

TYOLOGIES OF LANDHOLDERS IN LEYTE, PHILIPPINES, AND THE IMPLICATIONS FOR DEVELOPMENT OF POLICIES FOR SMALL-HOLDER AND COMMUNITY FORESTRY

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ABSTRACT

A lack of understanding of the variation in socio-economic circumstances and value systems within rural communities in the Philippines has been consistently mentioned by extension theorists and those involved in planning and administering forestry development programs as a hindrance to the achievement of the objectives of forestry development programs. One means to explore and describe this diversity is through the use of cluster analyses and the development of typologies to illustrate 'typical' situations faced by rural households. This paper briefly reviews previously developed typologies of farmers in upland areas of the Philippines, then reports on a study which developed a typology of households in four rural communities in Leyte province, Philippines. The Leyte households were clustered into 5 groups according to their perception of the importance of various reasons for and constraints to tree planting and management on the lands they manage. Subsequent testing for differences in the behaviour and socio-economic characteristics of the groups revealed numerous differences between them. These differences, in conjunction with their attitudes, help to illustrate the diversity of households in the communities, plus provide a means to estimate the types of forestry that is of interest to the household and their likely reactions to various potential forestry development activities. The characteristics of the various groups in the typology and the likelihood of them participating in forestry activities are discussed in the final two sections of the paper.

FORESTRY DEVELOPMENT AND THE LACK OF UNDERSTANDING OF INTRA-COMMUNITY SOCIO-ECONOMIC VARIATIONS

Many researchers and extension personnel from throughout the world have argued that decision-makers and extension providers need to understand the variety of socio-economic circumstances and value systems of the various sectors in communities. These socio-economic and cultural variations are related to differences in land management attitudes and behaviour. Furthermore, these variations result in differences in the impacts of government policies and development programs across a community (Chamala and others 1980; Byron and Boutland 1987; Chamala 1987; Raintree 1991; Cernea 1992; Emtage 1995; Byron 1996, van den Ban and Hawkins 1996; Bisson and others 1997; Howden and others 1998; Emtage and Specht 1998; Pulhin 1998; Guerin 1999; Fulton and Race 2000; and Howden and Vanclay 2000).

A consistent criticism of community and small-scale forestry development programs in the Philippines and elsewhere is that they fail to take account of the diversity of people within communities (Byron 1987, 1996; Raintree 1987, 1991; Pulhin 1998; Bisson and others 1997; Donoghue 1999; Contreras 2000).

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Pulhin (1998, p.5) quotes Cernea (1992) as stating:

'Entrusting a social forestry program (and development programs in general) to the wrong social actor will lead to the failure of the program, as in fact has happened repeatedly... Some statements or articles are repeating the term community forestry from title to end hundreds of times as mantra, without once bothering to discuss what specific social groups, strata, or classes compose this mythical "community"...it is necessary to desegregate the broad term people and identify precisely which unit of social organisation can do afforestation, and which social units and definable groups can act as sustaining and enduring social structures for long-term production activities.'

Pulhin (1998, p.5) goes on to comment:

"...some Community Based Forest Management projects in the Philippines would show that both the DENR field personnel and NGO's oftentimes regard the community as a homogenous grouping with similar interest. There is little if any conscious effort exerted on the identification of the different interest groups, including those whose source of livelihood are mainly dependent on the local forest resources. This has contributed to the perpetuation and reproduction of inequity in terms of access to forest benefits in favour of the local elite."

Byron (1996) believes that this statement applies not only to the Philippines, but to other nations and cultures as well. He too pointed to the potential for benefits from projects to be co-opted by the elite within communities.

It is apparent from the above statements that the failure to understand and allow for variation within communities is affecting the success of forestry development programs in the Philippines and elsewhere. One means to define and describe this diversity is through the use of cluster analyses and typologies.

