ON TERRITORIAL CONTROL AND CONSERVATION BEHAVIOR: SOME PRELIMINARY FINDINGS */

by

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INTRODUCTION

Many believe that a stable, sustainable, productive and socially acceptable form of upland farming system could be attained only under the condition of a secure land tenure system. Without secure long-term rights to land, farmers would not have the incentive to plant trees and other perennial crops which are necessary to improve upland conditions (Madigan, 1967, as cited by Guthrie, 1976; Fujisaka, 1986; Sajise, 1987; and Pingali, 1991).

Insecurity of tenure has also been hypothesized as an institutional obstacle to conservation (Lee, 1980). In fact, findings in various studies on soil erosion in the United States revealed that soil degradation is more prevalent in areas with tenurial problems (Frey, 1952; Held and Timmons, 1958; Blase and Timmons, 1961; and Hauser, 1976). Pingali (1991) added that in the humid tropics, where uncertain ownership or tenure prevents the planting of trees, degradation is most likely to occur.

Similarly, production activities are held at the minimum in areas suffering from tenurial problems. Cohen (1979) observed that food production dropped when the terms of the reform law were unclear, for "farmers tend to avoid investing in land they may not hold at harvest time."

While many researchers point out the relevance of tenurial security on conservation and productivity, no empirical study has been done yet in the Philippines to prove this. It is for this reason that a study of this sort was conducted in the highlands of the Cordillera region.

MATERIALS AND METHODS

For a period of one month, interviews were conducted in six highland communities in Benguet Province to determine if there is any relationship between conservation behavior and forms of territorial control. Subjects of the study were the recipients of various territorial control schemes, namely: Free Patent (FP),

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Certificate of Land Ownership Award (CLOA), Certificate of Ancestral Land Claim (CALC), and Certificate of Stewardship Contract (CSC). A group of squatters (SQ) from each site were also interviewed.

Using a purposive sampling technique, a total of 172 upland farmers were interviewed, broken down as follows:

	Site/Territorial Control	Number
a.	Barangay Loo, Buguias (for Free Patent)	32
b.	Barangays Ambassador and Caponga, Tublay (for CLOA)	35
c.	Barangay Ekip, Bokod (for CALC)	35
d.	Barangays Poblacion and Loakan, Itogon (for CSC)	33
e.	All of the above sites (for SQ)	37
	Total	172

Because of some incomplete answers, 5 respondents however were excluded in the final analysis, thereby reducing the actual number of respondents to only 167.

Focused of interviews were on: (a) conservation behavior; (b) perception of territorial control and attitude towards territorial documents/status; (c) socio-economic-demographic characteristics; (d) physical/ geographical attributes; (e) socio-psychological factor; (g) exposure to GO and NGO; and (f) problems faced and solutions recommended.

All these variables were analyzed using both descriptive and inferential statistics. Specifically, for conservation behavior, factor analysis was used in reducing its number into a more manageable level. Similarly, correlation analysis was employed in reducing the number of intervening variables pitted with conservation behavior factors. After which, series of regression analyses were done.

PRELIMINARY FINDINGS

Six conservation behavior factors were actually obtained after the factor analysis. The most significant so far is the "Farming System" factor or dimension. This will be the focus of discussion in this paper.

"Farming System" Dimension

Table 1 shows the means of the seven variables comprising the farming system dimension and their distribution according to forms of territorial control. Here, it can be gleaned that the CSC farmers plant the most number of agricultural crops at an average of 8.36 while CLOA has the lowest average at 4.2 crops. CALC and SQ have an almost identical number at 5.6 and 5.4, respectively.

FP farmers plant also a small number of crops at an average of 4.5. This is probably due to their heavy concentration on commercialized farming of potato, cabbage, pechay Baguio and Wombok.

The relatively higher number of plants for the CSC group could be attributed to their exposure with DENR technicians and community workers who usually provide free planting materials during their seminars and trainings.

Again, the CSC has the highest average for the number of animals raised in the farm at 2.12 animals. This is followed by the CALC group at 1.5 animals, then by the SQ at 1.2, then by FP at 1.00, and finally by CLOA at 0.88 animals.

