



Significance of Badri cattle in rural household of Uttarakhand hills

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ABSTRACT

The present study was carried out to investigate the significance of Badri Cattle in rural household of Uttarakhand state of India. A total of 120 respondents, 60 each from Pauri Garhwal and Almora district were randomly selected for the study and data were collected using semi-structured interview schedule. The results revealed that majority of respondents (71.7%) had low level of income generation and consume less quantity of milk obtained from Badri cattle. The average annual income earned through Badri cattle was ₹ 13054/household, which contributed 19.9% to gross annual income. Average milk consumed and sold was 1.7 and 1.2 litres/day/household, respectively with average fat, protein and calcium contribution of 70 g, 55 g and 2000 mg, respectively. The results revealed that Badri cattle generated 91.2–136.9 mandays for 59.2% of household followed by 136.9–182.5 man days for 37.5% of household and 182.5–228.1 mandays for 3.3% of respondents annually with an average of 136.9 mandays/annum. Majority of respondents (83.3%) had low level of Farm Yard Manure (FYM) production followed by medium (11.7%) and high (5%) levels of FYM production. The study showed that the average FYM production was 4.8 tonnes per annum with NPK production of 38.3, 19.1 and 76.6 kg/annum, respectively. The results also revealed that 20.8% of the respondents perceived Badri cattle as a security during uncertainties, 58.3% of respondents consider keeping Badri cattle a status symbol and cent percent of the respondents consider that Badri cattle has religious importance. Most preferred reason for rearing of Badri cattle by majority of respondents (94.2%) was fulfillment of need for milk and milk products followed by manure utilization (68.3%) and draught power (10%). The overall contribution of Badri cattle in the livelihood generation was very low and therefore, needs to be enhanced by improving the production performance of cattle and agriculture practices, marketing and value addition facilities.

Key words: Badri Cattle, Employment generation, Income Generation, Livelihood generation, Utilization Pattern, Uttarakhand

Livestock acts as a subsidiary source of income and contributes to the livelihoods of the poor and marginal farmers of Uttarakhand by providing milk, manure, meat and wool. Most of the dairy products are consumed locally, and do not fetch suitable prices mainly due to lack of market and cold storages (Sati 2016). Indigenous cattle had the highest population (31.5%) among total livestock followed by buffalo (20.6%) (GoI 2012). The indigenous cattle of Uttarakhand have become the first certified cattle breed of Uttarakhand as Badri breed. These indigenous cattle are small with prominent hump, weighing between 200–250 kg, having short legs and varied body colors (black, brown, red, white and grey). Muzzle and hooves are black or brown in colour.

Udder is small, tucked up with the body. Landless and marginal farmers mainly rear Badri cattle and hence, the

livelihood generation through Badri cattle becomes an important investigating variable to find its role in income generation. This will generate information for planning and improvement of Badri cattle, which is one way to conserve this cultural and traditional heritage of Uttarakhand. The present study, therefore was undertaken with the specific objective to study the significance of Badri cattle in rural household of Uttarakhand hills.

MATERIALS AND METHODS

The study was conducted in Uttarakhand state from where cattle breed 'Badri' has been registered recently. Its geographical area is 51,125 km², of which about 90% is mountainous. Two districts (Pauri Garhwal from Garhwal and Almora from Kumaun commissionaires) were selected purposively due to its high cattle population. The population of indigenous cattle has its highest proportion in Pauri Garhwal (269994 i.e. 17.8%) followed by Almora (197326, i.e. 11.5%) district (GoI, 2012). Two blocks from each district and 3 villages/block were selected randomly for the study. From each district, 60 respondents (10 respondents/village) having at least two Badri cattle with a minimum of

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two years of experience were randomly selected. A semi-structured interview schedule comprising various dimensions of livestock contribution was used to collect the data.

Annual income earned and its proportion in total income through Badri cattle was estimated. The respondents were categorized into three groups as per the annual income earned through Badri cattle, viz. Low (₹ 0–20,133), Medium (₹ 20,134–40,266) and High (₹ 40,267–60,400). Total milk from Badri cattle, consumed and sold by the respondents were calculated and based on average milk consumed by the family, the nutrients were estimated in terms of protein, fat and calcium as suggested by Gopalan *et al.* (2004), i.e. 100 g of cow's milk contain 4.1 g fat, 3.2 g protein and 120 mg calcium. The FYM produced by the cattle was calculated as majority of farmers practiced semi-intensive system of rearing, so the manure production from each adult cattle was considered as 5 kg/day and from each calf as 2.5 kg/day (Biradar *et al.* 2013). The average FYM applied to their respective farm was converted in terms of N, P and K by following the conversion factors suggested by Gautam (2007), i.e. 1 tonne of FYM was equivalent to 8 kg N, 4 kg P and 16 kg K.

