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Socio-economic status of farmers rearing Bachaur cattle in its habitat under middle Gangetic plains

P C CHANDRAN[1], A DEY[2], S K BARARI[3], REENA KAMAL[4], SHANKER DAYAL[5] and ASIT CHAKRABARTI[6]

ICAR Research Complex for Eastern Region, Patna, Bihar 800 014 India

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ABSTRACT

Bachaur cattle, the only recognized cattle breed of Bihar, was studied for its role in uplifting the farmers in their breeding tract by visiting 53 villages in 5 blocks of Sitamarhi district in Bihar. The different practices of farming systems involving Bachaur cattle, socio-economic status of farmers and economics of rearing of Bachaur cattle were studied through standard questionnaire. The regression of different independent variables on the total income was calculated. The study revealed that 29.7 % of farmers possessing Bachaur cattle were practicing agriculture apart from rearing cattle. Literacy rate of Bachaur cattle owners ranged from 21.39 to 57.14% for different types of farmers. Marginal, small, semi-medium and medium farmers earned 91.40, 89.90, 86.31 and 87.22%, respectively, of their income from draught power of Bachaur cattle. Rearing of Bachaur bullocks supported the income of marginal, small and semi-medium farmers to the tune of 50.12, 48.31 and 42.66%, respectively. Regression of independent variables on income from Bachaur bullocks indicated that expenses incurred on maintenance of health and feeding of bullocks influenced the total income of farmers to a greater extent followed by money invested in purchasing Bachaur bullocks.

Key words: Bachaur, Bihar, Cattle, Socio-economics

Bachaur is one of the recognized cattle breeds of India, which plays a key role in the socio-economic status of farmers in Sitamarhi, Darbanga, Sheohar and Madhubani districts of Bihar. The state of Bihar completely depends on agricultural economy in which agriculture and allied sector alone contributes 20.92% of the gross state domestic product at current prices (Directorate of Economics and Statistics 2012). Though contribution of draught cattle has been partially or even completely replaced by machine power in several regions of the country, there have been certainly some pockets, which are in the phase of developing, depends largely on the draught power of cattle. Though nicknamed as *"Chota Hariana",* the power of Bachaur cattle in the agricultural field and its contribution to the farming community has never been studied. Singh *et al.* (2010) had only studied the phenotypic characteristics of breed with reference to conformation traits. Hence, the present work was undertaken to study various aspects of socio-economic status of farmers in Bachaur breeding tract which lies in the middle Gangetic plains of Bihar.

MATERIALS AND METHODS

A study was undertaken in 5 blocks namely Sursand, Dumra, Pupri, Riga and Belsand of Sitamarhi district of north Bihar to collect information on socio-economic parameters of farmers rearing Bachaur cattle. A total of 53 villages were randomly chosen and 348 farmers' families were interrogated for the study. The information on climatic parameters and land utilization patterns were collected from respective Directorates under Government of Bihar to define the breeding tract of Bachaur cattle. Different roles of Bachaur cattle in various farming systems adopted by the farmers were studied by observation and questionnaire. The farmers possessing Bachaur cattle were divided into 4 categories based on their land holding. There were 187 marginal farmers (having less than 1.0 ha land), 124 small farmers (having 1.0 ha to 2.0 ha land), 30 semi-medium farmers (having 2.0 ha to 4 ha land) and 7 medium farmers (having 4.0 ha to 10.0 ha land) who were subjected into the study. Large farmers, having more than 10.0 ha land and possessing Bachaur cattle could not be found in the study area. The socio-economic status of different categories of farmers who owned Bachaur cattle was assessed. As Bachaur bullocks were the lifeline for majority of farmers in earning their livelihood, the cost involved in management of these bullocks was estimated for different categories of farmers. The regression coefficients of different independent variables that determine the income through Bachaur bullocks were found out using the following linear statistical model.