This can also be attributed to the recent program of the government where distribution of livestock to upland farmers was done.

While it is not surprising for CSC to have the most number of conservation structure put up in terms of averages, the squatters perform amazingly well in this sector when they install an average of 2.08 structures. This is a record that even surpassed the performances of FP (1.66), CLOA (1.65) and CALC (1.63).

Thus, there is a strong indication that the installation of conservation structure is not affected by tenurial status. What probably encourage the squatter to have these structures is the "need" for them. In short, this is necessary for them to produce enough from their farm. So far, the most common conservation structures put up in the area are rip-raps and terraces.

In terms of animals and cropping combination, still the CSC has the best performance. The average value of 3.90 means that they have in their farm a combination of short-term, perennial, and to some extent permanent forest species. Lower scores for the rest of the tenurial statuses, on the other hand, mean that they grow only short term crops and very seldom they combine these with trees and animals.

The rest of the data tell practically the same story in terms of manifestation of conservation behavior through the practice of a particular farming system. Again, SQ performs amazingly well despite their "unstable" tenurial status. This somehow indicates that tenure really does not influence the practice of conservation-oriented farming system (Table 1 and Fig. 1).

Regression Analyses

Three forms of territorial control have significant ß coefficients when matched with farming systems dimension. These are: Free Patent (-0.653); Certificate of Land Ownership Award (-0.598); and Certificate of Stewardship Contract (0.461) (Table 2).

The same table also shows that it has a highly significant F-value of 8.259 which means that these ß coefficients vary and therefore could account for some variability in farming system. R^2 however implies that only 14.90% of the changes in this dimension could be explained by the above variables.

In running the second set of regression analysis, i.e., ATC and ATCT, no variable is found significant (Table 3). Other variables might have greater influence on this factor.

For the third step, there are 13 intervening variables matched with this dimension namely: SACT, NCFI, RCFI, NMF, WEOA, WMOA, ATOC, NLL, EALL, SOT, NPAC, SI, and ANP.

Regression analysis in Table 4 shows that only two of these 13 intervening variables are found significant. These are ATOC and RCFI with ß coefficients of 0.252 and 0.121, respectively.

Analysis of variance reveals that the combination of these intervening variables however could meaningfully effect changes in farming system as indicated by its highly significant F value of 5.914. As much as 27.8% (R^2 - 0.278) could be explained by these variables.

In the final regression analysis, all the variables, except for CSC, matched with this factor behave significantly, to wit: SQ with ß coefficient of -0.562; FP with ß coefficient of -0.660; CLOA with ß coefficient of -0.368; RCFI with ß coefficient of 0.150; and ATOC with ß coefficient of 0.315. T values indicate that these coefficients are not equal to zero, meaning they are significant (Table 5).

It is quite ironic to note that despite the relatively good performance of CSC respondents in the farming system dimension as shown in Fig. 1 and Table 1, it turns out that these do not suffice a truly significant conservation-oriented farming system.

Compared to the recipients of other territorial schemes, the CSC farmers seem to perform "below par" when a truly sustainable farming system is used as gauge. Table 1 shows that despite its good performance, e.g., in CP where they planted an average of 8.36 crops compared to only 5.68 average of SQ and 4.5 of FP, this performance is still low to warrant a truly sustainable practice. The FP farmers can afford to practice a more commercialized type of vegetable farming

because of the high demand for potato and beans and their relatively secure tenurial status. The SQ group, on the other hand, is also expected to concentrate more on monocropping of high-valued vegetables like cabbages and pechay than engaging in a multi-cropping of short term and perennial crops because of the immediate return it provides. The squatters, of course, cannot afford to wait a long time because of their relatively unstable tenurial status. Yet despite this, the FP farmers and SQ still plant both a combination of the above short term and perennial crops. Also, data in Table 8 support the relatively significant relationship of FP and SQ with farming system and the insignificance of CSC. Here, it shows that CSC is highly dependent on commercial products which is completely in contrast with the requirements of a sustainable farming system. The FP and SQ, on the other hand, have minimal dependence, thus, making them "somehow" support a conservation-oriented cropping system. The high preference for monocropping of commercial crops would probably account for the negative ß coefficients of SQ and FP, and, to some extent, the CLOA group. Similarly, the insufficiency of CSC's performance of acceptable and sustainable upland farming system, despite the assistance and exposure given by GO & NGO, explains also the non-significance of its ß coefficient.