USING TYOLOGIES OF HOUSEHOLDS TO ASSIST FORESTRY DEVELOPMENT

Anthropologists, marketing professionals and others whose job is to track public opinions seek clusters (or groups) of people in the community with similar attitudes and behaviour patterns to help them conceptualise and describe intra-community variation for a variety of applications. These applications can include tracking political voting intentions, targeting advertising and product development to market segments, and describing the variations in cultural practices among indigenous communities (Dillon 1990, Hair and others 1998). A typology is a set of archetypal 'portraits' designed to illustrate the range in the population in the characteristics of interest to those undertaking the research. Typologies may be used to describe the important social, economic, behavioural and attitudinal characteristics of various groups that have been defined using cluster analysis.

While it is recognised that all households are individual and have unique social and economic characteristics, behaviours and attitudes, it is not possible to take account of every individual when seeking to plan and administer development programs. Cluster analysis and the development of typologies are a means

of simplifying and organising information so that it can be used to aid planning and administration of development programs at a regional or even national level. It is stressed that the development of such typologies is not a substitute for having development personnel available for consultations with communities and households. Rather, they are a means of assisting with the development and prioritisation of programs at a higher-than-local scale. It is one means of ensuring that the needs of various sectors of the community are at least considered by those planning and administering development programs.

Typologies can be used to aid understanding and describing the variations in socio-economic circumstances, and land management attitudes and behaviour within communities. Through clustering people or households using relevant criteria, such as their attitudes to forestry development, then examining the socio-economic and behavioural characteristics of the groups that are formed, the understanding of the relationships between households' socio-economic characteristics and their land management behaviour is developed. Once these relationships have been explored, typologies can be developed as a descriptive and planning tool to aid understanding about how development programs will affect landholders in differing social and economic circumstances, and how they may respond to different types of activities, assistance and information. Typologies can help to develop strategic plans for timber industry development and conservation planning at a regional scale by helping to match the needs of potential timber suppliers to timber processors through better understanding of the forestry practices that would suit varying types of households. Further, by improving the predictions of future behaviour, typologies can help to forecast potential future wood supplies (Chamala and others 1980; Byron and Boutland 1987; Raintree 1991; Emtage 1995; van den Ban and Hawkins 1996; Howden and others 1998; Emtage and others 2001; Emtage and Specht 1998; Guerin 1999; Race 1999; Fulton and Race 2000; Howden and Vanclay 2000).

Which Criteria Can Be Used to Classify Households?

Raintree (1991) has argued that developing an understanding of intra-community differences is an essential part of planning any forestry development strategy. He provides examples of over thirty socio-economic criteria which can be used to categorise rural farmers or households. These criteria ranging from measures of wealth, such as land size and cash income, to classification schemes based on cultural practices such as farming practices.

In Australia the definition of landholder typologies according to landholders' attitudes to tree planting and management has been used to provide insight into the combination of socio-economic factors affecting landholders land management behaviour (Emtage and others 2001). The use of attitudes as classifying criteria offers some advantages over methods that rely on single socio-economic criteria to define groups. Because of the breadth of socio-economic topics covered by attitude statements, a households' pattern of responses to attitude statements is able to summarise their socio-economic position and indirectly indicate the relationships between socioeconomic factors, current behaviour and intended behaviour. A disadvantage is that attitudes are more expensive to measure and analyse than many socio-economic characteristics.

An important part of validating a typology is to assess if it has predictive validity and practical utility (Hair and others 1998). Predictive validity is said to occur when the characteristics of the groups in factors not used to cluster them are consistent with the findings from previous research or theory describing the phenomena. The practical utility of a typology may be judged in this case by the extent the typology is able to assist in targeting the extension and other activities related to smallholder forestry development.

TYOLOGIES OF FILIPINO UPLAND FARMERS

In the Philippines a number of studies have sought to describe different types of communities and farmers in the ecologically fragile upland areas of the country. These studies are reviewed in the following section.