$$Y = \mu + b_1X_1 + b_2X_2 + b_3X_3$$

Present address: [1,4]Scientist (vetchandran@gmail.com; dr.reenakamal@yahoo.com), [2]Head (amitavdey_icar @yahoo.co.in), [3]Chief Technical Officer (skbarari@yahoo.co.in), [5,6]Senior Scientist (antudayal@gmail.com, asit1963 @yahoo.com).

where, Y is the annual income from Bachaur bullocks, μ is the general mean, X_1, X_2 and X_3 are initial cost of purchase of animals, cost on feeding and cost on health care management, respectively, and b_1, b_2 and b_3 are the respective regression coefficients.

RESULTS AND DISCUSSION

The breeding tract of Bachaur cattle falls under Sitamarhi, Darbanga, Sheohar and Madhubani districts of north Bihar. The habitat extends up to the northern border of the country where it meets with Nepal. The tract comes under Bihar Agro-Climatic Zone I which is a permanent flood prone zone due to the rivers flowing from uplands of Nepal.

Climate and soil: Analysis of data on climatic parameters indicated that the temperature in the breeding tract is very hot as the monthly maximum temperature reaches up to 40°C in summer, and the monthly minimum temperature comes down to 7°C in peak winter (Directorate of Economics and Statistics 2012). The climate mostly stays in unfavourable conditions in most of the days in a year in the breeding tract posing a challenge for adaptability to the crossbred cows. The mean annual rainfall is more than 1,200 mm and is sufficient for continuous cultivation of green fodder.

Land utilization and livestock population in the breeding tract: Differential utilization pattern of total geographical area under the breeding tract of Bachaur cattle from 1987 to 2010 indicated that the land put under non-agricultural use has witnessed an increase of around 10%, which is largely at the cost of other fallow lands and marginally at the cost of net sown area. Hence, it is obligatory to check further erosion in net sown area from which feed and fodder source is taken for Bachaur cattle.

Data analysis of district-wise livestock population showed that the farmers in the breeding tract were very selective in rearing different livestock species. The breeding tract possesses 8.46 % of total cattle and buffalo and 9.25% of total goat population available in the entire Bihar state. However, other species of livestock available in Bachaur breeding tract were less than 5% of the species available in the state (Directorate of Economics and Statistics 2012).

Components in different farming systems: Farmers rearing Bachaur cattle were found using varying combinations of components involving different farming systems. Cultivation of crops along with rearing Bachaur cattle for agricultural operations was the major farming system (29.7% farmers) in the breeding tract followed by keeping one or few buffaloes for additional family income (18.8% farmers). A total of 14.2% farmers in the breeding tract had crops, cattle and goat, whereas, 10.1% farmers possessed crops, cattle and poultry. Besides, 27.2% farmers had varying combinations of components involving crops, cattle, buffalo, goat and poultry.

Role of Bachaur cattle in farming system: The peak milk yield per day in a lactation varied from 3 litres in less favoured environmental condition to 6 litres in most advantageous environment. The milk from Bachaur cows was mostly used for domestic consumption and the bullocks were the real breadwinners for the Bachaur farmers. The farmers could use the bullocks continuously for 6 to 8 h in a day in the agricultural fields. The pulling power of Bachaur bullocks was also remarkable as it was estimated that a pair bullock could pull around 1.28±0.21 tonne of load continuously for 7.26 h. The pulling power and the time duration obtained in the present study is also comparable to Dhal *et al.* (2007) for Khariar cattle, Gokhale *et al.* (2008) for Khillar cattle, and Samantray *et al.* (2009) for Ghumusar cattle. However, Singh *et al.* (2008a) reported pulling power of Hallikar cattle as 2.75 tonnes, which is higher than the pulling power of Bachaur cattle as obtained in the present study. This may be due to comparatively smaller stature of Bachaur cattle than Hallikar breed. Such smaller phenotype could also be considered advantageous as maintenance and management of these animals would be easier.

