

SOCIAL AND ECONOMIC FACTORS ASSOCIATED WITH FARM LEVEL TECHNOLOGY IN CARABAO RAISING

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ABSTRACT

The study dealt with the general characteristics of the respondents, existing management practices employed, some socio-economic factors associated with carabao raising, and the gap between the recommended and existing management practices in carabao raising in Iloilo, Bohol and Leyte.

Generally, the respondents were farmers in their late forties, predominantly male, mostly married and fifth graders who were engaged in carabao raising for more than 20 years. Rice-, corn-, coconut-, sugarcane-, rootcrop- and vegetable-based farming systems were practised in the three locations with rice-based farming as the most widely used.

Most of the carabaos raised were intended primarily for draft purposes. The native strain was the most predominant among the breeds raised. Several management practices such as tethering, wallowing, feeding soilage, confining, castration, breeding and training for draft were employed.

Adoption of recommended practices was associated with tribe, number of persons involved, beliefs, years in carabao raising, peace and order condition, number of animals raised, gross income, distance to market, types of road, and number of animal days.

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KEY WORDS: Carabao raising. Socio-economic factors. Technology level.

INTRODUCTION

The contribution of the carabao to the farmer's household income can not be overlooked. The carabao is highly valued for its usefulness as draft animal and for its meat, milk, hide and horn. However, carabao production in the country is still primitive and operates at a subsistence level.

The Bureau of Agricultural Economics (1981 as cited by PCARRD, 1983) reported about 2.7 million carabaos in the country but only 19 percent in the Southern Tagalog and the Bicol regions. Despite the increase in the use of machines to replace the carabao in land preparation during the last 10 years, there has recently been a shift in the preference of small farmers because of increasing oil cost.

Backyard farmers contribute more than 90 percent of the carabao production in the country (MA, 1979). It was observed that the level of carabao technology is very low and the farmers themselves acknowledge the need to improve management practices and to increase production.

This study was conducted to determine and compare the existing technology level and the socio-economic factors associated with carabao raising, and to measure the gap between the existing and the recommended management practices in carabao raising.

METHODOLOGY

The study was conducted in the three regions of the Visayas particularly in the provinces of Iloilo, Bohol and Leyte which represent Regions 6, 7

and 8, respectively. Selection of representative provinces for each region was based on the carabao population, and peace and order condition in the area. Three hundred fifty three carabao raisers were interviewed from the three representative provinces (115 from Iloilo, 120 from Bohol and 118 from Leyte).

Secondary data were gathered from the provincial offices to determine the five leading carabao-producing municipalities. From each municipality, two barangays and 10 to 12 sample carabao raisers from each barangay were selected using the simple random technique. The carabao raisers were further stratified by farm size and crop raised.

Aside from simple tabular analysis, the nonparametric statistics method of analysis was employed. The chi-square test was used to determine the independence of the different factors affecting the decision making of various farmers' group. It was assumed that both the innovative and non-innovative farmers differed in some socio-economic characteristics.

Data on the physical, biological, socio-economic and other related information relevant to the study were gathered through personal interviews using pretested questionnaires.

RESULTS AND DISCUSSION

General Characteristics of the Carabao Raisers, Farming System and Farm Size

The selected characteristics of 353 carabao raisers from the three provin-

ces of the Visayas namely Iloilo, Bohol and Leyte are presented in Table 1. On the average, the respondents had an educational attainment of grade five, 26 years of farming experience, and 23 years experience in carabao raising. Leyte respondents fell below these averages while respondents in Iloilo were older than the rest.

About 90 percent of the respondents were married and 51 percent had no other occupation besides crop farming. As to tenure, 44 percent were share tenants, 37 percent were owner cultivators, 16 percent were lessees, and 2 percent were amortizing owners. Most farmer respondents in Iloilo and Bohol were owner cultivators while those in Leyte were mostly share tenants.

Six types of farming systems were practised by the respondents (Table 2). Three hundred twenty respondents were rice-based farmers, 22 corn-based, 5 vegetable-based, 3 coconut-based, 2 rootcrop-based, and 1 sugarcane-based. Forty-six percent of the respondents have small farms (less than 1 hectare), 45 percent have medium farms (1.1 to 3 hectares), and 9 percent cultivated large farms (more than 3 hectares).

Generally, Iloilo respondents cultivated medium-sized rice farms while Bohol and Leyte respondents cultivated small-sized rice-based farms. Corn-based farming was generally done on a medium-scale.

Carabao Acquisition and Disposal

Generally, carabaos were acquired and raised mainly for draft. Of the total 615 carabaos raised, 583 (95%)

were raised solely for draft while only 32 (5%) were for multi-purpose use (Table 3). This was expected since most farmers cultivated small and medium-sized farms where the animal was a cheap source of power for farm operations. The Ilongos raised carabaos for draft only while some Boholanos and Leyteños utilized the animals for milk and breeding.