Engagement of 8 h in any livestock activity was considered to be one manday equivalent. The daily time spent on care and management of Badri cattle according to farmers' response was multiplied by 365 to determine total no. of working hours created in a year by Badri cattle and then divided by 8 to generate the mandays. Observation on number of households who had used Badri cattle in situation of uncertainties in past 2 years, status symbol, wealth within or outside their community and religious and social importance were recorded. Response on utilization pattern of Badri cattle were collected on four point continuum (most preferred-3, preferred-2, least preferred-1, not preferred-0) and finally mean obtained score for each indicator was calculated. Data were analysed using SPSS software.

RESULTS AND DISCUSSION

Income generation: Results revealed that majority of respondents (71.7%) fall in low income generation with an average annual income of ₹ 13054.0 earned through Badri cattle. Balaraju (2016) in Karnataka reported that majority of the respondents had low income through indigenous cattle with mean income of ₹ 14,736. Percentage share of income through Badri cattle revealed that majority (77.5%) of respondents had low level of contribution with an average contribution of 19.9% in gross annual income (Table 1) Akand *et al.* (2017) reported similar findings that contribution of income from animal husbandry in total family income was low. Balaraju (2016) reported that majority of respondents (47.5%) had less share (5–11%) of indigenous cattle in total household income. The marginal and small farmers earned 50% of the household income by Bachaur bullocks under middle Gangetic plains of Bihar (Chandran *et al.* 2014). The reason for low annual income earned through Badri cattle might be due to low milk yield,

Table 1. Distribution of Badri cattle owners according to various parameters of livelihood generation.

Parameter	Almora (Mean±SD)	Pauri Garhwal (Mean±SD)	Pooled (Mean±SD)
Annual income through Badri cattle (₹)	14596±13689	11512±12337	13054±12068
Percentage share of Badri cattle income in gross annual income	23.27±28.65	16.69±22.65	19.98±25.93
Badri milk consumed by family (l/day)	1.57±0.89	1.89±0.70	1.73±0.81
Badri milk sold by family (l/day)	1.27±1.35	1.07±1.17	1.17±1.27
Nutrients to farm (tonnes/year)	4.62±1.68	4.95±1.87	4.79±1.78
Average man hours per day	3.16±0.70	2.84±0.61	3±0.68
Employment generation (Man days/year)	144.40±32.34	129.57±27.90	136.87±31.11
Security in uncertainty	10 (16.70)	15 (25.00)	25 (20.80)
Status symbol	32 (53.30)	38 (63.30)	70 (58.30)
Have religious importance of Badri cattle	60 (100.00)	60 (100.00)	120 (100.00)

Figure in parentheses indicates percentage.

decreased agricultural practices and unavailability of better marketing facility. The income through Badri cattle needs to be increased by improving the feeding and managerial practices as well as market availability. The value addition training should be given to Badri cattle owners which will fetch them with better market prize. For improving marketing facility, the Uttarakhand Cooperative Dairy Federation, i.e. Aanchal, should enhance their network towards villages by collecting milk either directly from house or through collection center at the village level.

Nutrients to the family: The nutritional contribution was measured based on average quantity of Badri cow milk consumed by each household/day. Table 1 shows that majority of respondents (83.3%) consume less quantity of milk at household level with an average consumption of 1.7 l/day/household. Balaraju (2016) reported that majority of respondents (35%) consumed less quantity of indigenous cattle milk with an average of 1.2 l/day in Karnataka. ICMR (2011) recommended consumption of 290 g of milk/head/day. The per capita availability of milk at the national level is 337 g/day and per capita availability of milk at Uttarakhand state level is 434 g/day (NDDB 2015–16). In the study area, average family size was 4.52 person/household and average milk consumption/household was 1.7 l/day. When per head milk consumption was calculated based on average family size in the present study, it was found to be 380 g/head/day which is 87.6% of the milk availability in the state of Uttarakhand, which shows that Badri cattle is important milk producing animal of the state. Indigenous cattle of Karnataka state provided 290 g/head/day of milk, i.e. 65.3% of the milk availability in the state (Balaraju 2016). Majority

(71.7%) of respondents sold low amount of milk with an average of 1.2 l/day/household. Average contribution of fat, protein and calcium from Badri cattle milk/day/household was 70 g, 55 g and 2000 mg, respectively. Balaraju (2016) reported the contribution of fat, protein and calcium from indigenous cattle milk/day/household was 48 g, 35 g and 1413 mg, respectively. Biradar *et al.* (2013) found contribution of fat, protein and calcium from cattle and buffalo milk/day/household was 53 g, 35 g and 1691 mg, respectively.

