Landcare, Stewardship and Sustainable Agriculture in Australia

ALLAN CURTIS* AND TERRY DE LACY†

* *The Johnstone Centre*
Charles Sturt University
PO Box 789 Albury, Australia 2640
Email: acurtis@csu.edu.au

† *Faculty of Land and Food Systems*
University of Queensland
Brisbane 4072, Australia
E-mail: T.delacy@mailbox.uq.edu.au

ABSTRACT: There are over 2,500 Landcare groups with 65,000 members operating across Australia. With considerable evidence of program impact, Landcare is an important example of state sponsored community participation in natural resource management. However, the authors suggest excessive emphasis has been placed upon attitudinal change – the development of landholder stewardship, as the lever for effecting major changes in land management. Analysis of data from a landholder survey failed to establish predicted stewardship differences between Landcare and nonLandcare respondents or between those who joined early/late, or participated more/less in group activities. And there was no relationship between stewardship and adoption for most of the sustainable agriculture practices surveyed. Further analysis clearly linked Landcare participation and concern about the environmental and economic impacts of land degradation. Whilst respondents were significantly more concerned about economic impacts, research findings were consistent with earlier work indicating that most land managers have a strong stewardship ethic. The authors also suggest that concerns that Landcare is not addressing biodiversity conservation are largely unjustified and reflect urealistic expectations of these voluntary groups.

KEYWORDS: Landcare, stewardship ethic, sustainable agriculture, Australia, community participation, rural development.

INTRODUCTION

Dryland and irrigation salinity, soil erosion, soil acidity, algal blooms and feral pests and exotic weeds have significantly affected agricultural productivity, biodiversity and public health in rural Australia (ABS 1996). Australian policy makers have invested heavily in the Landcare program as a voluntary approach

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to managing these difficult issues. Following a successful start in 1986 in the state of Victoria, and after lobbying from major farmer and conservation groups, the Commonwealth government committed spending of $360m in the *Decade of Landcare* program (Hawke 1989). The Landcare program was intended to achieve more sustainable use of Australia's farming lands (ASCC 1991) and to enhance biodiversity (Farley and Toyne 1989). However, Landcare involved limited government funding of education and demonstration activities as opposed to direct funding of on-ground work on private land. From the government perspective (ASCC 1991; DCE 1992a), Landcare was a catalytic program, attempting to engage a large proportion of the rural population and produce more aware, informed, skilled and adaptive resource managers with a stronger stewardship ethic. It was expected that this process would result in the adoption of more sustainable resource management practices.

There are now over 2,500 Australian Landcare groups (Alexander 1995) with 65,000 volunteer members (Curtis and De Lacy 1996), involving about 30% of the farming community (Mues et al. 1994). Landcare is viewed as an Australian success story (Alexander 1995; Campbell 1994) and is an important example of state-sponsored community participation in natural resource management in a developed nation. Midgley (1986) and Uphoff (1991) noted the paradox of participation that required 'top-down' efforts to promote 'bottom-up' development. As part of our background to Landcare we explore program implementation and examine Landcare's successes and limitations. However, the real focus of this paper, which may have implications beyond the Australian experience, is upon the assumed links between Landcare, stewardship and the adoption of sustainable agriculture practices. The authors also explore recent concerns that Landcare is excessively focused upon increasing farm productivity and profitability and has given insufficient attention to biodiversity conservation.

Research finding discussed in this paper came from a survey of landholders in 12 small catchments in north-east Victoria. Victoria has the second largest population of the six Australian states and a variety of physical settings, resulting in a mix of farm enterprises from dairying through horticulture to grains and livestock.

LANDCARE AS STATE-SPONSORED COMMUNITY PARTICIPATION

Landcare in the state of Victoria: the early days

Edgar and Patterson (1992) suggested that the Victorian Landcare program emerging in 1986 incorporated four elements – information exchange, financial assistance, community involvement and enforcement or prosecution – which together, would change the behaviour of land managers. They highlighted the efficacy of information transfer in achieving behaviour changes when individuals were highly motivated, and where management changes were relatively

straightforward and demonstrably profitable. However, these authors acknowledged this 'was often not the case with soil conservation, salinity or vermin and noxious weed control'. Under these circumstances, incentives 'may be provided to farmers to encourage them to adopt a new practice'. This can be justified where there is a significant off-site benefit to the community or to initiate the adoption of a practice which has significant benefit to the individuals but the adoption rate has been slow (1992: 199). The obligation of government to provide limited financial support for Landcare work where there was a community benefit was incorporated into the Victorian 'Decade of Landcare Plan' (DCE 1992a). Edgar and Patterson (1992: 199) suggested that the final element of Landcare was enforcement and prosecution; however, the proposed Land Protection Bill of 1987 did not become law and Landcare in Victoria was not supported by any new legislation (DCE 1992a). The Victorian 'Decade of Landcare Plan' explicitly stated that 'The Landcare Program departs from a regulatory approach ...' (DCE 1992a: 20).

Rural communities were urged to form local Landcare groups and the Victorian Minister frequently attended highly publicised accreditation ceremonies. The group approach to resource management was promoted to landholders on the basis that individuals working on their own could not solve key issues such as salinity, soil erosion or weeds and animal pests (Edgar and Patterson 1992; Poussard 1992; Campbell 1989). The benefits of Landcare membership for landholders were: sharing problems and ideas; working together to tackle common problems more effectively; learning about land management at the property and catchment levels; accessing financial and technical assistance from government; and having greater opportunities for social interaction (Campbell 1989; 1991a; Curtis and De Lacy 1995a). By 1991 there were in excess of 300 Landcare groups across Victoria, financial support to groups had been incorporated in the Land Protection Incentive Scheme, and more than 40 community based facilitators/co-ordinators were working with groups (DCE 1992b: 28; Poussard 1992).