Two hundred twenty three (36%) of the carabaos owned by farmers were offspring of the parent carabaos, 217 (35%) were purchased, and the rest were acquired through inheritance, exchange of crops produced, and as mortgage or share for taking care of a caracow. Most Ilongos obtained their carabaos through rearing caracows while most Boholanos and Leyteños purchased their carabaos.

Most of the carabaos were in good and fair state of health. The indispensability of these working animals in both on-farm and off-farm activities motivated the farmers to provide proper health care measures to their carabaos. Carabulls were found to be younger (6 to 8 years old) than the caracows (6 to 12 years old). Generally, carabaos in Iloilo were older than those in Bohol and Leyte. The most common breed of carabao raised was the native type.

Most carabaos were found in small and medium-sized farms. The average value per animal was ₱ 1,799.00. Farmers usually sell or slaughter excess carabaos or those which are no longer useful for off-farm or on-farm activities. Rare cases (only 9) of carabao death due to undetermined diseases were noted.

Characteristic	Province				Average/Frequency	No.	Percent	No.	Percent	No.	Percent
	Iloilo (n=115)	Bohol (n=120)	Leyte (n=118)	All Provinces (n= 353)							
Age in years	51	48	48	49							
Years in school	5	5	4	5							
Years in farming	25	29	24	26							
Years in carabao raising	24	24	20	23							
Civil Status											
Single	5	2	11	18	1.67	4.35	11	9.32	18	5.10	5.10
Married	103	112	102	317	93.33	89.56	102	86.44	317	89.80	89.80
Widow/widower	6	6	5	17	5.00	5.22	5	4.24	17	4.82	4.82
Separated	1	—	—	1	—	0.87	—	—	1	0.28	0.28
Total	115	120	118	353	100.00	100.00	118	100.00	353	100.00	100.00
Source of income other than crop farming											
None	41	62	78	181	51.68	35.65	78	66.10	181	51.27	51.27
Livestock	31	10	6	47	8.33	26.96	6	5.08	47	13.31	13.31
Fishing	0	4	4	8	3.33	0.00	4	3.39	8	2.27	2.27

Table 1. Continued . . .

Characteristic	Province				All Provinces (n=353)
	Iloilo (n=115)	Bohol (n=120)	Leyte (n=118)		
Salary/wages/pension	16	3	5	24	6.80
Buy and sell	8	18	9	35	9.92
Cottage industry	2	7	0	9	2.55
Others ¹	17	16	16	49	13.88
Total	115	120	118	353	100.00
Tenure status					
Share tenant	35	44	79	158	44.76
Lessee	34	5	16	55	15.58
Amortizing owner	2	0	6	8	2.27
Owner-cultivator	44	71	16	131	37.11
Landlord	0	0	1	1	0.28
Total	115	120	118	353	100.00

¹ Others include carpentry, poultry production, tuba gathering, etc.

Table 2. Farming systems practised by 353 carabao raisers based on farm size.¹

Farming System	Iloilo (n=115)			Bohol (n=120)			Leyte (n=118)			All Provinces (n=353)			Total (n=353)
	S (n=42)	M (n=65)	L (n=8)	S (n=54)	M (n=51)	L (n=15)	S (n=65)	M (n=42)	L (n=9)	S (n=163)	M (n=158)	L (n=32)	
Rice-based (n=320)	34.78	55.65	6.09	40.00	36.67	10.00	51.69	29.66	7.63	42.21	40.51	7.93	90.65
Corn-based (n=22)	—	—	—	3.33	4.17	1.67	3.39	5.93	—	2.28	3.40	0.57	6.25
Coconut-based (n=3)	—	—	—	—	0.83	0.83	0.85	—	—	0.28	0.28	0.28	0.84
Sugarcane-based (n=1)	—	—	0.87	—	—	—	—	—	—	—	—	0.28	0.28
Rootcrop-based (n=2)	—	—	—	0.83	0.83	—	—	—	—	0.28	0.28	—	0.56
Vegetable-based (n=5)	1.74	0.87	—	0.83	—	—	0.85	—	—	1.14	0.28	—	1.42
Total	36.52	56.52	6.96	44.99	42.50	12.50	56.78	35.59	7.63	46.19	44.75	9.06	100.00

(In Percent)

¹ Classification of farm size:

S = Small (1.0 ha. & below)

M = Medium (1.1 ha. - 3.0 ha.)

L = Large (3.1 ha. & above)

Table 3. Continued . . .