With regard to other explanatory variables, RCFI and ATOC are both found to have significant ß coefficients when regressed against farming system dimension. Tables 6 and 7 explain this by showing that both variables exhibit a similar trend of respondents' distribution in terms of perception of relevance of credit and financial institutions as well as in the level of attendance to conservation trainings. Both have positive linear relationships. In these tables, it shows that those who have low perception of relevance of credit/financial institutions tend to exhibit also a low level of farming system. Those with high level of perception perform a high level of farming system. This pattern of relationships is found significant at Pearson Chi-square value of 17.761.

In similar manner, respondents who attended more trainings on conservation also exhibit a high degree of farming system. Those with low attendance manifest a low level of farming system practice. Again, the Pearson Chi-square value of 45.370 which is highly significant at 99% confidence level confirms this linear relationships.

In order to test the significance of differences of ß coefficient values, an analysis of variance was run and Table 5 indicates that indeed there is significant differences existing among variables. This is even strengthened by the F value of 18.250. This means also that the six variables are capable of accounting a meaningful part of changes in farming system. Its R^2 value of 0.342 means that it could explain as much as 34.20% variability in this dimension.

PRELIMINARY IMPLICATIONS AND RECOMMENDATIONS

Of the 5 territorial schemes studied, CALC and CSC are expected to perform the best upland farming system because of their relatively more exposure with DENR conservation agents. In the case of CSC, Integrated Social Forestry Projects are very active in their areas while for CALC, the contract reforestation is notable. However, it turns out to be the opposite. Data shows that CSC and CALC are low users of organic fertilizers and heavy users of commercial inputs (Table 8 and 9). This behavior is completely in contrast with what DENR and ISF project technicians are advocating. This means that it is not exposure alone. The kind of training and

the degree of knowledge assimilation have an influence on the promotion of right conservation attitude.

In terms of putting up conservation structures, CSC and SQ farmers perform much better than FP, CLOA and CALC farmers. This is an indication that tenurial status has nothing to do with farming system conservation behavior.

In the light of the above preliminary findings, extension campaign on conservation must be strengthened. There should be more trainings on conservation in order to ensure a more successful and viable farming systems in the uplands.