Most Landcare groups developed in rural areas and group membership was voluntary and open to any local person. Groups frequently operated at catchment or subcatchment scales. At no stage has there been any attempt to prescribe the role and operation of Landcare groups. This may have reflected the diversity of Landcare stakeholders and a desire to retain flexibility and allow local communities to adopt a Landcare structure and method of operation that suited them. Whilst the focus of group activity was usually on the privately owned or leased land managed by group members, groups also worked on roadsides, reserves and other public lands. Amongst their various activities, Landcare groups held meetings to discuss issues, identify priorities, develop action strategies and debate a range of resource management issues; conducted field days and farm walks and established demonstration sites; undertook a variety of educational and promotional activities such as hosting tours and involving other community

groups in Landcare activities, organising conferences, writing newsletters and field guides, and preparing media releases; carried out a range of on-ground work including seed collection and tree planting, constructing structures to control salinity and erosion, co-ordinating pest animal and weed control, and erecting fencing to control stock access to creeks and streams and establish wildlife corridors; co-ordinated planning activities related to property and catchment planning; and were involved in the preparation of submissions for government funding.

Concerns about co-option by government

Despite the lack of prescription of the role and operation of Landcare groups it is possible that governments may exert control over groups through the allocation of Landcare funds to groups and projects that address government priorities (Lockie 1992). For example, agency staff play an important role in the decision-making of many groups, and group work is significantly related to government funding (Curtis and DeLacy 1996). In the absence of an independent Landcare organisation, groups are reliant upon agency staff for much of their information, and intergroup communication is limited. There is also evidence that state agencies have captured a large part of the Landcare resources provided by the federal government. Direct funding to Landcare groups represented 20% of Community Landcare Program expenditure in 1991-92 and 15% in 1994-95 (Campbell 1992: 52; Alexander 1995: Appendix 2).

Landcare may also be viewed as part of government efforts to cut back, and shift responsibility for action to local communities. It was undoubtedly cheaper to invest in Landcare as a process of awareness-raising and education than to fund large scale on-ground work. However, governments had not attempted to mislead Landcare participants: the Victorian 'Decade of Landcare Plan' explicitly stated 'The Landcare program will be a partnership based primarily on community action and supported by government' (DCE 1992b: 18) and, 'Incentives need to be targeted ... so that limited resources generate the greatest community benefit' (ibid.: 27). Landcare participants openly express frustration that Landcare group successes have been held up as evidence of government commitment to manage land degradation at the very moment when state governments are making severe cuts to extension support as well as to education, health and transport services in rural communities. Discussions with senior staff in the key Victorian natural resource management agencies suggest that average budget and staff reductions of approximately 40% were imposed over the period 1987 to 1995.

It is important to acknowledge that landholders may be using Landcare to pursue sectional interests. Landcare participants are more likely to be larger, more profitable landholders (Black and Reeve 1993; Mues et al. 1994), and a small number of groups have accessed a disproportionate amount of Landcare

funding (Curtis and DeLacy 1996). Regional communities can also 'capture' agency staff, particularly when these staffers reside in a region for some time or when their employment/research is dependent upon funds allocated by regional boards. Landcare can also be seen as providing a strategy for farmer organisations and government to deflect criticisms of structural impediments to sustainable resource management and to defer taking hard decisions about farm and regional viability, land tenure systems, allocations of river water for irrigation, or vegetation clearing. Farmers may have embraced Landcare as a way to prop up existing ownership structures such as the family farm or leasehold rights; or to protect access to leasehold grazing land in opposition to conservation or aboriginal interests; or to act as a bulwark against the demands of 'greenies' and 'animal libbers' that they make costly changes to current practices. Dr Bob Brown, Tasmanian Greens Party senator, speaking at the 1994 National Landcare Conference in Hobart (Grose 1994: 2), suggested as much when he said that Landcare had failed to address the need to remove grazing from the 1.8 million hectares of Australia's arid zone and that Landcare was overly preoccupied with increasing agricultural productivity. On the other hand, Alexander (1995) documented examples where groups were beginning to address structural impediments to sustainability.

Linking Landcare groups in the regions

By 1992, state agency projects funded by federal Landcare moneys and the project submissions of local Landcare groups were being scrutinised by regional assessment panels. These panels operated under the authority of regional Catchment and Land Protection Boards (CALP Boards) or Integrated/Total Catchment Management Committees (TCM Committees). These boards/committees are comprised of Ministerial appointees from regional communities, including Landcare representatives, and are funded and co-ordinated by the lead agency responsible for Landcare. CALP Boards and TCM Committees may provide the missing institutional mechanism to link and support the activities of the local community based Landcare groups. These regional boards have the potential to provide the important regional perspective; to co-ordinate, but not control, the activities of the various independent community groups; and to enable community groups to influence broader policy development and 'pull down' additional resources.

Funding large-scale on-ground Landcare work

Landcare advocates have argued for a change in government policy, contending that whilst Landcare has been successful, limited funding of a catalytic program of educational and demonstration activities would not make a significant impact at the landscape scale. These advocates have argued for increased funding of on-

ground work using cost-sharing principles based upon identifying community benefits flowing from specific works (AACM 1995). They have argued that increased funding for Landcare work on private property is not an unwarranted subsidy and is justified on the following grounds: the community benefits of important remedial works such as revegetation on steep hills, fencing watercourses to control stock access and establishing perennial grasses on steep, infertile hills usually outweigh benefits accruing to private landholder; most land degradation problems have been inherited from previous generations; government policies have contributed to many land degradation issues; and, there is an important linkage between the conservation of native flora and fauna and the condition of privately owned agricultural land. The incoming federal Liberal government has substantially adopted these proposals and provided increased funding for on-ground Landcare work through the partial sale of Telstra, the national telecommunications carrier (Hill 1996).