Typologies of Swidden Farmers

The earliest typology studies in the Philippines by Conkin (1957), cited in Belsky (1984), are largely anthropological works, which examined the differences in cultures and farming practices of indigenous and non-indigenous communities, practicing swidden agriculture in the upland forest regions of the Philippines. Conkin's typology had 2 basic types, including the 'integral' swidden farmers, and the 'partial' swidden farmers. Integral swidden practices require large forest areas, practiced in primary and secondary forests using long fallow periods. They are those practiced by indigenous peoples and tribal groups who are experienced in upland farming. 'Partial' swidden practices are intensive, short-fallow or permanent cropping systems. These practices are generally by 'lowlanders' who have little or no land of their own and are relatively inexperienced swidden farmers. They mostly work in lower elevations and in areas vegetated as grasslands or open brushlands. Conkin (1957) differentiated 'partial' farmers into two sub-groups, described those who have some lowland farmland as 'supplementary' farmers, with those who have no lowland farming areas termed 'incipient' farmers. Ooi (1987) described a similar typology of upland cultivators to that of Conkin (1957), although Ooi did add a sub-group to the category of partial farmers, the 'land speculators', who are said to sponsor occupation of upland areas in the hope that it will one day be possible to sell the land.

More recent studies have changed in focus as the area under forest in the Philippines has dramatically decreased. Upland agriculture changed as indigenous communities have merged with non-indigenous communities, and land use in the upland areas has become dominated by agriculture. Belsky (1984) defined three farmer types on the basis of their rice self-sufficiency (RSS), those who produce more than half their yearly rice requirements; those who produce less than half their annual rice needs; and low strata households who produce none of their rice needs. Her criteria was selected following discussions with the community about the factors that most affected their upland farming practices and differentiated between them. This is similar to the approach used by researchers applying Participatory Rapid Rural Appraisal (PRRA) and Participatory Rural Appraisal (PRA) methodologies. These researchers employ categorisation of landholders using the landholders own criteria to help describe the variations in socio-economic circumstances within rural communities (Balbarino 2001). In these studies the community members are allocated into a number of categories according to their wealth or 'wellbeing'.

Belsky reported that the RSS of households is related to their land tenure status, livestock holdings, area of coconut orchards, and control of or access to other economic resources. The RSS-based stratification of the community members was also reported to be correlated with the values and goals of different sectors of the community. Belsky (1984) noted that the criteria she employed to produce her classification system appear to be valid and useful for the locality and time for which the study was made but might not be applicable in other situations.

In summary, the typologies that have been developed for upland farmers in the Philippines seek to aid understanding of the variation in upland farming practices and the ways these relate to variations in socioeconomic circumstances and cultural practices. The biophysical and social conditions in the Philippines have

changed dramatically since the time of Conkin's and even Belsky's study, with large cultural, demographic, and environmental changes in the last 50 years (Kummer and Ho Sham 1994, de los Angeles 2000). The most recent relevant typology found in a literature review was developed in the early 1980's. Furthermore the typologies that have been developed were focussed on agricultural practices rather than the management of trees on rural lands. It is apparent that a new typology of Filipino upland farmers could help to improve understanding of the factors affecting land management behaviour and assist the design and delivery of forestry development programs.

CLUSTER ANALYSIS OF HOUSEHOLDS IN FOUR COMMUNITIES IN LEYTE ACCORDING TO THEIR ATTITUDES TO FORESTRY DEVELOPMENT

One of the objectives of researchers involved in the Australian Centre for International Agricultural Research (ACIAR) funded Leyte State University/ University of Queensland Smallholder Forestry Project was to develop a typology of upland households in relation to their tree planting and management attitudes, behaviour and intentions. In order to provide data for the development of a typology of rural households in Leyte, a survey of four rural communities and households was undertaken in the year 2002 in locations across Leyte province, Philippines. In the following sections the methods used for the survey and data analysis are briefly reviewed before the results of the cluster analyses and the typology that was developed are presented and discussed.