Socio-economic status of farmers rearing Bachaur cattle: Socio-economic status of farmers rearing Bachaur cattle is given in Table 1. Most of the marginal, small and semi-medium farmers were just possessing a pair of Bachaur cattle, mostly bullocks, for agricultural operations. On the other hand, the households of medium farmers had more

Table 1. Socio-economic parameters of farmers rearing Bachaur cattle

Socio-economic parameters	Marginal farmers	Small farmers	Semi-medium farmers	Medium farmers
Total households surveyed	187	124	30	7
Average land holding (ha)	0.72	1.43	2.77	4.11
Average holding size	2.00	2.12	2.34	4.17
Herd size of bullocks	1.78	1.97	2.05	3.38
Family size				
<or=4	17 (9.09)	19(15.32)	8 (26.67)	1(14.29)
> 4	170 (90.91)	105(84.68)	22(73.33)	6 (85.71)
House type				
Kachcha	154 (82.35)	71(57.26)	7 (23.33)	0 (0.00)
Pucca	33 (17.65)	53(42.74)	23 (76.67)	7 (100.00)
Primary occupation				
Agriculture	142 (75.94)	82 (66.13)	19 (63.33)	2 (28.57)
Other than agriculture	45 (24.06)	42 (33.87)	11 (36.67)	5 (71.43)
Literacy rate	21.39	34.68	50.00	57.14
Gross annual income (₹)				
from rearing Bachaur	65,734	63,907	53,610	43,772
from other enterprises	65,415	68,378	72,056	136,596
Per cent contribution from Bachaur	50.12	48.31	42.66	24.27

Figures in the parentheses are percentages.

than four Bachaur cattle in the breeding tract. The increased herd size of Bachaur cattle with medium farmers might be for supporting their increased agricultural operations.The family size of Bachaur farmers was generally large irrespective of their land holding with the average family size being 7.1, 6.8. 6.8 and 7.0, respectively, for marginal, small, semi-medium and medium farmers. Most of the marginal and small farmers lived in '*kachcha'* houses, whereas, majority of semi-medium farmers and all medium farmers lived in *'pucca*' houses. Marginal, small and semi-medium farmers depended on Bachaur cattle for their livelihood considerably by getting 50.12, 48.31 and 42.66 of their total income from Bachaur cattle, respectively. On the other hand, rearing Bachaur cattle was a source of an additional income apart from earnings from other enterprises for medium farmers. These results clearly indicated that Bachaur cattle played a vital role in the livelihood of marginal, small and semi-medium farmers.

The family size of the farmers maintaining Bachaur cattle was comparatively larger than the family size of farmers maintaining Krishna Valley cattle in different blocks (mostly between 5 and 6) as reported by Ghokale and Bhagat (2012). The same authors have also reported larger land holding size (7.61 acres) and higher literacy rate (61.36%) in case of Krishna Valley farmers. Though the farming community in the Bachaur breeding tract seems to be on right path with Bachaur cattle rolling completely in all spheres of their social networking, there is still a long way to go for an absolute development.

Economics of Bachaur cattle rearing in the breeding tract: Bachaur cattle was maximally used for its draught power in agriculture dependent region of north Bihar. Purchasing Bachaur bullocks, using them for agriculture operations for a period of 1 year, and selling them at appreciated cost was one of the major activities in the breeding tract. Regular purchasing and selling Bachaur bullocks every year by most of the farmers might be due to flooding from rivers flowing from adjacent highland territories. This causes stagnation in agricultural activities for few months forcing the farmers to keep the bullocks idle in the shed otherwise not sold. The Bachaur bullocks were fetching appreciated cost till 7 to 8 years of age which depends on the feeding and other management factors offered to them. The financial outlay in rearing Bachaur bullocks for different categories of farmers in their breeding tract is furnished in Table 2. Among the expenses on Bachaur bullocks, initial investment on bullocks was the major expense for all categories of farmers, which was followed by expenses on cost of feeding. Similarly, all the farmers were obtaining major income from the draught power of Bachaur cattle apart from the sizeable revenue obtained from sale of bullocks. The income from the sale of Bachaur bullocks for medium farmers was higher comparing to farmers belonging to other categories. Possessing larger holding size of Bachaur cattle might be the reason for the medium farmers to earn more income from Bachaur cattle.