Item	Iloilo			Bohol			Leyte			All Provinces			Total/Ave.	
	S	M	L	S	M	L	S	M	L	S	M	L		No.
Breeds of carabao raised														
Native	62	105	21	75	87	37	107	67	19	244	259	77	580	94
Murrah	-	-	-	-	1	4	-	-	-	-	1	4	5	1
Crossbreds	-	-	-	6	4	5	-	-	-	6	4	5	15	2.5
Others ³	-	2	5	2	3	2	1	-	-	3	5	7	15	2.5
Total	62	107	26	83	95	48	108	67	19	253	269	93	615	100
Number of carabao raised	62	107	26	83	95	48	108	67	19	253	269	93	615	100
Total value of carabao raised (P)	113925	219960	50850	141200	148450	61500	195300	133900	41500	450425	502370	153850	1106535	
Average value of carabao raised (P)	1838	2056	1956	1701	1562	1281	1808	1998	2184	1780	1867	1654	1799	
Number of carabao sold	1	4	7	3	1	2	5	3	1	9	8	10	27	100
Average value of carabao sold (P)	1300	1733	2336	1600	1200	850	1240	1833	1000	1380	1589	1385	1455	
Number of carabao lost/died	-	1	-	1	2	-	2	2	1	3	5	1	9	100
Average value of carabao lost/died (P)	-	1200	-	1200	1600	-	2350	600	300	1775	1133	300	1069	
Number of carabao eaten	-	-	1	-	-	-	-	-	-	-	-	1	1	100
Average value of carabao eaten (P)	-	-	3000	-	-	-	-	-	-	-	-	3000	3000	

¹ Any combination of draft, meat, milk and breeding.² Prize from a raffle draw, mortgage, share from taking care of other caracows, "inalimahen".³ Upgrade, Cambodian

Existing Management Practices

The different management practices employed by the carabao raisers are presented in Table 4. Carabaos were often brought to the wallowing pond, tethered or herded, and given drinking water. Many carabaos used for draft (79%) were registered and marked for identification. About 65 percent of the farmers gave feed supplements and others made their carabaos available for breeding. Other management practices observed were deworming, feeding soilage, confining and shaving hairs. No respondent gave commercial feed concentrates to carabaos and very few milked their caracows. The reasons for not giving feed concentrates were the availability of enough native grasses for pasture and unavailability of money to buy concentrates.

In determining the gap, the farmer was given a minimum score of 1 if he did not adopt a certain recommended practice and a maximum score of 3 if he employed the practice. The overall outcome based on the response of all respondents is presented in Table 5.

A maximum gap of 2 was noted in feeding concentrates indicating that it was not practised. There was a zero gap for tethering/herding and wallowing because everyone practised these.

Socio-economic Factors Associated with Carabao Raising

To ascertain what possible variables could explain the variation in adoption score, multiple regression analysis was done (Table 6).

The dummy variable for Bohol and Leyte showed a negative and significant influence on adoption of technology in carabao raising. This implies that the respondents in Bohol and Leyte were less innovative compared to those in Iloilo. Moreover, Iloilo farmers tended to adopt more recommended technology than the farmers in Bohol and Leyte probably because Ilongo farmers were older, more experienced and more dependent on livestock raising as a secondary source of income.

The type of farm cultivated did not influence the farmer's response to technology in carabao raising since the farmers used carabaos as source of farm power regardless of whether the farm was irrigated or not. Likewise, farm size has no influence on technology adoption. On the other hand, tenure status influenced the mode of adoption with leaseholders as better adopters of new technology.

A chi-square analysis of the relationship between technology adoption and some socio-economic variables is summarized in Table 7. The statistical test showed that sociological factors such as tribe, beliefs, number of persons involved in taking care of carabaos, years engaged in carabao raising, and peace and order condition together with economic factors such as total number of animals raised, gross income, distance to market, types of road, and number of animal days influenced the adoption of technology in carabao raising. The analysis showed that the Ilongos were more innovative than the Boholanos and Leyteños for the reason mentioned earlier. Farmers

Table 4. Different management practices adopted by the carabao raisers based on farm size, Visayas.

Management Practices ¹	All Provinces							
	S (n=163)		M (n=158)		L (n=32)		Total (n=353)	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Feeding concentrates	0	0	0	0	0	0	0	0
Feeding soilage/dry roughage	66	40	74	47	10	31	150	42
Tethering/herding	163	100	158	100	32	100	353	100
Giving water	152	93	150	95	31	97	333	94
Wallowing	163	100	158	100	32	100	353	100
Confining	56	34	73	46	10	31	139	39
Cleaning the place where the animals are confined	40	24	41	26	8	25	89	25
Registering, making identification marks	120	74	130	82	28	88	278	79
Castrating	21	13	43	27	6	19	70	20
Dehorning	23	14	12	8	5	16	40	11
Shaving hair, clipping the switch, trimming the hoofs	62	38	43	27	10	31	115	33
Deworming	78	48	62	39	20	62	160	45
Culling/selection	24	15	27	17	5	16	56	16
Breeding	96	59	93	59	23	72	212	60
Milking	2	1	1	1	0	0	3	1
Giving feed supplement	110	67	97	61	21	66	228	65
Training for draft	141	86	135	85	31	97	307	87

¹ Multiple response

Table 5. Recommended vs. existing management practices in carabao raising in the Visayas.

