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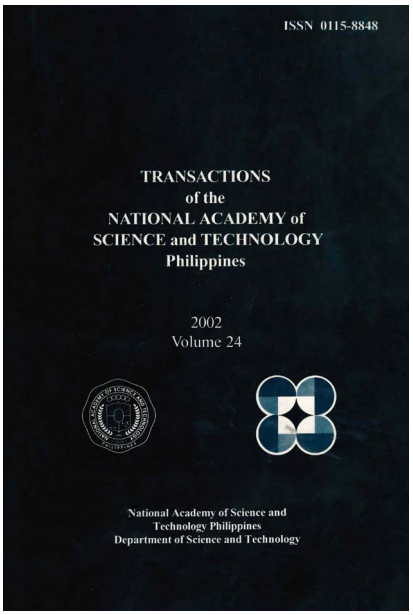

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THE USE OF *WEALTH RANK* AS AN EXPLANATORY VARIABLE IN A MODEL OF CULTIVATION DECISIONS AMONG HOUSEHOLDS IN BUFFER ZONE COMMUNITIES

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ABSTRACT

This paper discusses an evaluation of wealth ranks generated by a wealth ranking exercise as an explanatory variable in econometric analysis of farm and household factors affecting cultivation decisions among forest buffer zone communities in the Upper Manupali Watershed, Bukidnon, Philippines. Wealth ranks improved the explanatory power of the model of cultivation decisions, but not the model of access. However, wealth – both in monetary terms and in the terms implied by the wealth ranks - was not a major determinant of buffer zone access and cultivation.

Wealth rank descriptors indicate that initiative, attitude and community relations were also significant determinants of a household's decision to make investments in farming. As a tool that builds on local people's own understanding of their own circumstances, the paper shows that wealth ranks present an opportunity for analytical tools to capture an elaborate on the socio-cultural dimensions of household decision-making.

Keywords: wealth rank, econometric analysis, model of access, model of cultivation

INTRODUCTION

Wealth – as well as its nemesis, poverty, has long posed challenges in definition and measurement. Economics texts define wealth as the value of monetary and non-monetary assets, minus liabilities. Sometimes, it is loosely used to refer only to the value of all assets owned, and many of its components are denominated in money terms (Arnold, 1989). Local people also have their

own varied definitions. And, because subjective definitions vary considerably (Niehoff, 2001), money values may not always capture the nuances of the concept in specific socio-cultural contexts.

The selection of a variable or variables that can reflect as much of the subjective definitions as possible in specific contexts is an issue because poverty is difficult to address without an understanding of what it means to the communities and of what they value. Moreover, they can only be interested in interventions if they see that these actually relate to the poverty that they are experiencing.

In Participatory Research and Development, an array of tools for appraisal is available for qualitative assessment and diagnosis. Since these tools engage intended users of innovation, they are supposed to result in more relevant and responsive interventions.

The wealth ranking exercise developed by Grandin (1988) is a PRA tool that gives indications of how (economically) differentiated households are in a certain community. Moreover, it generates indicators of quality of life relevant to a specific community. Indicators, rather than the categories per se, are perhaps the more useful information for agricultural research and development, as they give insights into what people value and what they aspire for. But in so doing, they bring into the definition, elements that may not always lend themselves to monetization, and/or quantification. This is probably one of the considerations when IIRR (1998) chose to call the exercise 'socio-economic ranking'.

Since community members themselves define the ranks, there is some sense of confidence that it is a fairly realistic indication of real-time conditions. Gnagi (1998) went so far to say that the method is precise, because it proceeds from villagers' knowledge about their neighbors, using local categories of rich and poor, and not from external notions of poverty and poverty factors. Building on these observations, this presents an exploratory effort in the use of ranks as generated by the wealth ranking methodology (Grandin, 1988) as an explanatory variable in models of buffer zone access and cultivation.

This paper is part of an UPWARD-funded study in 1998 on farm-household characteristics affecting buffer zone cultivation in the Upper Manupali Valley in Bukidnon, the Philippines (Sister, 1999). The study sought to validate the hypothesis that a household's access to the buffer zones and decisions related to cultivation of buffer zone parcels are related to certain farm-household characteristics, economic factors and accessibility of the buffer zone. Among the economic variables considered in specifying the models, ranks (WRANK) were used as an alternative to the value of assets (WEALTH).