Landcare as successful state-sponsored community participation

Whilst Landcare may represent a more 'bottom-up' approach than was typical of 'transfer of technology' approaches to agricultural extension in Australia (Campbell 1991b), Landcare groups have not developed spontaneously and autonomously and are therefore not 'grass-roots' organisations in terms of the theory of authentic community participation (Midgley 1986). For the same reasons, Lockie (1992) argued it is inaccurate to refer to the 'Landcare movement' which implies Landcare is a social movement. Landcare groups are not organs of the state, nor are they purely social associations. They can best be described as local organisations (Esman and Uphoff 1984: 18) '... which act on behalf of and are accountable to their membership and which are involved in development activities'.

The community-agency partnership is a fundamental element of Landcare and there is considerable evidence that Landcare is an important example of state-sponsored community participation. Groups and agency staff have established effective working relationships based on trust and a shared sense of purpose, and lead agencies have demonstrated a firm commitment to developing effective partnerships with groups (Curtis et al. 1995; Curtis and De Lacy 1995a). Other research (Curtis and De Lacy 1995b; Mues et al. 1994) suggests that Landcare has been effective in mobilising the participation of a large section of the rural population; in embracing an extensive range of community development activities which have increased awareness of issues and enhanced landholder skills and knowledge; and in accomplishing on-ground work likely to have an impact upon land and water degradation at the local scale. There have also been observable improvements in the condition of some catchments. Given limited program funding and a short period of operation, it would be unrealistic to expect Landcare to have made measurable improvements in environmental conditions, landholder viability or public health at the landscape scale.

LANDCARE AND STEWARDSHIP

Campbell and Junor (1992: 17) suggested that two of the key assumptions underlying the community Landcare program were that 'attitude change leads to behaviour change' and that 'groups will accelerate attitude change and development of more appropriate land management systems'. A number of statements within the federal 'Decade of Landcare Plan' (ASCC 1991: 6) described the aims of 'community education and awareness activity' in terms of changing 'attitudes, knowledge and behaviour so all Australians can contribute to achieving sustainable management of land resources'. Indeed, Landcare Australia Limited, a non-profit company established by the federal government in 1989 to promote Landcare, has as an important element of its charter, responsibility to 'stimulate a landcare ethic among all Australians' (Landcare Australia 1991, cited in RAC 1993: 42). In a 'Statement on the Environment', the federal government of the day claimed 'The development of a landcare ethic among landholders and land managers is one of the most important developments in the environment debate in the last 10 years' (Keating 1992: 9). Indeed, the view that behavioural change can be effected by developing a stewardship ethic has permeated many of the important natural resource management programs in Australia. For example, the Murray-Darling Basin Commission's Natural Resources Management Strategy (MDBC 1990: 10), states that one of the objectives of this strategy is to 'increase the Community's knowledge of natural and cultural resources and develop a stewardship ethic'.

Roberts defined a stewardship or land ethic as 'a set of values which engenders an appreciation of and respect for the land as the basis of our prosperity and quality of life', and explained that adopting a land ethic was a new concept for most Australians (1992: 17). For Vanclay (1992: 97),

> Stewardship refers to the notion that farmers are stewards of the land and that farming is a way of life that places implicit responsibility on farmers to look after the land for future generations. The stewardship concept recognises that farmers may have to make uneconomical decisions in order to protect the land.

In what follows, we present the results of a mailed survey which strongly suggests that excessive emphasis has been placed on attitudinal change as a lever for effecting major changes in land management.

THE NORTH-EAST VICTORIAN LANDHOLDER SURVEY

During autumn 1993, the authors mailed a 16 page survey to all rural property owners in 12 small catchments in the north east region of the state of Victoria: nine catchments where Landcare groups had been operating for a minimum of six years and three catchments where no Landcare group existed. The intention was to describe the characteristics of Landcare participants and nonparticipants, explore reasons for participation and nonparticipation, and assess the impact of

Landcare upon key program outcomes, including the development of a stewardship ethic (Curtis and De Lacy 1994). The literature on voluntary groups, Landcare, community participation and the adoption of agricultural innovations was examined to identify key social and farming variables, which were included in the survey. The authors (Curtis et al. 1993; Curtis and De Lacy 1994; Curtis and De Lacy 1995a) identified a number of best-bet management practices as intermediate indicators of the extent Landcare group action was assisting the move to more sustainable agriculture (Table 4). These practices had been the focus of extension efforts through Landcare activities in north east Victoria and appeared the most useful strategies for managing the major natural resource issues in the region, which were soil erosion, tree decline, soil acidity, pasture invasion by weeds, and rising water tables (DCNR 1993).

Survey methodology conformed with Dillman's (1978) Total Design Method. With 352 responses from the 593 land holders in the nine Landcare areas, a 59% survey response rate was achieved. With 48 responses from the 110 land holders in the three nonLandcare areas, a 42% response rate was achieved. Whilst most listed rural property owners were men, with the assistance of local residents the authors were able to target 20% of surveys to rural women. Surveys were returned by 84 women (66 Landcare and 18 nonLandcare).