METHODS USED TO DEFINE GROUPS OF HOUSEHOLDS IN FOUR COMMUNITIES IN LEYTE PROVINCE

The survey of the four communities in Leyte province had a number of parts included open community meetings, two series of focus group discussions, case studies, a policy workshop, and 50 structured interviews that were undertaken with members of households randomly selected from within each participating community. Data collected during the household interviews included: demographic data; information about the farming and present and intended tree planting and management practices of the household; information about perceived importance of various reasons for and constraints to the tree planting and management practices of the household, and more.

Once collected the data were entered into the SPSS software package (version 10) for processing and analysis. A series of data processing and analyses was undertaken to prepare the data before the cluster analyses were carried out. The households were grouped by applying cluster analyses to the ratings of importance given by households to various potential reasons for and constraints to tree planting and management. Once the memberships of these groups had been recorded, the behavioural and demographic characteristics of the groups were tested for differences. The steps taken prior to the cluster analyses are outlined in more detail in the following section.

Processing of Attitudinal Data from the Household Survey

The information about households perceptions of the importance of various reasons for and constraints to tree planting and management was collected by asking respondents to rate the importance of sets of potential reasons and constraints on a Likert scale from one, not important, to five, very important. Scores were allocated to the ratings, and then

analysed using principal components analysis, a form of factor analysis, to determine the factors underlying the responses. Factor analysis allowed the construction of scales, in this case averaged scores, from items that were highly correlated. Two scales were created and tested for reliability from the responses to the topic 'reasons for tree planting and management', and four scales from the topic 'constraints to tree planting and management'. Scores for each scale were calculated for every responding household, and each scale named to reflect the factor it represents. These scale scores were used as the criteria on which to develop a typology of households in the communities following analysis using a combination of hierarchical and non-hierarchical cluster analysis techniques. The results of the analyses and the typology are described in the following sections.

VARIATIONS IN HOUSEHOLDS ATTITUDES TO TREE PLANTING AND MANAGEMENT—RESULTS OF THE CLUSTER ANALYSES AND FORMATION OF A TYPOLOGY OF RURAL HOUSEHOLDS IN LEYTE

The groups defined using a combination of hierarchical and non-hierarchical cluster analyses are different from each other and are internally relatively homogenous in regards to their ratings of importance for the scales of reasons for and constraints to planting and managing trees. The size or relative proportion of each cluster group as a part of the sample varies from 13% to 24%, with 5 cases that were not included in any group due to missing data (Table 1).

Table 1.—Number of households in each cluster group.

Cluster group	Proportion	Frequency
1	22%	43
2	13%	25
3	23%	45
4	24%	47
5	18%	35
Valid		195
Missing		5
Missing		5

In terms of their average ratings of importance for the various scales relating to tree planting and management, it is the ratings for scales relating to constraints that show the greatest variation between the groups (Table 2). There is less variation between the cluster groups in terms of their ratings of importance for the 2 scales relating to reasons for planting and managing trees. Tests for differences in the mean ratings of the groups revealed that the

Table 2.—Mean scores for scales of reasons for and constraints to tree planting and management for groups defined by cluster analyses.

	Cluster Group				
	1	2	3	4	5
Constraint to planting - tree protection	1.18	2.37	1.76	3.95	1.69
Constraint to planting – planting support	1.63	3.65	1.86	4.02	2.83
Constraint to planting - commercial viability	1.35	2.35	2.01	3.88	3.21
Constraint to planting – tenure and space	1.40	2.11	3.97	4.49	2.26
Reason for planting - immediate	4.17	4.39	4.14	4.46	2.70
Reason for planting - long term	4.65	4.67	4.49	4.69	3.62

Note: scores indicate average ratings of importance for the items included in each scale

Table 3.—Profile of cluster groups on various socio-economic characteristics and tree planting and management behaviour.