The study was limited to the municipality of Lantapan, which is the Philippines site of the USAID-funded Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program (SANREM-CRSP). Specifically, 18 *purok* or household clusters in the fringes of the

forest buffer zones were the study communities. All were under the political jurisdiction of only two villages: Songco and Kibangay, and were largely strongholds of Bukidnon cultural minorities, despite migrant settlement at the village proper.

The objective of this paper is to present an evaluation the use of ranks generated by the wealth ranking exercise developed by Grandin (1988) as an explanatory variable in models of forest buffer zone access and household decision-making on forest buffer zone cultivation.

MATERIALS AND METHODS

Sampling

One hundred seventy-six (176) households selected by systematic random sampling in each household cluster (purok) were interviewed regarding cultivation decisions in a total of 324 parcels. However, due to invalid data sets, only 198 parcels entered into the econometric analysis. Evaluation of secondary data preceded sites and sample selection.

Data gathering

Primary data on the study households were obtained by formal, instrument-aided interviews with available member(s) of each sample household. To measure the variable WEALTH, the sum of the values of household assets and properties, including livestock, were taken at current market prices. A basic assumption made in measuring the variable WEALTH is that the households have no liabilities. In effect, it was solely a measure of assets.

To generate ranks (WRANK) and their descriptors, six wealth ranking exercises were conducted with individual local key informants using the following steps (Vishwakiran and Shivaraja, 1990):

1. Preparation of a list of heads of all sample households in the village
2. Preparation of index cards sized 2" x 3" (approx.) were prepared
3. Labelling of cards with name(s) of householder(s)'s, so that all sample householders were represented in a set of cards

HH no. ___ (Village) HOUSEHOLDER(S)' NAME(S)	KI # Rank Remarks

4. Choosing of local/key informants, with whom the ranking exercises will be done individually
5. Choosing of a secluded venue for each exercise, to ensure that no other local persons are watching or advising
6. Ranking exercise: One at a time, each card was handed over to the informant, with the request to identify the household, in his/her own opinion, as poor, rich or somewhere in between. The informant was given the freedom to classify the households into any number of categories
7. Filing of cards into separate piles by informants
8. Review of piles/categories, to see if any cards needed to be moved to other categories, or if some categories may be merged
9. Description of each household by the key informant, noting why it is categorized as rich, poor, or somewhere in between
10. Taking down of short notes on the reasons for classification on each card
11. Preparation of categories-wise list after the interview
12. The process was repeated with the each of the other key informants

Data analysis

SPSS was used to obtain descriptive statistics, while the LIMDEP software developed by Greene (1985) was used in the estimation of the models of access and cultivation decisions.

The logit binary response model and the tobit truncated dependent variable model discussed by Maddala (1983) were used in regression analysis.

Model specification

Sixteen explanatory variables were used in each of the two models(Appendix 1). However, an evaluation of the robustness of the models was done to make a choice between WRANK and WEALTH.

Detection of data problems

An examination of the simple correlation coefficients (r) between all possible pairs of variables was done in order to make an initial assessment of the presence of colinearity. When such problems were detected, further assessment was done by evaluation of variance inflation factors (VIF), where a VIF value of 5 or more was used to indicate severe multicollinearity (Judge et al., 1988). Evaluation of the conditional indices (CI) generated by characteristic roots or eigenvalues was also done for further verification.

The Durbin-Watson test was used to determine the presence of autocorrelation in the tobit model.

Models estimation

The logit analysis was used to identify the determinants of access to forestlands, and to obtain probabilities under specific states of the explanatory variables. Tobit estimates helped explain the extent to which the various factors influence decisions involving parcel cultivation, namely: (1) the decision to cultivate, and (2) the extent or rate of cultivation. In both, models, Yi* defined by

$$Y_i^* = b'x_i + \mu_i$$

where: b is a k x 1 vector of unknown parameters
X_i is a k x 1 vector of known parameters
μ_i is a vector of residuals ~ N (0, s^2)

is unobservable. A dummy, Y_i, is used.
For the logit model, Y_i, is a dummy for ACCESS to buffer zone areas, and assumes the following 'values':