Development of a stewardship or land ethic has been considered a vital element of Landcare. Until recently, the accepted view was that Landcare participants would develop a stronger land ethic; Landcare activity would foster the strengthening of the land ethic of others; and that a stronger land ethic would affect the behaviour of land managers, in particular, their adoption of more sustainable agriculture practices. Vanclay (1986) developed a stewardship/land ethic attitudinal scale utilising a series of statements with five point Likert-type response categories. After appropriate statistical tests for scale reliability and validity, respondents scores for each scale item were computed to provide an index score for each respondent. Vanclay's (1986) stewardship scale was adapted for this research project in north east Victoria. The nine statements included in the survey for the stewardship scale were:

- *It is in the best interest of farmers to invest in soil conservation to ensure the long term success of their farms*
- *Practices to manage land degradation cost more than they are worth (reverse to score)*
- *Profit and capital gain is only a small part of the satisfaction to be gained from being a farmer*
- *Farmers should be allowed to produce all they can even if some land degradation results from their activities (reverse to score)*
- *In my case increasing farm income is a more important consideration than reducing land degradation on the farm (reverse to score)*

- *A slight decrease in farm income is worthwhile to help protect the environment on the farm*
- *Most practices to control land degradation are well worth considering*
- *Measures to control land degradation should be considered another cost of running the farm*
- *Protecting the environment is not an important part of being a successful farmer (reverse to score)*

Using statistical procedures for constructing attitudinal scales outlined by De Vaus (1991), three items were eliminated to arrive at a scale of six items.[1] Since the stewardship scale met requirements for unidimensionality, had been used previously, and a number of relationships were found to be as hypothesised, the researchers were confident of scale reliability and validity.

DISCUSSION OF SURVEY RESULTS

Landcare participation makes a difference on key program outcomes

As part of research investigating Landcare program effectiveness, multivariate analyses were conducted using Landcare program outcomes as the response variable in either logistic or linear regression models with Landcare membership as one of the explanatory variables. Significant positive relationships were observed between Landcare participation and concern about the impacts of land degradation issues, knowledge of land management topics, and adoption of all but one best-bet practice surveyed (Curtis and De Lacy 1995b).

No differences between Landcare and nonLandcare on stewardship

However, analysis of survey data failed to establish any of the hypothesised links between Landcare participation, adoption of sustainable agriculture practices and stewardship. Whilst causal links are complex, it was predicted that in Landcare areas, Landcare participants would score significantly higher than nonparticipants on the stewardship scale. However, there was no significant differences in the scores of Landcare and nonLandcare respondents in Landcare areas on the stewardship/land ethic index (Table 1). Given that Landcare activities have impact beyond the immediate group membership (Curtis and De Lacy 1996), it was predicted that respondents from Landcare areas would score significantly higher on the stewardship scale than those from nonLandcare areas. However, there was no significant difference between the scores of respondents in Landcare and nonLandcare areas (Table 2). The authors also hypothesised that those respondents who joined Landcare earlier or attended more frequently would score significantly higher on the stewardship scale. Again, this analysis revealed no significant relationship between the intensity of Landcare participa-

	Index scores for 6 item scale range 1-30					
	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	Mean
Landcare (n=268)	0.5%	2.5%	18%	46%	33%	23.45
NonLandcare (n=75)	3%	2%	24%	39%	32%	22.91

Mann-Whitney U Wilcoxon signed ranks test, Z -.6434 1 Tailed P .2600 (not significant)

TABLE 1. Stewardship ethic scale scores
All respondents in Landcare areas, north-east Victoria, April 1993 (N=402)

	Index scores for 6 item scale range 1-30					
	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	Mean
Landcare areas (n=348)	1%	3%	20%	43%	33%	23.31
NonLandcare areas (n=48)	0%	2%	23%	44%	31%	23.42

Mann-Whitney U Wilcoxon signed ranks test, Z -.1632 1 Tailed P .4356 (not significant)

TABLE 2. Stewardship ethic scale scores
Landcare areas compared to nonLandcare areas, north-east Victoria,
April 1993 (N=402)

tion (attended all, most, about half, less than half, few activities) and respondents' stewardship scores; or between the time of joining Landcare (early, middle or late) and respondents'scores on the stewardship scale (Table 3). Indeed, respondents in Landcare areas who scored highly on the stewardship scale (>20 of possible score of 30) were not significantly more likely to be Landcare members or, if they were members, to have been early joiners.

The authors also hypothesised that respondents with stronger stewardship would adopt best-bet management practices at a significantly greater rate. Because the adoption of some practices would be affected by very small property size, only respondents with properties greater than 10 hectares (25 acres) were included in this analysis. As illustrated in Table 4, analysis confirmed a significant relationship between stewardship and the number of trees planted in the past two years. But there was not a significant relationship between stewardship and the amount of perennial pasture established in the past two years, the number of soil tests undertaken in the past two years, the extent of involvement in property planning, the length of fencing for landcare work

Variable	n=	Stewardship ethic index score (1-30)			Kruskal-Wallis H		
		Low	Medium	High			
		<20	21 to 25	>25	χ^2	df	P
		Mean rank on variable					
Age	340	197	162	164	7.2776	2	.0263
Highest level of schooling	336	144	173	180	8.5824	2	.0137
Property size	337	208	166	146	19.1589	2	.0001
Intensity of participation in Landcare activities#	258	133	129	127	.2097	2	.9005
When joined Landcare#	259	137	129	127	.6909	2	.7079

#for Likert-type response categories, (1) more important rating than (5), hence lower score on mean ranking indicates a higher ranking for that variable. For all other variables, higher scores on mean ranking indicates a better performance.

TABLE 3. Stewardship ethic and other social and farming variables
All respondents in Landcare areas, north-east Victoria, April 1993 (N=402)

Variable	n=	Stewardship ethic index score (1-30)			Kruskal-Wallis H		
		Low	Medium	High			
		<20	21 to 25	>25	χ^2	df	P
		Mean rank on variable					
Perennial pasture past 2 yrs	238	121	117	123	0.4389	2	.8029
Trees planted past 2 yrs	270	117	134	150	6.6959	2	.0352
Soil tests past 2 yrs	256	125	124	138	2.1758	2	.3365
Fencing for Landcare past 2 yrs	219	96	108	120	5.1084	2	.0778
Lime applied past 2 yrs	229	120	110	118	1.711	2	.5568
Involvement in whole farm planning	266	133	130	138	06250	2	.7316

Higher score on mean ranking indicates better performance on that variable.