Independent variable	1	2	3	4	5
% below poverty threshold	74%	64%	53%	75%	51%
If own some of the land they farm	72%	60%	53%	40%	60%
Have a lease contract	24%	22%	40%	16%	67%
Proportion of total food needed for household grown					
0 - 50%	63%	88%	71%	85%	60%
51 - 100%	37%	12%	29%	15%	40%
House construction materials					
Light materials	54%	32%	27%	51%	34%
Mixed materials	37%	36%	29%	34%	46%
Concrete	9%	32%	44%	15%	20%
Intend to plant trees in the future	79%	88%	69%	63%	88%
Interested in commercial tree farming	77%	72%	44%	46%	74%
If participated in community forestry project	42%	42%	35%	27%	57%
If know how to register trees	19%	29%	17%	5%	21%
Have belonged to a community organisation	61%	56%	52%	32%	66%
If attended agricultural training	12%	36%	20%	32%	29%
If use resources from public lands	19%	8%	23%	18%	74%
If use resources from public lands in the past	40%	16%	30%	27%	80%

mean rating of importance for both ‘reasons’ scales by households in cluster group 5 are significantly lower than those of other groups ($p < 0.005$). The ratings range from those of group 1, who place the lowest importance on all scales relating to constraints and high importance on scales of various reasons for tree planting and management, to those of group 4 who have the highest ratings for every scale.

The clustering of the households works to maximise the differences between groups and minimise within group variation, and thus it is to be expected that there are significant differences between the cluster groups in terms of their attitudes. Each group has a unique combination of scores on the attitude scales, or attitude profile, which, in conjunction with their socioeconomic characteristics, helps to explain their capacity and enthusiasm for, and constraints to, forestry development. The testing of differences in socioeconomic characteristics of the groups formed through cluster analysis are described and discussed in the following section.

Variations in Socio-Economic Characteristics of the Cluster Groups

There are a number of variations in socio economic characteristics that differentiate the cluster groups (Tables 3 and 4). In the following sections the groups are described in turn and named to reflect the characteristics that best summarises their character in relation to tree planting and management.

Cluster group 1 – ‘Confident Farmers’

Households in cluster group 1 have the greatest interest in developing commercial tree farming (Table 3). They rated the importance all of the potential constraints to tree planting and management very lowly and all reasons for planting and managing trees highly. Over 60% of these households have been or still are members of a community organisation and more than 40% have participated in community forestry programs, so they appear to be active in the community. Their low level of attendance in agricultural training activities together with their low ratings of

importance for potential constraints to tree planting and management suggests that they are confident in their own abilities in regards to farming, hence their name the ‘confident farmers’.

The households in the other cluster groups tend to be better off than those in group 4 in most socio-economic measures, but all of them face some constraints in terms of developing their tree farming activities. For example, cluster group 1 households have the highest proportion of members that own at least some of the land that they are farming at 72%, tend to grow a relatively high proportion of their own food, and have a relatively large farming area to manage. However, they are also cash poor and almost 75% below the official poverty line. In addition, a high proportion of their households are made of light materials, and the land they do manage is, on average, furthest from their houses of all the cluster groups.

Cluster Group 2 – ‘Doubtful Foresters’

Households that are members of cluster group 2 have, on average, the largest areas of land for farming and second largest cash incomes of all the groups, yet the variation within the group in these characteristics is large, as indicated by the standard deviations for these means (the ANOVA test for differences in land size between groups was significant at the 90% confidence level).

Only 12% of households in this cluster group grow more than 50% of their total food requirements. This group has been termed the ‘doubtful foresters’ because they rate reasons for planting and managing trees highly, but appear to be highly concerned about the lack of support of tree planting and management relative to other constraints to tree farming (Table). Nearly 90% of households in this cluster group report that they intend to plant some trees in the future. They have the lowest reported level of use of materials from public land of all the groups in the past or presently, possibly indicating that they lack experience in forestry activities, and yet nearly 30% of these households know how to register their trees with the Department of Environment and Natural Resources (DENR) so they can be legally harvested.