Nutrients to the farm: The nutrients contribution to the farm is measured through FYM production at household level which ranged between 2.7 to 11.7 tonnes/annum with an average of 4.8 tonnes (Table 1). Majority of respondents (83.3%) had low level of FYM production, might be due to small herd size. Average NPK production from FYM was 38.3, 19.2 and 76.6 kg/year/household, respectively. In Karnataka majority (44.2%) of household FYM production ranged from 8.4–13.1 tons/annum with an average of 9.9 tonnes/annum and average yield of NPK/year/household was 78.9 kg, 39.5 kg and 157.9 kg respectively (Balaraju 2016). In Maharashtra NPK yield/year/household from FYM was 89.3 kg, 44.7 kg and 178.7 kg, respectively (Biradar *et al.* 2013). The FYM at all India level yields 2.9 mt N, 2.8 mt P and 1.9 mt K annually (Ramesh *et al.* 2005).

Employment generation: Table 1 reveals that rural households in hills of Uttarakhand can generate an average employment of 136.9 mandays/year by rearing Badri cattle, i.e. 3 manhours/day and 1095 manhours/year. The study further revealed that Badri cattle generated 91.3–136.9 mandays for 59.2% of household followed by 136.9–182.5 mandays for 37.5% of household and 182.5–228.1 mandays for 3.3% of respondents annually. Indigenous cattle in Karnataka generated 168–243 mandays for majority of the respondents with an average of 199 mandays (Balaraju, 2016). In Maharashtra about 95.3–140.9 mandays of employment were created by the livestock farming annually (Biradar *et al.* 2013). Ramrao *et al.* (2006) observed that about 316 employment days were generated in integrated livestock farming system. Initiation of dairy farming in Andhra Pradesh supplemented 122 additional mandays of

employment/day (NIRD 2005).

Security during uncertainties: As shown in Table 1, 20.8% of the respondents had perceived Badri cattle as security during uncertainties. The reason for not considering Badri cattle as a security element during uncertainty may be that it is a low milk producer cow and the market for manure in Uttarakhand is yet not developed. In Maharashtra, only 12% of respondents perceived livestock as security during uncertainties (Biradar *et al.* 2013). In Karnataka, 43% of respondents used indigenous cattle as security during uncertainties (Balaraju 2016). In Ladakh use of livestock as security during uncertainties is not a common practice and only 10% of respondents consider it as security during uncertainties (Chandran 2014).

Religious and social importance: Table 2 shows that cent per cent of the respondents consider that Badri cattle had religious importance and they had great respect for cow and worship them. People have a belief that the house which

Table 2. Distribution of respondents according to religious importance of Badri cattle

Religious importance	Almora (n=60)	Pauri Garhwal (n=60)
Considered as sacred animal, maternal figure and care taker of her people	60 (100.00)	60 (100.00)
Milk and dairy product provide <i>ojas</i> (strength and immunity)	60 (100.00)	60 (100.00)
Bull considered as Nandi	60 (100.00)	60 (100.00)
Home are plastered with cow dung	30 (50.00)	19 (31.67)
Cow urine is sprinkled in the house for purity	60 (100.00)	60 (100.00)
Cow dung and ghee are used in fire ceremonies	60 (100.00)	60 (100.00)
Donated during birth, kanyadan, death and other rituals	8 (13.34)	0 (0.00)
Panchamarit distributed after ceremonies	60 (100.00)	60 (100.00)
Panchagaya preparation	33 (55.00)	0 (0.00)

Figure in parenthesis indicate percentage.

Table 3. Distribution of Badri Cattle owners according to their utilization pattern of Badri cattle

Utilization pattern of Badri cattle	Almora (n=60)				Pauri Garhwal (n=60)				Pooled (n=120)			
	MP	P	LP	NP	MP	P	LP	NP	MP	P	LP	NP
Draught power	6 (10.00)	13 (21.70)	1 (1.70)	40 (66.70)	6 (10.00)	0 (0.00)	0 (0.00)	54 (90.00)	12 (10.00)	13 (10.80)	1 (0.80)	94 (78.30)
Milk & milk products	55 (91.70)	5 (8.30)	0 (0.00)	0 (0.00)	58 (96.70)	2 (3.30)	0 (0.00)	0 (0.00)	113 (94.20)	7 (5.80)	0 (0.00)	0 (0.00)
Manure	39 (65.00)	21 (35.00)	0 (0.00)	0 (0.00)	43 (71.70)	12 (20.00)	5 (8.30)	0 (0.00)	82 (68.30)	33 (27.50)	5 (4.20)	0 (0.00)
Selling purpose	0 (0.00)	0 (0.00)	4 (6.70)	56 (93.30)	0 (0.00)	0 (0.00)	5 (8.30)	55 (91.70)	0 (0.00)	0 (0.00)	9 (7.50)	111 (92.50)
Service purpose	0 (0.00)	0 (0.00)	0 (0.00)	60 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	60 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	120 (100.00)