TABLE 4. Stewardship ethic and adoption of best-bet practices
All respondents with properties >10 ha, north-east Victoria, April 1993 (N=402)

erected in the past two years, or the amount of lime applied in the past two years (Table 4). These findings were surprising given the finding that Landcare participants were significantly more likely to adopt most of these best-bet practices (Curtis and De Lacy 1996). These findings are consistent with other research in Australia and overseas. Vanclay (1992: 99) reported his research in the Darling Downs of Queensland in the early 1980s suggested 'there was no indication that stewardship or conservationism (as measured by any of the five scales) was positively associated with protection'. Buttel et al. (1990: 159) reported US research findings that 'Farmer attitudes regarding stewardship obligations toward the land have been found to have significant but modest positive impacts on the adoption of conservation practices' (Coughenour, 1985; Napier and Forster, 1982; Nowak, 1985).

It is interesting to note that of the best-bet practices surveyed, only tree planting was significantly related to stewardship. Most of the recent tree planting by landholders has been for catchment protection or aesthetic purposes as opposed to establishing commercial farm forestry (Barr and Cary 1992; Race and Curtis 1996). Compared to the other best-bet practices, tree planting is a longer term strategy with little prospect of a short-term economic payoff (as, to a lesser extent, is fencing for Landcare). The authors therefore expected that the strongest relationship would be between stewardship and tree planting. The finding of a significant relationship between stewardship and tree planting suggests that stewardship is important. However, federal and state governments allocate considerable funding for tree planting and much of the tree planting by Landcare groups is subsidised. Surveys of Landcare group activity (Curtis and De Lacy 1995a; Curtis 1996) have consistently found a positive relationship between Landcare group activity on tree planting and government funding for groups.

The possibility that the stewardship ethic scale was flawed and failed to identify differences which actually existed was also considered. Statistical tests for scale validity and reliability were conducted and have been reported above. Vanclay (1992) discussed the issue of social desirability affecting participants' responses and concluded that this should affect responses from respondents equally. Further bivariate analysis using variables such as age and education, which might reasonably be expected to discriminate respondents, produced a number of significant relationships. As expected, younger and more educated Landcare respondents (Table 3) and women Landcare respondents[2] scored significantly higher on the stewardship ethic scale. These findings appeared to validate the stewardship scale.

Landholders more concerned by economic impacts of land degradation

Analysis of survey data suggested that property size was part of the explanation for the absence of the predicted linkage between Landcare participation and

stewardship. Landcare respondents were significantly more likely to operate larger farms.[3] However smaller property owners had significantly higher scores on the stewardship scale (Table 3). Respondents from smaller properties also worked significantly longer hours off-farm.[4] It is possible on-farm income was relatively less important in the household budgets of respondents from smaller properties so they could therefore afford to adopt a stronger stewardship ethic. However, information that respondents from smaller properties had completed significantly higher levels of schooling[5] suggested there may be other explanations for this difference on stewardship.

Part of the explanation for the absence of predicted relationships between stewardship and Landcare participation or the adoption of best-bet practices appears to be that Landcare participation is being driven by concern about the economic impacts of land degradation rather than by an emerging stewardship ethic. Survey respondents had been asked to indicate their level of concern about the impact of land degradation issues upon a range of economic and environmental values (Table 5). Respondents selected from 'not concerned', 'some concern', 'very concerned' and 'alarmed'. These categories were later collapsed into 'concerned' and 'not concerned'. Under multivariate analysis there was a statistically significant relationship between Landcare participation and concern about economic impacts of land degradation (P = 0.0057), and an inconclusive relationship between Landcare participation and concern for environmental

Extent concerned that land degradation will	**n=**	**Concerned**	**Not concerned**
Reduce current farm income*	364	61%	39%
Threaten long term farm viability*	366	61%	39%
Threaten long term property values*	363	59%	41%
Reduce current property values*	365	55%	45%
Reduce attractiveness as place to live**	366	55%	45%
Contribute to decline of habitat and wildlife**	360	45%	55%
Index			
Economic impact of land degradation*	272	70%	30%
Environmental impact of land degradation**	290	54%	46%

Using index scores, respondents significantly more concerned about economic impacts χ^2 14.946 df1 p<0.00

TABLE 5. Concern about the impact of land degradation issues
All respondents, north east Victoria, April 1993 (N=402)

impacts of land degradation (P = 0.0546) (Curtis and De Lacy 1995b). As illustrated in Table 5, a majority of survey respondents were concerned about both the economic and environmental impact of land degradation. Respondents were significantly more concerned about the economic as compared to the environmental impacts of land degradation. But they were concerned about the long-term environmental impacts of land degradation (Table 5). These findings highlight the importance of clearly articulating linkages between conservation of biodiversity and profitable agriculture. Landcare provides an excellent forum for landholders to learn about linkages between conservation of biodiversity and profitable agriculture, and to develop locally appropriate management strategies.

Landholders have strong stewardship ethic and Landcare contributing to biodiversity conservation

Survey data confirmed Vanclay's (1986; 1992) earlier finding that most farmers have a strong stewardship ethic (Tables 1 and 2) and indicated that a majority of landholders were concerned about the environmental impacts of land degradation (Table 5). These findings suggest moral considerations are an important influence upon landholder decision-making and that much of the appeal of Landcare is that it reflects values already widely held in the rural community, including a strong stewardship ethic (Lockie 1992). Nitsch (1989: 29) reported Swedish research indicating that a majority of farmers 'perceive farming primarily as stewardship and a way of life'. Vanclay (1992: 118) also reported that 'Farmers do not have environmentally hostile attitudes. Rather, they endorse concepts of stewardship and conservation.' However, Australian farmers often use the saying that 'it is hard to be green when you are in the red' to explain the impact of poor seasons, feral animals or declining terms of trade upon their capacity to adopt more sustainable practices. 'It is hard to be green when you are in the red' might also mean it is unrealistic to expect farming families to adopt strategies that will undermine their short-term economic survival.