Management Practice	Recommended	Existing	Gap
Feeding concentrates	3	1.00	2.00
Feeding soilage/dry roughage	3	1.85	1.15
Tethering/herding	1	1.00	0.00
Giving water	3	2.22	0.78
Wallowing	2	2.00	0.00
Confining	3	1.75	1.25
Cleaning the place where the animals are confined	3	1.62	1.38
Registering the animals/ making identification marks	3	2.55	0.45
Castrating ¹	3	1.40	1.60
Shaving hairs, clipping the switch, trimming the hoofs	3	1.33	1.67
Deworming	3	1.93	1.07
Culling/selection	3	1.35	1.65
Giving feed supplements	3	2.30	0.70
Training for draft	3	2.74	0.26
Affixing a nose ring	3	2.74	0.26
Smudging	3	1.19	1.81
Total	45	28.97	16.03

¹Castration is a recommended practice only for genetically poor stocks. Scores could range from 1 – 3. If the farmer does not castrate his animals even if it is a poor stock, a low score is given; higher if he does.

with fewer or no superstitious beliefs were also more innovative. Furthermore, farmers with longer experience in carabao raising and living in a peaceful community have a high technology adoption rate.

Farmers who raised more than three carabaos were motivated to

adopt more recommended management practices which implies that adoption rate is directly influenced by number of animals raised. Farmers with higher income also tended to adopt more technology than those with lower income. This is expected because higher income would enable

Table 6. Partial regression coefficient and related statistics of adoption score.¹

Parameter	Regression Coefficient ⁴	Standard Error
Constant	29.3283	
Province (X ₁)		
Dummy for Bohol (X ₁₁)	-3.1835***	0.4773
Dummy for Leyte (X ₁₂)	-4.2559***	0.4981
Tribe (X ₂)		
Dummy for Boholano (X ₂₁)	<u>2/</u>	<u>2/</u>
Dummy for Leyteño (X ₂₂)	<u>2/</u>	<u>2/</u>
Farm type (X ₃)	0.4661 ^{ns}	0.4274
Tenure (X ₄)		
Dummy for leaseholder (X ₄₁)	1.3328**	0.5312
Dummy for owner (X ₄₂)	0.6550 ^{ns}	0.4467
Farm size (X ₅)	-0.0498 ^{ns}	0.0690
Crops raised (X ₆)	<u>3/</u>	<u>3/</u>
Number of carabao raised (X ₇)	0.7592***	0.1723
Sex of carabao (X ₈)	0.3469 ^{ns}	0.3731
Standard error of regression		3.4611
Fraction of variable explained by regression (R ²)		0.2747

¹The regression equation was of the form:

$$Y = b_0 + b_1X_1 + \dots + b_8X_8$$

where:

Y = adoption score

X = independent variables

b = regression parameters

²To avoid multicollinearity problem, tribe was not included as regressor since there was an almost perfect correlation between tribe and province.

³Crop raised was not included as an independent variable because more than 90 percent of the respondents raised the same type of crops.

⁴*** = Significant at 1% level

** = Significant at 5% level

ns = Not significant at 10% level

Table 7. Relationship between adoption of technology in carabao raising and some socio-economic factors.

Factors	Chi-square value ¹
Sociological Factors	
Tribe	73.068***
Number of persons involved in taking care of the carabaos	5.164**
Beliefs	7.513**
Religion	1.866 ^{ns}
Educational attainment	3.791 ^{ns}
Sex of the decision-maker	0.124 ^{ns}
Age of the decision-maker	5.601 ^{ns}
Years engaged in carabao raising	16.824***
Peace and order condition	19.413***
Economic Factors	
Farm size	0.971 ^{ns}
Number of crops raised	0.228 ^{ns}
Total number of animals raised	3.222*
Gross income	11.173***
Distance to where they buy/sell most of input/output	6.241**
Types of road	37.521***
Number of animal-days on-farm + off-farm (total operation)	10.912***

- ¹ *** — Significant at 1% level
 ** — Significant at 5% level
 * — Significant at 10% level
 ns — Not significant at 10% level

the farmers to purchase the necessary inputs in carabao raising. Likewise, the number of animal-work days of carabao and adoption rate were significantly related i.e. the more ani-

mal-days spent, the higher was the adoption score. This means that farmers who were more exposed to recommended practices used carabao power more effectively.

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