Cluster Group 3 – ‘Well-off Households’

Households who are members of cluster group 3 are termed ‘well-off households’ as they have, on average, the largest cash incomes of all the cluster groups and have the second lowest proportion of households below the poverty threshold for rural households in the region (Table 4). Despite their relatively high level of economic resources less than half the households in this group are interested in commercial tree farming and they have the second lowest proportion of members that intend to plant trees in the future. Only half the households in this group own some of the land they use for farming and their ratings of importance for the ‘tenure and space issues’ as a constraint to tree planting and management is almost twice the size of their ratings of importance for other constraints. This may be because despite the relatively large size of their landholdings, only 53% of these households own some of the land they farm, though 40% report having formal lease contracts on land they do not own. They are the least reliant on farming for their income and would appear to be more interested

Table 4.—Mean values of various socio-economic variables that differ between cluster groups.

	Group no.	N	Mean	Std. Deviation
Remittance amount per year average per year (Pesos*)	1	43	P2,223	5,034.9
	2	25	P4,020	10,504.4
	3	44	P6,707	16,049.8
	4	46	P2,068	4,680.1
	5	34	P12,971	25,334.7
	Average	192	P5,351	14,466.4
Proportion of income from Farming	1	42	44%	0.34
	2	25	46%	0.36
	3	45	34%	0.33
	4	47	54%	0.36
	5	35	34%	0.29
	Average	194	43%	0.34
Household gross yearly cash income (Pesos)	1	43	P45,495	42,330.0
	2	25	P62,582	65,193.7
	3	45	P69,171	80,612.6
	4	47	P33,199	24,503.3
	5	35	P54,803	43,644.5
	Average	195	P51,856	55163.6
Average distance to farm plots (km)	1	43	2.50	4.37
	2	25	1.42	1.27
	3	43	1.37	1.52
	4	44	0.92	1.00
	5	33	2.27	3.04
	Average	188	1.69	2.68

*Note: US\$1 approximately equals P50

in expanding their non-farming activities rather than concentrate their capital in their farming activities, as supported by the fact that they have the highest proportion of households with concrete housing.

Cluster Group 4 – ‘the Disadvantaged’

Cluster group 4 appears to be the most disadvantaged overall. They have the lowest gross annual income, in part because they receive the least amount in remittances from outside the household. They also have the greatest reliance on income from farming despite managing the smallest land size for farming of all the groups (Table 4).

Cluster group 4 have the highest proportion of members below the poverty threshold, are the least likely to have a formal lease contract on land they manage, have a high proportion of members with houses constructed of light materials, grow little of their own food, and have the lowest proportion of members that own at least some part of the land they use for farming (Table 3). Cluster group 4 households have the lowest proportion of membership of community organisations and have the least interest in future tree planting or commercial tree farming. Members of this group gave the highest ratings of importance to all scales of reasons for and constraints to tree planting and management. They are particularly concerned with ‘space and tenure issues’ as constraints to tree planting and management, and also gave high ratings of importance to tree protection issues relative to other groups.

Cluster Group 5 – ‘Experienced Foresters’

Finally, the households in cluster group 5 stand out for a number of reasons apart from their relatively low dependence on farming for their cash income. The households in this group get the

highest amount of income from remittances, have the highest level of participation in community forestry programs and community organisations, have the greatest proportion of members with formal lease contracts, and the greatest proportion of members who grow more than 50% of their food needs.

Nearly 90% of these households report that they intend to plant trees in the future and 75% express interest in developing commercial tree farms, and yet the households in this group rated the importance of all reasons for planting and managing trees lower than members of other groups, particularly the ‘immediate’ reasons for planting and managing trees. They also rated the constraints to planting relatively lowly, however, with the most important constraints for this group being ‘financial viability issues’, and ‘planting support issues’ (Table 2). The most dramatic difference between this group and the others is in terms of the proportion that reported using materials from public land in the past and in the present. It was reported that 80% of these households used materials from public lands in the past, twice the proportion of the next highest group. Furthermore, the proportion of households continuing to use materials from public land has dropped dramatically for all except households in cluster groups 3 and 5. The proportion of households continuing to use materials from public lands in cluster group 5 has only fallen to 74%, and remains more than three times the proportion of any other group (Table 3). The high use of public land materials implies that households in this group are experienced in forestry activities and want to use this experience to expand tree planting and management activities on their own land.