Vanclay (1992: 95) suggested that calls for changed attitudes amongst Australian farmers were politically motivated and that 'By placing the failure of soil conservation adoption on farmers, governments can claim the responsibility for the problem lies with farmers, not the government.' The Victorian government's 'Decade of Landcare Plan' provided some official support for this position when it stated that

> In the relatively affluent 1980's there was much hope that changing attitudes would lead to a major change in farm practices. With dramatic declines in wheat, wool, vegetable, fruit and milk prices, the financial realities of making ends meet on the farm show that attitude change is not the only key. (DCE 1992a: 5).

Landcare participants are concerned about biodiversity and do make the linkage between sustainable agriculture and biodiversity conservation. Landcare partici-

pants across Australia are undertaking work – such as feral animal and weed control, fencing of watercourses, and planting trees and protecting remnant vegetation – which has considerable impact on biodiversity conservation. A recent survey of Victorian Landcare groups (Curtis 1996: 26) found that that even in a year affected by drought (1995), Victoria's 700 Landcare groups established about five million trees and shrubs. Fencing watercourses to manage stock access to riparian areas is one example where Landcare work results in community benefits outweighing the benefits accruing to private landholders. Fencing watercourses assists with establishing habitat corridors by planting trees/shrubs or encouraging regeneration of remnants; stabilising eroded creek banks prevents the deposition of sediments in major rivers and storages which damages sensitive plants and reduces native fish habitat; and revegetating watercourses traps nutrients in runoff, and stabilises eroded gullies which prevents the loss of nutrients attached to clay particles, and in turn, prevents algal blooms poisoning river systems. Curtis (1996: 27) calculated that in 1995 Victorian Landcare participants erected about 3,500 kilometres of fencing as part of their efforts to manage land degradation. Governments subsidise tree planting and fencing and Curtis (1996) has consistently found government funding is positively correlated with the level of group activitiy. However, community or private contributions usually exceed government funding for a project. In most cases funding guidelines stipulate that this is the case.

Claims that Landcare groups have ignored important biodiversity issues such as riparian areas, wetlands and native grasses or vegetation clearing are largely unjustified. To a large extent these claims reflect frustration with the rate of change and unrealistic expectations of voluntary groups. For example, in Victoria, even where Landcare groups operate, only a small proportion (median of 5%) of perennial creeks or rivers have been fenced to manage stock access to riparian areas (Curtis 1996: 28). There is little private benefit in fencing watercourses, and in many areas Landcare groups have only recently emerged. Wetlands and native grass management are emerging national issues, which natural resource agencies and conservation groups are only just coming to grips with. For example, the federal government only recently released its draft wetlands policy (ANCA 1996). It would be unrealistic to expect Landcare groups to be in the vanguard on these issues; although some groups are. Awareness and understanding are important first steps in bringing about change, and Curtis (1996: 20) found that in 1995, 47% of Victorian group had discussed the management of native grasses on farms.

Need to support Landcare with a stronger mix of policy instruments

Wetlands management is an excellent example of the mix of policy options needed to support Landcare. In the Murray-Darling Basin – the agricultural heartland of Australia – 90% of floodplain wetlands are privately owned (MDBC 1995). Without the co-operation of these private owners, implementation of

government wetland management strategies becomes problematic. There is considerable landholder interest in improved wetland management. There is also a high level of anxiety that dramatic and expensive changes will be imposed upon landholders. Agencies cannot assume landholder co-operation and will need to explain carefully linkages between wetland conservation and sustainable agriculture. These efforts may need a more sophisticated approach to landholder training than the typical Landcare field day organised around a demonstration site. Opportunities will also need to be investigated for sustainable use of wetlands, for example, with controlled grazing to strip nutrients trapped in wetlands, or by establishing riparian paddocks. Landholders will also need financial assistance to fence wetlands and establish alternate stock watering points, to control weeds and feral animals such as European carp and pigs, and in some instances to revegetate degraded areas. Given time, Landcare group activity can also build community support for agencies so that it becomes possible to invoke legal sanctions against those landholders who continue to mine, plough, drain, graze or burn wetlands.

CONCLUSION

As a program that involved only limited funding of a community development process, Landcare has probably exceeded any realistic goals established at the start of the Decade of Landcare. Landcare has mobilised a large and diverse cross section of the rural population, has increased awareness of issues, enhanced landholder knowledge and skills of key management topics, and made a difference to the adoption of best-bet management practices. There appears to be a healthy, robust relationship between agencies and community groups, and group processes enable Landcare participants to discuss conflicting views and explore emerging issues in a reasonable fashion. Legislation supporting TCM or CALP Boards suggests that institutional structures are emerging which are likely to link and support the work of Landcare groups. Landcare participants are able to influence policy development, have successfully 'pulled down' additional resources for Landcare, and are beginning to address some of the structural impediments to sustainability. Landcare is therefore an important model of community participation in a developed nation.

