree planting during the implementation of the Landcare Program was impressive. By the end of 2002 there were approximately 400 adopters of NVS −7 per cent of all farm households. Based on the household survey, the perceived impacts of NVS 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 NVS were progressively enriched with productive crops, including timber species. In addition, by 2002, 64 community nurseries had been established and 162 000 trees planted on farms. 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. Combining adopters of the two main conservation measures – contour barriers and agroforestry – there were approximately 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 approximately 1150 ha (43% under NVS and 57% 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.

There was also rapid formation of landcare groups and a Landcare Association. The formation of a subvillage landcare group usually followed the first training event. The Lantapan Landcare Association, linking these groups at the municipal level, was registered in June 2000 with 840 members. By 2001, 58 landcare groups had been formed and four existing farmer groups were affiliated with the Landcare Association, making 62 groups in all. 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 villages where plantation development and other agribusiness ventures had led to the demise of smallholder farming. Nevertheless, the municipal Landcare Association remained an active partner with ICRAF in implementing the Landcare Program.

4. Economic analysis of the role of landcare in adoption

In this section, an economic model is developed to explain the influence of landcare participation on adoption of contour barriers. To evaluate fully the impacts of the

Landcare Program in Lantapan would require a comparison with other non-Landcare municipalities, taking into account differences in initial conditions, including the factors that led to the selection of Lantapan in the first place (Feder *et al*. 2003). The available evidence indicates that other programs implemented in similar regions, but lacking the elements of the landcare approach, have rarely been as successful in bringing about rapid and widespread adoption of conservation practices, and that, in the absence of any such programs, adoption is minimal (Cramb 2000a, 2000b; Cramb *et al.* 2000; Garcia *et al.* 2002). However, the aim here is to address the more limited question: given the presence of a municipal-wide Landcare Program, how did individual participation in landcare training and local landcare groups affect adoption of NVS and contour hedgerows?

It is important to note that the survey data used in this analysis were derived from one village in which the Landcare Program had been actively implemented, reflecting the general interest of the residents in landcare technologies and institutions. Thirty-five per cent of the respondents in Barangay Sungco had undergone NVS and/or agroforestry training, 27 per cent were members of a local landcare group, and 60 per cent had adopted contour farming measures (NVS or contour hedgerows) on at least part of their farms. Although some adoption was still occurring, the rate of diffusion had slowed significantly, in characteristic sigmoidal fashion, and it is likely that the diffusion ceiling for the basic contour technology was close to being reached (Cramb *et al*. 2003). Hence a cross-sectional analysis of the factors affecting adoption, though subject to well-known limitations, was justified (Feder *et al*. 1985; Lindner 1987).

Given that the Landcare Program gave farmers the opportunity to participate to varying degrees, a landcare participation index was developed (Table 2). Those who both undertook the farmer-based training in contour measures provided through the Program and were members of a local landcare group (18% of the sample) were given the highest score. Those who had not participated in training but were group members (9%) were scored next highest, on the argument that group membership would have given them enhanced opportunity to learn the conservation practices informally. Those who had participated in training but had not joined a group (16%) were ranked next, given that one-off training was likely to be less effective than on-going participation in a group that included trained individuals. Those who did not participate in either way (57%) were ranked lowest, though some of these undoubtedly benefited from the Landcare Program indirectly.

Table 2 Participation in landcare by adoption category, Barangay Sungco

Participation index	Undertook training	Landcare member	No. respondents		
			Adopters	Non-adopters	Total
1	No	No	23	36	59
2	Yes	No	15	2	17
3	No	Yes	7	2	9
4	Yes	Yes	17	2	19
Total			62	42	104

Because 91 per cent of farmers who adopted NVS or contour hedgerows applied the technology to less than 50 per cent of their farm area, with a pronounced mode at 20–29 per cent, it was considered appropriate to model adoption as a binary rather than a continuous variable. Hence logistic regression was used to estimate the influence of the independent variables on the likelihood of adoption (Greene 2003). It was hypothesised that the likelihood of adoption would:

- first increase then decrease with age (as younger farmers had less spare capacity to invest in soil conservation, while older farmers were less inclined to change and more likely to have shorter planning horizons);
- increase with years of formal education (enhancing both awareness of the benefits of soil conservation and the skills required to understand and learn new practices);
- be higher among indigenous farmers (who would have a stronger sense of connection with and stewardship of the land);
- be higher among those who were full-time farmers (i.e., whose primary occupation was farming and/or did not have a secondary occupation; meaning both more motivation and time to undertake soil conservation);
- be higher for land owners (who would have greater assurance of realising the benefits of investment in soil conservation);
- increase with farm size (an indicator of income and wealth, hence the ability to invest in soil conservation);
- be higher in subvillages in the more environmentally sensitive upper part of the village;
- be higher among those who had steeper land, hence greater need for soil conservation;
- increase with the degree of participation in landcare training and group activities.