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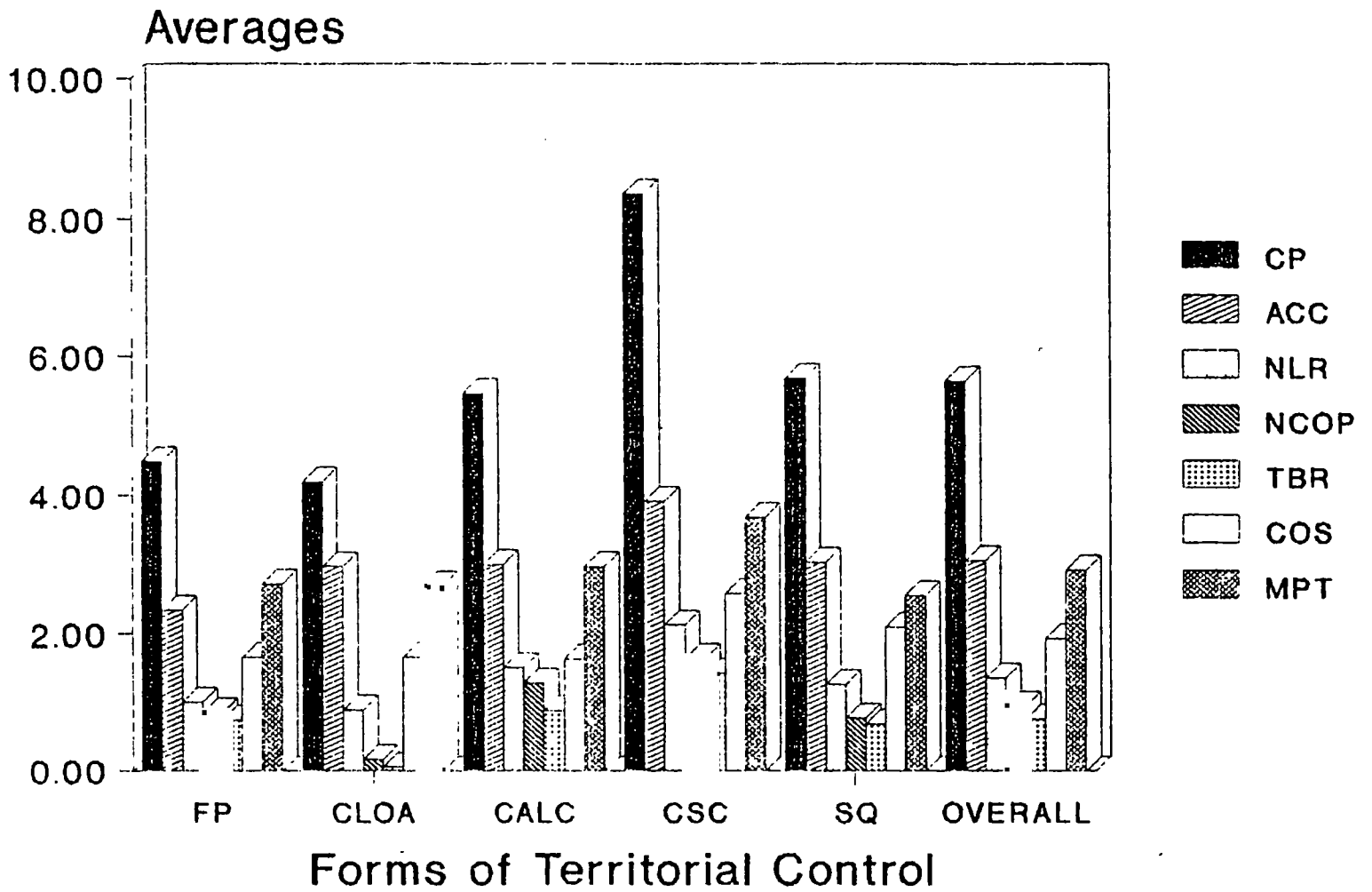

Fig. 1 Graph of means of "Farming Systems" dimension variables against forms of territorial control

Table 1. Means of "Farming System" variables by forms of territorial control

	FORMS					
VARIABLES	**FP**	**CLOA**	**CALC**	**CSC**	**SQ**	**OVERALL**
CP	4.50	4.20	5.46	8.36	5.68	5.64
ACC	2.34	2.97	3.00	3.90	3.02	3.05
NLR	1.00	0.88	1.50	2.12	1.25	1.35
NCOP	0.84	0.17	1.28	1.63	0.77	0.94
TBR	0.75	0.05	0.87	1.42	0.68	0.75
COS	1.65	1.65	1.62	2.57	2.08	1.91
MPT	2.71	2.68	2.96	3.66	2.54	2.91

Table 2. **Analysis of Variance. Test for significance of regression of "Farming Systems" dimension on different forms of territorial control (N = 167)**

SOURCE	DF	SS	MS	F-Ratio	P
REGRESSION	4	28.117	7.029	8.259	0.000
RESIDUAL	162	137.883	0.851		

FORMS OF TERRITORIAL CONTROL	ß COEFFICIENTS	T	P (2 TAIL)
FREE PATENT (FP)	-0.653	-2.893	0.004
CERTIFICATE OF LAND OWNERSHIP AWARD (CLOA)	-0.598	-2.710	0.007
CERTIFICATE OF ANCESTRAL LANDS CLAIM (CALC)	-0.111	-0.491	0.624
CERTIFICATE STEWARDSHIP CONTRACT (CSC)	0.461	2.060	0.041
SQUATTING (SQ)	0.180	1.157	0.249

$R^2 = 0.149$

Table 3. Regression of "Farming Systems" Dimension and Perception of (ATC) and Attitude Towards Territorial Control (ATCT)