It is also important to acknowledge limitations of the existing Landcare program. At both federal and state levels the Landcare component is 'run on a shoe string' with small budgets ($15m of $102m at federal level in 1995), (Alexander 1995: Appendix 2) and limited numbers of personnel; has very few senior staff directly involved in program management; and has very few staff with specific knowledge of volunteer management. Indeed, there is no systematic approach to the management of issues such as inadequate leadership and management skills training; poor communications between groups and agency decision makers; low turnover of leadership positions in some groups; gender

stereotyping with the allocation of group leadership roles; and the trend for a small number of groups to access a disproportionate share of funds. Of particular concern is the continued reluctance of the federal agency responsible for the National Landcare to allow long-term funding (beyond an initial 3 years) for employment of group co-ordinators. This approach fails to acknowledge the growing weight of evidence highlighting the critical role of group co-ordination. It has also be acknowledged that farmer organisations and government have embraced Landcare as a strategy to deflect criticisms of structural impediments to sustainable resource management and to defer taking hard decisions about farm and regional viability, land tenure systems, allocations of river water for irrigation and vegetation clearing. Landcare may also be entrenching existing power relationships, in that Landcare participants are more likely to be better educated and own larger, more profitable properties.

Research reported in this paper suggested landholders were more concerned about the economic impacts of land degradation than about environmental impacts: respondents were particularly concerned about the long-term economic effects of land degradation. A majority of respondents were also concerned about the environmental impacts of land degradation, and survey results support the hypothesis that much of the appeal of Landcare is that it reflects values already widely held in the rural community, including a strong stewardship ethic. These findings highlight the importance of clearly articulating linkages between conservation of biodiversity and profitable agriculture. It is also important for policy makers and conservationists to appreciate the limited capacity of landholders to adopt costly or unproven technology, particularly when they are struggling financially. Concerns that Landcare groups have ignored important biodiversity issues such as riparian areas, wetlands and native grasses are often unjustified, or reflect unrealistic expectations of voluntary groups.

Survey analysis failed to establish expected significant differences in the stewardship scores of Landcare and nonLandcare respondents or to establish expected significant relationships between stewardship and the adoption of more sustainable agriculture practices. These results were consistent with Vanclay's (1986; 1992) findings that scores on the stewardship ethic do not discriminate between adopters and nonadopters of conservation and agricultural practices. Vanclay (1986; 1992) concluded that other factors related to resource availability, farmers' assessment of risk, and aspects of particular innovations are more important barriers to the adoption of agricultural innovations. Attempts to manage land degradation by developing landholder stewardship therefore appear misguided. Australian policy makers would be better advised to focus upon awareness raising and landholder training rather than upon changing landholder attitudes. Given the limitations of extension as a policy instrument, the intractable nature of many issues, the continued marginal viability of sheep and beef cattle farming, and the considerable off-site benefits of many best-bet practices, it is problematic whether limited funding of a communication process, such as

Landcare, can effect behavioural changes sufficient to achieve sustainable resource management at the landscape level. A stronger mix of policy instruments needs to be employed. The large increase in Landcare funding promised by both major parties in the 1996 federal election was a timely acknowledgment of the need to adopt a revised Landcare model, with funding for work on private land on the basis of identifiable community benefits.

Landcare has mobilised community participation in natural resource management on an unparalled scale in Australia and has been a catalyst for important changes in landholder awareness, understanding and behaviour. The authors suggest Landcare is also in a unique position to bridge the divide that still exists between the conservation movement and the farming community in Australia – with potentially important natural resource management outcomes.

NOTES

[1] Item-to-item Spearman rank correlation co-efficients P>0.3, and a standardised item alpha using SPSS of 0.6479 (slightly below the accepted 0.70 standard).
[2] Women mean score 24.41, men mean score 23.14, MMW Z -2.1017, 2 tailed P<0.05.
[3] Farmlets 10-40 hectares, small farms 41-150 hectares, large farms >150 hectares. Mean property size of 193 hectares compared to 146 hectares for nonLandcare participants, MWW Z -2.6919 1 tailed P<0.01.
[4] Mean rank of 97 for farmlets, 93 for small farms and 61 for large farms, Kruskal-Wallis H χ^2 15.5262 df 2 P>0.01.
[5] Primary or below, junior secondary, senior secondary with mean rank of 183 for farmlets, 162 for small farms and 150 for large farms, Kruskal-Wallis H χ^2 9.0220 df 2 P>0.05.

REFERENCES

AACM International 1995. Cost sharing for on-ground works discussion paper. Canberra, Australia: The Murray-Darling Basin Commission.

Alexander, Helen 1995. A framework for change: the state of the community Landcare movement in Australia. The National Landcare Facilitator Project Annual Report. Canberra: National Landcare Program.

Australian Bureau of Statistics (ABS) 1996. *Australians and the environment*. Canberra, Australia: Australian Government Publishing Service.

Australian Nature Conservation Agency (ANCA) 1996. *Draft wetlands policy of the Commonwealth government of Australia.* Canberra: ANCA.

Australian Soil Conservation Council (ASCC) 1991. *Decade of Landcare plan.* Canberra: ASCC.

Barr, Neil and John Cary 1992. *Greening a brown land: an Australian search for sustainable land use*. Melbourne: Macmillan.

Black, Alan W. and Ian Reeve 1993. 'Participation in Landcare groups: the relative importance of attitudinal and situational factors.' *Journal of Environmental Management* **39**: 51-57.

Buttel, Frederick. M., Olaf F. Larson, and Gilbert W. Gilespie Jr. 1990. *The sociology of agriculture*. New York: Greenwood Press.

Campbell, Andrew 1989. 'Landcare in Australia - an overview.' *Australian Journal of Soil and Water Conservation* **2** (4): 18-20.

Campbell, Andrew 1991a. *Landcare-testing times. National landcare facilitator 2nd annual report*. Canberra, Australia: National Soil Conservation Program.

Campbell, Andrew 1991b. Community participation- a new frontier in land management. Paper presented to International Conference on Sustainable Land Management, Napier. New Zealand.