The independent variables were measured as follows. To allow for the hypothesised rise and fall of adoption with age, five age brackets were used, hence four dummies were specified with the age bracket 60+ years as the reference category. Education was measured by the number of years in school. Dummies were defined for the ethnic origin of farmers (1 = indigenous), occupation (1 = full-time farming), land ownership (1 = full or part owner), and the dominant topography of the farm (1 = moderately to steeply sloping land). Farm size was measured in hectares. Sub-villages were classified according to their position in the landscape, with 1 = lower, 2 = middle, 3 = upper. This variable had a dual interpretation. In part it captured a group-level effect (indicating if adoption was affected by one's neighbourhood) and in part a landscape effect (indicating if adoption was more likely in the more environmentally sensitive upper zone). Participation in landcare was measured by an index with a scale of 1–4, as described above.

The results of the logistic regression are presented in Table 3. The equation was significant at the 1 per cent level (as indicated by the model chi-squared statistic) and provided an acceptable fit of the data (as indicated by the Hosmer-Lemeshow goodness-of-fit test, the Nagelkerke R^2, and the percentage of correct predictions). The significant factors at the 10 per cent level were age, full-time farming, farm size, slope, and landcare participation. The correlation coefficients among the independent variables were all

Table 3 Logistic regression of adoption of contour barriers, Barangay Sungco ($n = 104$)[†]

Variable	Coefficient	Standard error	Odds ratio
Constant	−7.765**	2.266	0.000
Age 20–29	1.449	1.179	4.258
Age 30–39	2.032**	1.038	7.632
Age 40–49	1.389	0.917	4.010
Age 50–59	1.717	1.089	5.567
Education	0.080	0.095	1.084
Indigenous	−0.313	0.617	0.731
Full-time farmer	1.442**	0.632	4.228
Land owner	0.650	0.774	1.084
Farm size	0.263*	0.137	1.301
Location	0.582	0.431	1.789
Slope	2.131***	0.639	8.423
Landcare participation	0.977***	0.331	2.658
Model chi-squared		50.014***	
Nagelkerke R^2		0.516	
H-L chi-squared		5.758	
% correct		79.8	

[†]Estimated with Statistical Package for the Social Sciences Version 11.5. *Significant at 0.10 level; **significant at 0.05 level; ***significant at 0.01 level.

less than 0.5 (apart from the age dummies, which had correlation coefficients among themselves in the range 0.6–0.7), suggesting that the variables were measuring different characteristics and their inclusion did not lead to multicollinearity.

The only significant age dummy was for the 30–39 years group, with an odds ratio of 7.6, confirming the hypothesis that younger, established farmers were more likely to adopt than either very young or middle-aged to elderly farmers (though there were adopters in every age group). Education was not a significant factor. This was probably because most farmers had at least a primary education (the average was 6 years for both adopters and nonadopters), which was sufficient to be able to assimilate the principles of contour farming. Indigenous farmers were no more likely to adopt than immigrant farmers. This can be interpreted to mean that, although the indigenous Talaandig did have a strong sense of stewardship derived from their traditional culture, most immigrant farmers had been established in the area for sufficiently long to develop an understanding of the local environment and a sense of permanence.

The coefficient for full-time farming was significant and positive, with an odds ratio of 4.2, confirming that adoption was more likely among those who were exclusively focused on own-account farming as opposed to engaging in part-time off-farm or non-farm employment. This is consistent with findings elsewhere in the Philippines (e.g., Cramb 2000b) that the need to work off-farm often means both no time and no spare cash for investment in soil conservation. Farm size was also significant, the odds of adoption increasing by 30 per cent for each additional hectare. This has also been a consistent finding, reflecting that those with smaller farms are reluctant to sacrifice productive area to contour strips, while those with additional land can afford to maintain their cultivated area (Cramb *et al*. 1999). However, the coefficient for land

Table 4 Reasons for joining a landcare group, Barangay Sungco ($n = 58$)