Singh *et al.* (2008b) also reported that sale and purchase of Malnad Gidda cattle in Karnataka was higher in the breeding tract which indicated that farmers get substantial income through rotation of bullocks every year.

Regression of independent variables on income from Bachaur bullocks: Three independent variables affected the income for farmers who reared Bachaur bullocks are given in Table 3. Expenses incurred on maintenance of health and feeding of bullocks influenced the total income of farmers to a greater extent followed by money invested in purchasing sound Bachaur bullocks. The result indicated that these 3 factors play a crucial role in maintenance of

Table 2. Financial outlay in rearing Bachaur bullocks in the breeding tract (Amount in thousand ₹)

Financial parameters	Marginal farmers	Small farmers	Semi-medium farmers	Medium farmers
Fixed cost				
Investment on Bachaur bullocks	35.07	41.84	50.76	126.94
Depreciation cost on shed	0.98	1.80	1.90	2.51
Depreciation cost on utensils	0.16	0.17	0.18	0.32
Total fixed cost	36.21	43.81	52.84	129.77
Variable cost				
Cost of feeding	23.75	27.85	35.32	114.52
Cost on health care	0.24	0.29	0.31	0.35
Cost of labour	9.13	9.13	9.13	18.25
Total expenses	69.31	81.07	97.60	262.88
Total variable cost	33.12	37.27	44.76	133.12
Income from Bachaur bullocks				
From draught power	90.35	90.96	84.9	154.29
From manure	3.29	3.47	3.89	7.30
Margin from sale of bullocks	5.21	6.75	9.58	15.3
Total income	98.85	101.18	98.37	176.89
ROVC	65.73	63.91	53.61	43.77
ROVC per month	5.48	5.33	4.47	3.65

ROVC – Return on variable cost.

Table 3. Regression coefficients of different independent variables on the total income from Bachaur bullocks

Independent variables	Marginal farmers	Small farmers	Semi-medium farmers	Medium farmers
Financial				
Investment on	934.52**	497.03**	105.20**	14.05**
bullocks	(43.28)	(28.59)	(15.44)	(3.38)
Cost of feeding	1,300.90**	728.80**	149.12**	12.90**
	(122.31)	(100.54)	(27.22)	(5.87)
Cost on health care	4,687.10**	12,162.61**	2,831.49**	952.40**
	(137.43)	(363.18)	(81.67)	(75.44)

**P<0.01. Figures in parentheses are standard errors.

healthy and sound bullocks which are highly essential for extracting appreciable draught power for agricultural activities.

Possibilities to improve earnings from Bachaur cattle: The absence of selection for higher body weight and faster growth rate leads to inertia in the unit growth rate of Bachaur bullocks which otherwise had high pulling and draught power. It is the time to have an open breeding unit to keep genetically potential breeding bulls and cows and apply selection on the progenies for the selected traits. Farmers in the breeding tract could get benefit by way of getting superior animals from the breeding unit. The quality of fodder and health services available to the animals throughout the year should be enhanced for better performance of the Bachaur cattle in the breeding tract.

To conclude that majority of the farmers rearing Bachaur cattle earned their livelihood specifically through the draught power of Bachaur cattle. Generally, Bachaur cattle was maintained along with other species of livestock in the breeding tract. Three independent factors such as investment on bullocks, cost of feeding and cost on health care management affected the total income of Bachaur farmers to a greater extent. Though pulling power of Bachaur cattle is remarkable (1.28±0.21 tonne of load), there is still a great scope in improving its draught capacity by applying proper selection and breeding programme involving large number of farmers.

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