Differences in Present Tree Planting and Management Behaviour Between Cluster Groups

Significant differences were found between the cluster group households in terms of the frequency of various types of trees they are presently manage on their farms (chi-square $P=0.003$, Tables 5 and 6).

The differences between the groups in terms of the characteristics of the trees they are growing are generally those that would be expected given the socio-economic differences between them and are consistent with the differences in the ratings of importance given to the various scales for various reasons for and constraints to tree planting and management that were described in the preceding sections. For example, households in cluster group 1 and 3 are more likely, and cluster group 4 households are less likely, to be growing premium timber tree species than would be expected if all the groups were equal. The enthusiasm of cluster group 1 households for tree planting and management, their lack of concern about constraints, and their relatively high level of ownership of land they farm, is consistent with the timber qualities of the species they grow and time taken for premium tree species to mature. The relatively high use of non-premium tree species and low use of premium tree species by households in cluster group 4 is also consistent with their socio-economic characteristics, given their rate and depth of poverty, lack of land ownership, and high level of concern about many issues as constraints to tree planting and management.

Table 5.—Number of species of trees of various types presently grown by cluster groups.

Tree type classification	1	2	3	4	5
Timber, premium	126	73	95	93	80
Timber, non-premium	36	31	39	67	53
Fruit trees	74	49	57	86	44
Total	236	153	191	246	177

Table 6.—Difference between observed and expected number of species of trees various types presently grown by cluster groups.

Tree type classification	1	2	3	4	5
Timber, premium	16.1	1.8	6.1	-21.5	-2.4
Timber, non-premium	-17.2	-3.5	-4.0	11.6	13.1
Fruit trees	1.1	1.7	-2.0	10.0	-10.7

USING THE HOUSEHOLD TYPOLOGY TO PREDICT THE PROSPECTS FOR FORESTRY DEVELOPMENT

The preceding analyses have indicated that households who are members of various groups of the typology are presently using different types of forestry practices to suit their needs and vary in their intentions to expand their future tree farming activities. Of the five groups that were defined by cluster analysis, three of them expressed high levels of interest in tree farming activities. The two groups of households with low interest in tree farming activities are discussed first.

Groups Not Intending to Develop their Forestry Activities

The two groups with more than half their members that do not have an interest in commercial tree farming are the 'disadvantaged households' and the 'well-off households', the groups which are opposite to each other in respect to their cash income levels and their reliance on farming for income. The 'disadvantaged households' are concerned about all the potential constraints to tree planting and management and would appear to require the highest levels of assistance in terms of greater access to land, tenure security, livelihood support and management advice if they are to be able to engage in forestry activities.

In the case of the 'well-off households', they appear to be in a better financial position to cover the large initial investment required to develop forestry but the majority are not eager to do so. Their primary concern is 'space and tenure' issues, with other constraints to tree planting and management given low ratings of importance. With these households primarily relying on non-farm income for their livelihood, and having land ownership levels below those of other groups other than the 'disadvantaged households', it is possible that they want to concentrate their resources on developing their off-farm livelihood activities, and that they are unwilling to reduce their current food production. These households may recognise the limitations of relying on farm products to support their livelihoods, and yet see the maintenance of their food production as a way of reducing the risks faced by the households in sustaining their livelihood.