Yi = 1 if $Y_i^* > 0$ (the plot is a buffer zone parcel, indicating access)
= 0 if the plot is a non-buffer zone parcel

For the tobit model, the dummy Y_i is the RATE of cultivation, expressed as a ratio of cultivated area to total parcel area. Thus, it assumes values between 0 and 1 under the following conditions:

Yi = L_{1i} if $Y_i^* >$or= L_{1i}
= Y_i^* if $L_{1i} > Y_i^* > L_{2i}$
= L_{2i} if $Y_i^* <$or= L_{2i}

Slope decomposition of the tobit conditional means was done (McDonald and Moffitt, 1980) to derive the component elasticities.

Measures of predictive ability

Limited dependent variable models are estimated by the method of maximum likelihood. Hence, the indicator of predictive ability used was the Pseudo-R^2 described by McFadden (1974, as cited by Maddala, 1983) as:

$$\text{Pseudo-}R^2 = 1 - [\log (L_{max})/\log (L_o)]$$

Where:

L_{max} = maximum of the likelihood function when maximized with respect to all parameters (model estimated)

L_o = maximum of the likelihood function when all coefficients except the constant are set to zero

The proportion of correctly predicted observations was also used to give a further indication of predictive ability.

Increase in the Pseudo R^2 value and in the proportion of correct predictions were used as indication of improvement in the model's robustness.

The tobit model was evaluated by examination of improvement in the Adjusted-R^2 from the OLS R^2 where:

$$R^2 = 1 - (1-R^2)\,[(n-1)/(n-k)]$$

RESULTS AND DISCUSSION

The local concept of wealth

Wealth was found to be very difficult to define, much less translate accurately into the local dialect. Though there were approximate literal translations (Table 1), these were generally inadequate.

Table 1. Approximate translations of 'wealth' in the local dialect

Local term	Literal equivalent
Bahandi	Treasure
Katigayonan	Properties and capital assets, usually family property
Kahimtang	Standard of living
Kabtangan	Properties, generally pertaining to home furnishings, appliances, vehicle

While it was generally agreed that being wealthy is having a good amount of cash, there was also a consensus that there is more to wealth than money.

Local indicators of wealth

The local concept of wealth or well being of a household was found to be based on financial/material wealth, along with some non-pecuniary factors. Thus, it departs somewhat from the conventional or purely economic notion expressed in terms of monetary value of assets minus liabilities. Three categories

of indicators emerged: economic, personal/attitudinal and sense of community (Table 2).

Table 2. Categories of wealth rank indicators in the villages of Songo and Kibangay[1]

	Desirable	Undesirable
Economic	- Availability of cash income - Membership in local agricultural cooperative- - Land, house, appliances - Livestock (cow) - Diversified commercial farming - Other sources of income - Small business- hundreds of thousands of pesos in one cropping) - professionals/employed - vegetables production	- no home improvement - mainly wage laborer - subsistence production (corn) - native corn variety used
Personal	- good household management ability - relatively higher education	- have vices - lack household planning ability - lazy/indolent
Community/Social	- good reputation - active in community affairs - good community standing	- rarely participates in community affairs - rarely seen at the village proper

[1]Elicited from wealth ranking done in 1999 with six (6) key informants

A reliable source of income was an important economic indicator. This consists of ownership of the production activity and livelihood diversification through off-farm and non-farm activities. Since most are farmers, the household's capacity to undertake crop production was held in high regard. Gainful employment, land and other properties were also important economic indicators. In addition to the accumulation of money or properties, wealth was also determined by the possession of admirable personal attributes such as good community relations, good household management, a positive work attitude and education. Though these are difficult to convert into monetary equivalents, they are qualities of the "better" households, as they are perceived to give households a comparative advantage over others to advance economically.

For instance, the ownership of land is common. However, the proportion of it under cultivation is seen as indication of a household's initiative and industry. Hence, the community speaks well of those who rent additional land to cultivate.

Ranking of households according to local wealth criteria

The key informants felt that households that can be categorically called wealthy are not in the sample, although they are very few. Hence, those in ranks 1 and 2 are perhaps what may really be referred to as the local middle class. They generally own land and till it. They are able to generate more than enough for their subsistence, and often have multiple sources of income.