Campbell, Andrew 1992. *Taking the long view in tough times. National Landcare facilitator, 3rd annual report.* Canberra: National Soil Conservation Program.

Campbell, Andrew 1994. *Landcare: communities shaping the land and the future.* St. Leonards, Sydney: Allen & Unwin.

Campbell, Andrew and Robert Junor 1992. 'Land management extension in the '90s. evolution or emasculation?' *Australian Journal of Soil and Water Conservation,* **5 (**2): 16-23.

CSIRO 1996. *Looking after our land: a future for Australia's biological diversity.* Canberra: CSIRO.

Curtis, Allan 1996. *Landcare in Victoria: a decade of partnerships*. Albury: Johnstone Centre, Charles Sturt University.

Curtis, Allan and Terry De Lacy 1994. *Landcare: does it make a difference.* Albury, The Johnstone Centre, Charles Sturt University.

Curtis, Allan and Terry De Lacy 1995a. 'Landcare Evaluation in Australia: towards an effective partnership between agencies, community groups and researchers.' *Journal of Soil and Water Conservation* **50**(1): 15-20 .

Curtis, Allan and Terry De Lacy 1995b. 'Landcare in Australia: does it make a difference.' *Journal of Environmental Management* **45**: 1-20.

Curtis, Allan and Terry De Lacy 1996. 'Landcare in Australia: beyond the expert farmer.' *Agriculture and Human Values* **13**(1): 20-31.

Curtis, Allan, Terry De Lacy and Nick Klomp 1993. 'Landcare in Victoria: are we gaining ground?' *Australian Journal of Soil and Water Conservation* **6**(2): 20-27.

Curtis, Allan, Jim Birckhead and Terry De Lacy 1995. 'Community participation in Landcare policy in Australia: The Victorian experience with regional Landcare plans.' *Society and Natural Resources* **8**: 415-430.

Department of Conservation and Environment (DCE) 1992a. *Victoria's decade of Landcare plan.* Melbourne: DCE.

Department of Conservation and Environment (DCE) 1992b. Decade of landcare guidelines regional landcare action plans.Melbourne: DCE.

Department of Conservation and Natural Resources (DCNR) 1993. *North east regional Landcare plan.* Melbourne: DCNR.

De Vaus, D.A. 1991. *Surveys in social research.* Sydney: Allen and Unwin.

Dillman, Don A. 1978. *Mail and telephone surveys. The total design method.* New York: Wiley.

Edgar, Robert V. and Dianne Patterson 1992. 'The evolution continues - Victorian Landcare groups', in *Proceedings Volume 1 of the 7th International Soil Conservation Organisation conference-people protecting their land, 27-30 September 1992,* Sydney. Australia.

Esman, Milton J. and Norman T. Uphoff 1984. *Local organisations: Intermediaries in rural development.* New York: Cornell University Press.

Farley, Rick and Phillip Toyne 1989. 'A National land management programme.' *Australian Journal of Soil and Water Conservation* **11** (2): 6-9.

Grose, S. 1994. Calling to rid farming from arid regions. The Canberra Times, 8 September p2. Canberra: Australia.

Hawke, Robert J.L. 1989. *Our country Our Future. Statement on the environment by the Prime Minister of Australia.* Canberra: Australian Government Publishing Service.

Hill, Robert 1996. *Investing in our natural resources. Statement by the Minister for the Environment.* Canberra: Australian Government Publishing Service.

Keating, Paul 1992. *Australia's environment: a natural asset. Statement on the Environment by the Prime Minister of Australia.* Canberra: Australian Government Publishing Service.

Lockie, Stewart 1992. 'Landcare- before the flood.' *Rural Society* **2(**2): 7-9.

Midgley, James 1986. 'Introduction: social development, the state and participation', in James Midgley (ed) *Community participation, social development and the state*, pp. 1-11. London: Methuen.

Mues, C. H. Roper and J. Ockerby 1994. *Survey of Landcare and land management practices*. Canberra: Australian Bureau of Agricultural and Resource Economics.

Murray-Darling Basin Commission (MDBC) 1990. *Natural Resources Management Strategy*. Canberra: MDBC.

Murray-Darling Basin Commission (MDBC) 1995. *Draft floodplain wetlands management strategy for the Murray-Darling Basin.* Canberra: MDBC.

Nitsch, U. 1989. 'The legitimacy of the agricultural extension service', in *Proceedings of the 9th European Seminar on Extension Education*, Sweden 28 August to 2 September. Swedish University, Uppsala.

Poussard, Horrie 1992. 'Community landcare to test government policies and programs', in *Proceedings Volume 1 of the 7th International Soil Conservation Organisation conference-people protecting their land, 27-30 September 1992*, Sydney. Australia.

Race, Digby and Allan Curtis 1996. 'Farm forestry: how things stand.' *Australian Journal of Soil and Water Conservation* **9**(2): 29-35.

Resource Assessment Commission (RAC) 1993. *Coastal Zone Inquiry. integrated resource management in Australia.* Information paper No.6. Canberra: Australian Government Publishing Service.

Roberts, Brian 1992. *Land care manual.* Sydney: New South Wales University Press.

Uphoff, Norman 1991. 'Fitting projects to people', in Michael Cernea (ed) *Putting people first*, pp. 467-511. New York: Oxford University Press.

Vanclay, Frank 1986. Socio-economic correlates of adoption of soil conservation technology. M.Soc.Sci. Thesis, University of Queensland. St Lucia.

Vanclay, Frank 1992. 'The social context of farmers' adoption of environmentally-sound farming practices', in Geoffrey Lawrence, Frank Vanclay and Brian Furze (eds) *Agriculture, environment and society*, pp. 94-121. Melbourne: Macmillan.