Groups that Do Intend to Develop their Forestry Activities

The groups of households that do have high levels of interest in commercial tree farming include the 'confident farmers', the 'doubtful foresters' and the 'experienced foresters'. The 'confident farmers' rated the importance of all constraints to tree planting

and management lower than other groups with the exception of 'finances required for tree growing' where they are second lowest. They rated the importance of this factor marginally higher than 'well-off households', with both these groups rating the importance of this factor significantly lower than households in the other groups. Nearly 75% of the households in the 'confident farmers' group are below the poverty threshold, the same proportion as the 'disadvantaged households', and more than 50% of households in this group are constructed with light materials. Despite their poverty it appears that their greater levels of land ownership, capacity to produce a greater proportion of their own food requirements and lack of concern about the constraints to tree planting and management contribute to this group having the greatest interest in commercial tree farming of all the groups. Unlike the members of the 'well-off households' group, members of the 'confident farmers' group appear to see the development of their farming activities as a means to improve their livelihood. They also tend to manage land that is further away from their housing, and may see tree farming as a way of using these farming

plots productively while at the same time reducing the labour requirements that are associated with annual crop production. It is likely that the members of this group would be the most responsive to the provision of basic forestry development assistance like the supply of seedlings.

The 'doubtful foresters' have been named as such because their main concern with developing tree planting and management activities is the lack of support for these activities, in particular the need for knowledge about silvicultural practices. They are less experienced in forestry, with the lowest proportion of households who used public land materials in the past or in the present. Their lack of confidence in land management activities is highlighted by the fact that households in this group produce the lowest proportion of their own food requirements of any of the groups, and have the highest proportion of members that have attended training for agriculture in the past. Members of this group would be likely to respond to the development of robust silvicultural systems and the provision training about tree planting and management.

The final group with a high level of interest in developing commercial tree farming is the 'experienced foresters'. Members of this group have the greatest amount of experience with using materials from public land in the past and many continue to do so now. They also have the highest proportion of members that have participated in community forestry programs. It appears that most households in this group are accustomed to using forestry activities to support their livelihoods and would undertake forestry development on their own land if they thought that such activities would be commercially viable. They are the only group which rated the items in the scale 'commercial viability issues' higher than other potential constraints to tree planting and management. The issues of the time taken before trees may be harvested, difficulties in marketing timber, problems with policies relating to forestry and lack of labour to manage tree plantations are the most important constraints to commercial tree farming for households in this group. It is difficult for tree plantations to compete financially with the harvesting of trees from native forests due to the absence of set-up costs of native forestry and the relative availability of timber resources compared to the time taken for tree plantations to mature commercially. Households in the 'experienced foresters' group presently tend to be managing more non-premium species than premium species, those species that mature the fastest and are

easiest to distinguish as not coming from native forests. It could also be that they tend to grow a higher than expected proportion of non-premium species because they continue to access some of their premium species timber requirements from public land. The households in this group grow the highest proportion of their own food requirements; have relatively high cash incomes, plus a low reliance on farming for their income. With their experience in both farming and forestry, interest in forestry activities and relatively high incomes they would be likely to respond strongly to the development of stable markets for timber products.

CONCLUSIONS

In the above discussion the prospects for development of forestry by various types of households was assessed, with the conclusion that different types of households vary in their capacity to undertake forestry activities and in the types of forestry that would suit their needs. Given the types and number of socioeconomic characteristics that differ significantly between the cluster groups, together with the relationships between these differences and their present and intended tree planting and management behaviour, it is concluded that the cluster analysis solution does have predictive validity. The differences in tree planting management attitudes, behaviour and in socioeconomic characteristics are consistent with the findings of previous research into agroforestry, agriculture and forestry practices in the Philippines (Anular 1982, 1986; Belsky 1984; Ponce and Bangi 1988; Ngidlo 1990; de los Angeles and Ygrubay 1992; Sajise and Briones 1996; Nasayao and Zara 1997; Carandang and others 2000; Stark and others 2002), and consistent with the analyses of relationships between tree planting and management behaviour and socio-economic characteristics undertaken for the Smallholder Forestry study.

Together with predictive validity, it is concluded that the typology has practical utility as it improves the understanding of the variation in the socio-economic characteristics of households in rural communities. The cluster analyses and development of a typology further help to define and describe the felt needs and circumstances of various sectors in the community in a manner that will enable targeting of communication strategies and development activities to stimulate smallholder forestry in Leyte.

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