Figure in parenthesis indicate percentage.

has Badri cattle, it always remains protected from bad evils. Cow urine was sprinkled in the house for purity. Cow dung and ghee were used in fire ceremonies believing it as an air purifier. Cow was also donated during all the ceremonies from birth to death. Panchamrit made by mixing Badri cattle milk, yoghurt, ghee and two external products, i.e. honey and sugar was distributed after auspicious rituals and ceremonies. Panchagavya prepared by mixing five ingredients obtained from cow, i.e. dung, urine, milk, curd and ghee was also used for purification.

The results revealed that 58.3% of respondents consider keeping Badri cattle a status symbol and felt that cattle brings prosperity to the house and at least one Badri cattle should be domesticated by a civilized family. In Karnataka state, 19% of the respondents perceived that keeping indigenous cattle as a symbol of social status (Balaraju 2016). In Maharashtra, 63% of the livestock rearing farmers considered keeping indigenous cattle a social status (Biradar *et al.* 2013). Akila (2009) reported that 100% of farmers accepted that keeping bullock gives social prestige in the society.

Utilization pattern: Table 3 reveals that the most preferred reason for rearing of Badri cattle by majority of respondents (94.2%) was the fulfillment of need for milk and milk products followed by manure utilization (68.3%) and draught power (10.0%). On the basis of mean obtained score utilization as shown in Table 4 ranking of Badri cattle was done as, milk and milk products was ranked first (2.9) by the respondents followed by manure (2.6), draught power (0.5) and selling purpose (0.08). None of the respondents had preferred Badri cattle for service purpose. Respondents prefer milk and milk products of Badri cattle for own consumption and selling purpose. Cow dung is used as manure in the field as well as for plastering the floor and walls of the house. Respondents do not prefer the Badri cattle for draught purpose as the actual working days of bullocks have decreased significantly in past few year. The utilization in form of selling purpose has decreased significantly in past few years because of no good amount being fetched by selling of the cattle. Majority (90%) of the respondent utilized Kherigarh cattle for agriculture work as it is a draught breed followed by (80%) manure production (Verma 2013). Siddiqui *et al.* (2013) reported

Table 4. Mean obtained score of utilization pattern of Badri cattle as perceived by Badri cattle owners

Mean score of utilization pattern	Almora (n=60)	Rank	Pauri Garhwal (n=60)	Rank	Pooled (n=120)	Rank (pooled)
Draught power	0.75	III	0.30	III	0.53	III
Milk & milk products	2.92	I	2.97	I	2.94	I
Manure	2.65	II	2.63	II	2.64	II
Selling purpose	0.07	IV	0.08	IV	0.08	IV
Service purpose	0.00	—	0.00	—	0.000	—

^{NS}non significant at 5% level ($P < 0.05$) of significance.

that majority (52.13%) of farmers reared cattle for milk sale and consumption. Biradar *et al.* (2013) reported that 58% of the families ranked milk to sell as the first purpose and use of dung as manure (44%) was ranked second purpose for keeping livestock. Khariar cattle breed in Orissa is reared mainly as draught animal followed by milk and manure (Sethi 2009).

Although Badri cattle holds a significant place in the rural households of Uttarakhand hills but its overall contribution to the livelihood generation is very low and therefore needs to be improved by enhancing the annual income through Badri cattle. This can be done by spreading the importance of nutrition and better management practices among Badri cattle owners, identifying the specific nutrient requirements for Badri cattle, assessing the nutritive value of various feed and fodder in the area, apart from practicing selective breeding. The agricultural practices should be improved in the hilly areas which will promote the use of Badri bullock. Badri cattle has various religious importance as well as medicinal properties in its milk, urine and dung (Banga *et al.* 2005) which can be exploited by the government in the form of value addition in milk of Badri cattle and improving its marketing network, establishing processing plants for urine, selling of dung as manure as well as harnessing its potential to make Uttarakhand a real organic state. These efforts would ultimately lead to enhancement in the contribution of Badri cattle to the life and livelihood of rural households in hills of Uttarakhand.

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