Reason	Current members		Intending members		Total	
	No.	%	No.	%	No.	%
Learn technology	18	64.3	26	86.7	44	75.9
Like the program	4	14.3	1	3.3	5	8.6
Plant trees	2	7.1	2	6.7	4	6.9
Improve livelihood	1	3.6	1	3.3	2	3.5
Influence the group	2	7.1	0	0.0	2	3.5
Follow others	1	3.6	0	0.0	1	1.7
Total	28	100.0	30	100.0	58	100.0

ownership was not significant. This reflects the low establishment cost and relatively rapid returns associated with the NVS technology, meaning that even those borrowing or renting land can benefit. It may also reflect the relatively secure tenancy conditions in the village.

There was weak confirmation that location in communities higher in the landscape was a factor in adoption (significant at the 18% level), but much stronger support for the hypothesis that farmers with more steeply sloping land were more likely to adopt (the odds of adoption being eight times higher than for those with gentler slopes). This points to adoption being more a farm-level than a landscape- or community-level decision, related to the degree of erosion hazard on a specific parcel of land.

Finally, the coefficient for the landcare participation variable – the focus of this analysis – was also highly significant and indicated a large effect, the odds of adoption increasing by a factor of 2.7 for each increment on the participation index, controlling for the other variables in the model. This confirms the fundamental importance of the practical, farmer-to-farmer, group-based training facilitated by the Landcare Program and the positive effect of subsequent participation in a local landcare group.

In light of social capital theory, the question is whether this involvement in landcare was an investment in bonding or bridging social capital (or both). Clearly, participation in training was a means of accessing information and support from the wider Landcare Program, implemented by ICRAF and, increasingly, the Lantapan Landcare Association. It appears that membership of a local landcare group was also primarily motivated by this external linkage. Table 4 shows that the principal reasons for joining a landcare group were to learn about technologies; that is, to tap into a wider network of information and technical support, rather than to facilitate cooperative activities locally. Once farmers had acquired the knowledge and skills to adopt, whether through training or farmer-to-farmer exchange, they could then proceed to implement the technology on their farms with or without the support of a landcare group. Table 5 shows that, while 55 per cent of adopters had learned about contour barriers from ICRAF or other agencies and 39 per cent from other farmers, 81 per cent implemented the technology by themselves. Thus the analysis of the survey data suggests that the Landcare Program, and farmers' participation in it, was mainly an investment in bridging social capital.

Table 5 Adopters' sources of information and assistance for implementation of contour barriers, Barangay Sungco ($n = 62$)

Source	Information		Assistance	
	No.	%	No.	%
Self	0	0.0	50	80.7
Other farmers	24	38.7	3	4.8
ICRAF	15	24.2	2	3.2
NGO	13	21.0	1	1.6
University	5	8.1	1	1.6
Department of Agriculture	1	1.6	0	0.0
No response	4	6.5	5	8.1
Total	62	100.0	62	100.0

ICRAF, International Centre for Research in Agroforestry; NGO, non-governmental organisations.

5. Sociological analysis of participation in landcare

The 14 case studies of landcare groups, drawing on focus group discussions, shed light on the sociological processes at work during the Landcare Program, as well as reflecting a wider range of conditions than in Barangay Sungco alone (Cramb *et al*. 2003).

The focus groups gave several reasons for the positive response to the landcare campaign in 1999. The landcare facilitators were dedicated and enthusiastic and made interesting presentations, engendering a personal 'debt of obligation' (*utang loob*) (thus enhancing their individual social capital). The issues raised by the campaign were important and the technologies promoted were highly relevant and adoptable. The cross-farm visits and farmer-to-farmer training stimulated interest and were effective in communicating the new technologies and bringing about their adoption.

The formation of landcare groups was not difficult, reflecting the traditional value placed on community solidarity (*pakikisama*) at the local level. In most cases, existing village and subvillage structures were adequate to arrange the initial information session, cross-farm visits, and training sessions, and subsequent group formation. Often the subvillage leader or the chair of the agriculture committee would head the group. In some cases an existing tribal or women's group took on landcare functions. Nevertheless, taking on landcare activities was mostly seen to add something of benefit to the local community or organisation and was not merely a formality. Landcare was thought to be more beneficial and enduring than previous community-based efforts in the municipality. The primary interest was in gaining access to useful technology through the information, training, and support provided by ICRAF. Additionally, landcare linked isolated farming communities to a wider network of like-minded farmers and professionals within and beyond the municipality. Hence, even where there was close social interaction locally, there was an incentive to link with landcare to achieve this wider contact. Relatedly, there was often a feeling of enhanced pride and purpose in being part of landcare, confirming a traditional sense of stewardship (especially in indigenous communities) and energising efforts towards farm improvement.