In the two lower ranks, 3 and 4, ancestral claims are common. However, many in these ranks were described as less interested in farming. The limited farm activities they engage in were focused on corn production for food. This allows them to engage in wage labor for immediate cash. A number do not take part in village affairs. There is also no evidence of home improvement and many were described as lazy and "content with sitting in a corner."

Those in rank 3 are able to earn some cash income, though barely enough for subsistence. Households in rank 4 are probably those that are truly poor. For households in this category, daily subsistence is very uncertain. Their lands, if there are any, have usually been leased or sold.

In general, vices, bad habits and character flaws particularly of the recognized household head could spell the difference between being in a higher or lower rank. Indulgence in drinking and gambling could bring an otherwise well off household down. Elevation to a higher rank could be a result of a display of traits that the community regards highly. An evidence of such traits is the effort put into the cultivation of lands that the household has access to.

Evaluation of the model of buffer zone access

Neither wealth nor wealth rank was a significant determinant of households' access to parcels within the buffer zones. However, the computed values of MacFadden's R2 for the final logit model were found to be high for binary response models (Parrilla, 1999, personal communication), indicating that the model is able to predict access to the buffer zones with the chosen set of variables fairly well. The high proportion of up to 88.38% correctly predicted responses (Table 3) corroborates this observation.

It was noted that the model's goodness-of-fit improved when the monetary variable WEALTH instead of the variable WRANK was used. Therefore, assets and properties seemed to attribute more to the model's ability to predict household access to buffer zone parcels, ceteris paribus. Since the largest areas reported were ancestral domain claims in forest areas, it appears that there is a link between forest access and controlling households in the local ethnic group.

Table 3. Comparison of logit model fit statistics when the varieties WEALTH and WRANK were used alternately to represent the economic status of households.

Model using WEALTH	Model using	WRANK
McFadden's R2	0.5187	0.512
%correctly predicted observations	88.38%	87.23%
Chi-square (w)	125.12**	118.99**

**significant at 1% level

Evaluation of the decision model

The tobit model of the extent of parcel cultivation had rather high adjusted R-squared values indicating that the model is well specified. Moreover, improvement in predictive ability was noted when WRANK instead of WEALTH was used (Table 4), although both were not found to be significant determinants of household cultivation decisions.

The tobit model represents actual effort and investment into the farming activity, as reflected in the extent of actual parcel cultivation. Thus, the results seem to indicate the importance of non-monetary factors that contribute to effort. That is, the decision to engage in crop production and the actual commitment of resources (labor and capital) are not only functions of access to physical capital or assets. Non-monetary factors are also important such as initiative and, perhaps, aspirations. Moreover, those in good social standing usually had access to credit and some forms of support from the local cooperative and their social networks.

Table 4. Comparison of tobit model fit statistics when the variables WEALTH and WRANK were used alternately to represent the economic status of households.

	Model using WEALTH	Model using WRANK
R^2	0.5887	0.599
Adjusted R^2	0.552	0.562
F-statistic	16.19**	15.98**

**significant at 1% level

Comparing wealth values across ranks

Comparing the average wealth values across the ranks (Figure 1), it may be noted that a rather thin margin of wealth values separate households in ranks 1 and 2. A similar observation may be made for wealth values of ranks 3 and 4. However, a considerable difference in mean WEALTH exists between ranks 2 and 3. This seems to indicate that there are only two basic wealth categories on the sole basis of material possessions or assets, which consist mainly of landholdings. Further differentiation seemed to be a result of non-material considerations of personal attitude and sense of community. Since the ranks made a difference in the model of cultivation decisions, it seems that these considerations bear on cultivation decisions, which reflect resource access and actual use.