INDEPENDENT VARIABLES	FORMS OF TERRITORIAL CONTROL					
	FP	CLOA	CALC	CSC	SQ	ALL FORMS COMBINED
CONSTANT	(-1.197) ns	(-0.043) ns	(0.676) ns	(1.517) ns	(1.747) ns	(2.041) *
ATC	(0.076) ns	(0.460) ns	(-2.375) *	(0.965) ns	(0.909) ns	(-1.437) ns
ATCT	(1.378) ns	(-0.631) ns	(0.886) ns	(-1.263) ns	(-1.898) ns	(-0.873) ns
F-Ratio	0.979 ns	0.315 ns	2.820 ns	0.887 ns	1.965 ns	2.847 ns
R^2	0.000	0.000	0.105	0.000	0.054	0.022
N	32	35	32	33	35	167

( ) Figures in parenthesis indicate T-values
** Significant at = 0.01 level
* Significant at = 0.05 level
ns Not significant

Table 4. **Analysis of Variance. Test for significance of regression of "Farming Systems" dimension on intervening variables**

SOURCE	DF	SS	MS	F-Ratio	P
REGRESSION	13	55.518	4.271	0.914	0.000
RESIDUAL	153	110.482	0.722		

INTERVENING VARIABLES	ß COEFFICIENTS	T	P (2 TAIL)
CONSTANT	-1.221	-2.279	0.024
SACT	0.010	0.757	0.450
NCFI	-0.005	-0.053	0.958
RCFI	0.121	3.057	0.003
NMF	-0.083	-0.927	0.357
WEOA	0.095	1.083	0.281
WMOA	-0.031	-0.306	0.760
ATOC	0.252	2.010	0.046
NLL	0.181	1.274	0.204
EALL	-0.062	-1.056	0.293
SOT	-0.002	-0.036	0.971
NPAC	0.181	1.479	0.136
SI	-0.005	-0.120	0.905
ANP	-0.070	-0.683	0.496

$R^2 = 0.278$

Table 5. **Analysis of Variance. Test for significance of regression of "Farming System" dimension on combined independent and intervening variables**

SOURCE	DF	SS	MS	F-Ratio	P
REGRESSION	5	60.050	12.010	18.250	0.000
RESIDUAL	161	105.950	0.658		

COMBINED VARIABLES	ß COEFFICIENTS	T	P (2 TAIL)
SQ	-0.562	-3.771	0.000
FP	-0.660	-3.733	0.000
CLOA	-0.368	-2.120	0.036
CSC	0.004	0.022	0.982
RCFI	0.150	4.390	0.000
ATOC	0.315	4.342	0.000

$R^2 = 0.342$

Table 6. Distribution of respondents by level of practice of farming system and perception of the relevance of credit and financial institutions

	PERCEPTION			
LEVEL	**LOW**	**MEDIUM**	**HIGH**	**TOTAL**
LOW	24	16	20	60
MEDIUM	12	14	30	56
HIGH	6	9	36	51
TOTAL	42	39	86	167

Pearson Chi-Square = 17.761 **

** Significant at = 0.01 level

Table 7. Distribution of respondents by level of practice of farming system and level of attendance to trainings on conservation

	LEVEL			
LEVEL	**LOW**	**MEDIUM**	**HIGH**	**TOTAL**
LOW	52	3	5	60
MEDIUM	36	11	9	56
HIGH	14	11	26	51
TOTAL	102	25	40	167

Pearson Chi-Square = 45.370 **

** Significant at = 0.01 level

Table 8. **Means of "Commercialization" variables by forms of territorial control**

	FORMS					
VARIABLES	**FP**	**CLOA**	**CALC**	**CSC**	**SQ**	**OVERALL**
DCF	1.59	1.48	1.56	2.54	1.94	1.82
DCP	1.25	1.02	1.62	2.66	0.74	1.46

Table 9. **Means of fertilization dependency variables by forms of territorial control**

	FORMS					
VARIABLES	**FP**	**CLOA**	**CALC**	**CSC**	**SQ**	**OVERALL**
FOF	3.00	3.32	1.21	2.24	3.31	2.62
DOF	3.59	3.77	1.53	2.60	2.60	2.82
FCF	3.65	8.74	2.18	2.70	6.75	4.80