Those groups that had maintained their landcare activities tended to be in stable, cohesive communities and were led by a well-respected and dedicated local leader. They were focused on farming 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. In contrast, disbanded groups had often been hampered by poor leadership, lack of follow-up, and a loss of interest or rationale once initial training and implementation of NVS was completed. Political factionalism sometimes hampered group development. Many disbanded groups had been affected by the emergence of large-scale agribusiness ventures (banana plantations and commercial poultry farms). Having leased or sold their land and taken up wage employment, there was no need or opportunity for them to continue in a landcare group. Others were dependent on vegetable traders and financiers or lacked secure tenure, and hence felt locked in to their current farming practices.

Both continuing and disbanded groups felt that for local landcare groups to survive they needed on-going support from the Landcare Program, which primarily meant support from ICRAF through research, extension and training. Even without an organised group, they hoped to continue to be informed about new farming opportunities. They also looked to the municipal government for stronger and more consistent support.

Thus, there was typically a high level of bonding social capital in the communities where landcare groups were formed. Forming a group reflected this initial stock of social capital rather than generating greater local-level integration. For example, implementing contour barriers or agroforestry nurseries through small work groups was a natural extension of the customary system of labour exchange (*alayon*). The persistence of a group both reflected and reinforced the trust and cooperation inhering in these pre-existing social bonds. However, forming or joining a landcare group also meant linking to a much wider network than provided by the local community. Hence it can be viewed primarily as an investment in bridging social capital. In some respects, the development of this bridging social capital actually undermined the bonding social capital encapsulated in the local groups, as predicted by Woolcock (1998). In particular, as members gained knowledge and experience in nursery management through the communal landcare nurseries, some preferred to develop private nurseries and pursue commercial outlets for their planting materials.

6. Conclusion

The concept of social capital provides an important new focal point for cross-disciplinary research on issues of environment and development in countries such as the Philippines. Economists have generally adopted an individual approach to social capital, while social and political scientists have taken a group-level approach. While the economic approach provides some insight into individual incentives for investment in social capital, it becomes unhelpfully complex when attempting to deal with the pervasive interpersonal externalities involved. The sociological approach allows for additional insights into the nature and dynamics of social capital. Especially

helpful is the distinction between bonding and bridging social capital and the hypothesis that their relative roles change as a community develops. In the present paper, both economic and sociological approaches have been used in a complementary fashion to explore the relationship between social capital and soil conservation in the Philippines, using the Landcare Program in Lantapan as a case study.

The economic analysis of survey data from one village in Lantapan showed that, controlling for other variables (of which age, farming focus, farm size, and slope were significant factors), participation in landcare through training and/or membership of a local landcare group had a significant and large effect on the adoption of soil conservation. The analysis indicated that this participation was primarily an investment in bridging social capital, providing the means for farmers to access a wider network of information and technical support than would otherwise be available. This was confirmed by the sociological analysis of focus group discussions held in a variety of villages, which showed that landcare groups were most easily formed and persisted longest where bonding social capital was already high (and had not been undermined by exogenous developments such as plantations). The main incentive for participation in groups was thus not to enhance bonding social capital but to access the emerging landcare network; that is, to invest in bridging social capital. Current, former, and prospective landcare members all hoped to maintain the flow of information and support made possible through these extra-community links.

Social capital has thus clearly contributed to changing farming practices in Lantapan, with likely benefits for longer-term natural resource management (though these remain to be quantified). However, the relationship between social capital and soil conservation was not a simple matter of investing in the formation of self-sufficient landcare groups in order to facilitate community conservation efforts. The primary effect of the landcare approach (information sessions, farmer training, cross-farm visits, landcare groups, the municipal landcare association, ongoing support from facilitators) was to create a valuable stock of bridging social capital. Hence it would be a mistake to think of established landcare groups as needing to be weaned off support and made to stand on their own, or to see the demise of some landcare groups as necessarily a sign of failure. The very success of the landcare approach has been a result of the horizontal and vertical extra-community links established. Continuing support from either local government or non-government organisations is needed to maintain this valuable stock of social capital, the quality of the services it provides, and hence the momentum of the landcare initiative.

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