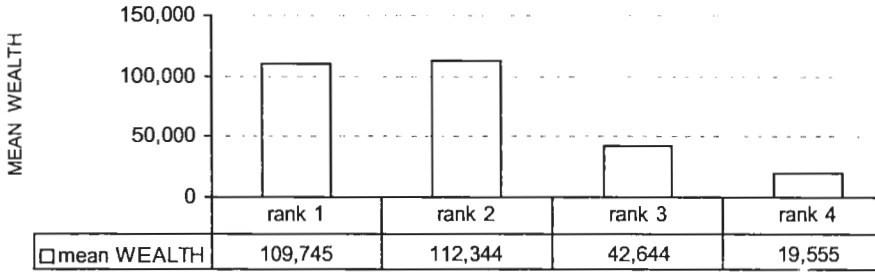
The results imply that program planning and policy interventions on natural resource management may have to take into consideration local perspectives of wealth in order to identify priorities in terms of what matters to the people most. This may prove to be crucial in poverty alleviation efforts, e.g., through enhanced livelihood opportunities, through enhancement and support for viable traditional resource management systems, and by improving local management capabilities. Furthermore, education as a tool for capacity development must also affirm traditional culture as a relevant aspect of present concerns.

CONCLUSIONS

Wealth ranking showed that personal attitude and social relations have significant bearing on household agricultural investment decisions in buffer zone communities. In the case presented, wealth ranks provided a useful alternative to valuing assets, capturing non-monetary considerations in explaining/predicting household decisions regarding investment in agricultural activities. Such opportunities must be further explored and evaluated against more conventional methods of measurement, not for discrediting one in favor of the other; but rather, to have a wider range of analytical tools that can be used towards a better understanding of processes studied.

Gnagi (1998) warns that the wealth ranking methodology is vulnerable to manipulation. Yet, the insights it yields and the relationships it reveals may otherwise be less explicit in more conventional data. Hence, the importance of care in the conduct of wealth ranking exercises and in critical assessment of the information generated cannot be over emphasized. Only then can a systematic dialogue between farmers and scientists proceed to solve agricultural problems.

Figure 1. Mean wealth values computed for all households classified under each wealth rank.



Kibangay village	Not really much money; own land; well-managed farms and households; non-farm and off-farm income sources	Have lands, lack capital; own house; farmer-cultivators	Subsistence corn production may own land, but lack initiative; not so industrious	Subsistence native corn production; lack initiative; content with "native life-style"; not interested in farming; prefer quick cash income from wage labor
Songco village	Vegetable producers**; very hardworking; farmer-cultivator, not necessarily land owners	Own house; some home properties; fish-eaters*	No home improvement; no community involvement; may/may not own land, house or cow; poor planning and budgeting; wage laborers; difficulty in sending children to school	No reliable souce of income; relies on seasonal wage labor; household food scarce, mainly vegetables produced by neighbors; shabby home and clothes; difficult situation aggravated by lack of initiative

* implies availability of cash for food not produced by the household

** associated with high income levels at optimal conditions, and access to capital

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APPENDIX

Definition of explanatory variables

x1	RES	Number of years that the household head has been on residence in the village
x2	EDU	Number of years of formal education of the household head
x3	LABF	Number of household members aged 16 to 65 years
x4	YOTHER	Income from off/non-farm sources and from perennials (pesos/hectare)
x5	AREA	Parcel area (hectares)
x6	APREVCUL	Areas cultivated in last cropping in hectares
x7	LAND	Aggregate area of parcels owned (formally or informally) by the household
x8	HIWAY	Distance of parcel from the highway or any point accessible to a transport vehicle, in minutes of travel time on foot
x9	YBPROP	Ratio of income from farms near/inside the forest buffer zone to total income from all (annual/high valued) crop production activities

x10	PRODN	Total value of crop produced (sold, consumed, seed) in pesos/hectare
x11	PROPCONS	Ratio of the value of product consumed/kept for seed to value of total production
x12	ENVEX	Dummy for exposure of household head to environmental information1=exposed 0=unexposed
x13	ETH	Dummy for ethnic affiliation of household head1=lumad 0=dumagat
x14	PUROK	Dummy for location of household relative to the buffer zone based on purok1=purok near/inside the biffer zone0=in the vicinity of the village proper or >3 km from the buffer zone
x15	HETH	Ethnic affiliation of the household in terms of lifestyle and agricultural practice1=lumad/indigenous 0=dumagat/ migrant
x16	WEALTH WRANK	Monetary value of a household' properties or assets (pesos) wealth rank of the household, by local standards (generated by wealth ranking exercises with local key informants)1=rank 1 (wealthiest) 2=rank 2 3=rank 3 4=rank 4 (poorest)