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Socio-economic Studies of Black Bengal Goat Rearing in Different Agro-climatic Zones of West Bengal

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ABSTRACT

Socio-economic study of Black Bengal goat rearing was carried out among 306 rural farmers distributed in four agro-climatic zones of West Bengal under "All India Co-ordinated Research Project on Goat Improvement" funded by Indian Council of Agricultural Research and Government of West Bengal during the period of April 2016 to March 2017. Mostly young goats were sold at 6 to 12 months of age and higher annual income from goat rearing has been recorded in General Category farmers (Rs. 10382.68 ± 385.77), followed by Schedule Caste (Rs. 6178.04 ± 373.87), Other Backward Class (Rs. 5190.15 ± 835.57) and lastly Tribal goat keepers (Rs. 4368.88 ± 611.04). Majority of the farmers kept 1 to 4 goats, followed by 5 to 8 goats, 9 to 12 goats, more than 12 goats and earned annually Rs. 3633.76 ± 374.98, Rs. 7042.10 ± 381.44, Rs. 9423.25 ± 593.11 and Rs. 24644.44 ± 1117.44, respectively. Most of the goat keepers in all the adopted villages were educated upto Secondary level with an annual income of Rs. 7278.65 ± 318.04, but higher annual income from goat rearing was recorded among the goat keepers who were illiterate (Rs. 8342.86 ± 1110.73) and lowest income earned by farmers educated upto Primary level (Rs. 6761.15 ± 379.01). However, mostly the women were involved in goat rearing in the project area and the income generated from goat rearing was Rs. 7150.00 ± 239.29 per family per year with average flock strength of 5.80 ± 0.22 goats, and the maximum annual income was recorded in Nadia cluster (Rs. 10675.15 ± 392.74), followed by Murshidabad (Rs. 6879.17 ± 871.93), Sundarban cluster (Rs. 5584.38 ± 384.43) and lastly Jhargram cluster (Rs. 3647.27 ± 578.08) with a flock size of about 8, 4, 6 and 4 goats, respectively; and an average annual income of Rs. 2861.00/- per doe per year enabling goat keepers to solve many family financial crisis which has a social value. Thus it can be concluded that income from goat keeping is not directly related with education level and caste of the farmers, but for proper care and management of their goats basic education is definitely required and more income is always related with larger flocks. Generally goat rearing with flock size of upto 12 goats is profitable thereby problems may be raised due to uncontrollable situations with existing resources of the goat keepers.

Key words: *Black Bengal goat, Socio-economic association, Agro-climatic zone, Income.*

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INTRODUCTION

India stands on 2nd rank in goat population in the World (FAO STAT, 2005[1]) and having around 15% of world population (807 million). The state of West Bengal ranks first (15.07 million) in India (123 million) (Annual Report[2]) and possesses a valuable genetic resource of dwarf goats, known as Black Bengal Goat (Syn. Bengal Goat). Evidence from population structure and novel lineages in Indian goats suggested domestication started 10,000 years ago[3]. The goats of *hircus* species migrated to undivided Indian subcontinent from the Western Asia between 7500-7000 B.C. However, the history of origin of the Bengal breed (Syn. Black Bengal Goat) is inadequate. It is believed that this breed is domesticated with early human colonizers to its breeding tract. The early goats must have undergone a long adaptation to local ecology and have taken the present shape of Bengal Goat.

The habitat of Bengal Goat is West Bengal and adjoining parts of the neighbouring states like Bihar, Jharkhand, Orissa, Assam and parts of Tripura. But the performance gradually decreased due to infiltration of genes from other breeds to Bengal Goat[4]. However, it is expected that, in some parts of West Bengal, mainly the islands of the Sundarban, pure variety of Bengal Goat is available. The Pure Bengal Goat is traditionally reared by the small marginal and landless rural farmers of West Bengal. They generally follow the extensive management system, primarily with poor natural vegetation and crop stubbles, without any supplementation. By virtue of their higher fecundity and better productivity, Bengal Goats attribute a considerable income to the rural population with low input cost in diverse agro-climatic conditions.

In consideration to the above, a study was conducted to evaluate the social status of the Bengal Goat rearers and their income from goat rearing in different agro-climatic zones of West Bengal. The results from the studies will be helpful for strategic improvement policies and necessary facilities for future betterment of the farmers.

MATERIAL AND METHODS

A total of 306 registered goat keeping families of four different clusters of West Bengal under the AICRP on goat improvement project were taken for the study of socio-economic association of Black Bengal goat. Data regarding caste, education, land holding and goat holding were collected from the villagers by field level enumerators of the said project from different clusters. The parameters were further classified into different groups which have been illustrated in the table 1.

Table 1: Classification of different parameters into sub-groups

Caste		Education		Land holding		Goat holding	
1	ST	1	Illiterate	1	Landless	1	1-4 goats
2	SC	2	Primary	2	Upto 20 *Katha*	2	5-8 goats
3	OBC	3	Secondary	3	>20 to 40 *Katha*	3	9-12 goats
4	General			4	> 40 *Katha*	4	> 12 goats

Analysis of data was done by SPSS Statistics version 21.0 – IBM Inc. Informations regarding the geographical location, soil topography, average rainfall, temperature and humidity of different clusters falling in different agro-climatic zones are given in the Table 2.

Table 2: Information of different agro-climatic zones (Source: Metrological Department, Govt. of India)

Clusters	Geographical location (Latitude & Longitude)	Soil topography	Average Rainfall throughout the year (mm)	Average temperature throughout the year (ºC)		Average humidity throughout the year (%)	
				Max.	Min.	Max.	Min.
Nadia	23.4710° N, 88.5565° E	New alluvial	1287.80	32.67	17.75	88	75
Sundarban	21.9497° N, 89.1833° E	Coastal saline	2300.10	37.75	19.42	92	76
Murshidabad	24.2290° N, 88.2461° E	Old alluvial	1228.20	37.33	18.75	90	71
Jhargram	22.4550° N, 86.9974° E	Red laterite	1389.50	37.83	19.00	87	64

RESULTS AND DISCUSSION

The village units under the project have been surveyed to find out the socio-economic status of the farmers. Survey included family land holding size, family goat holding size, family education status, social status and annual income from goats.

AGE OF GOAT AND INCOME

Sale of goats at different ages and income from goat rearing have been studied for different social factors. The main source of income from goat rearing is sale of animals, where mainly kids below the age group of one year are sold . Only 0.20 % of the male kids (35 out of 708) of the age group 0 - 3 months and 0.55 % of the female kids (5 out of 916) were sold during 2016 -17. Whereas 6.19 % of the male kids (62 out of 1002) and 6.85 % of the female kids (60 out of 876) of 3 - 6 months age, 41.63 % of the male kids (378 out of 908) and 19.08 % of the female kids (157 out of 823) of 6 -12 months age, 50.29 % of the adult males (172 out of 342) and 16.42 % of adult females (203 out of 1236) were sold during 2016 -17. Most of the animals were sold at 6 - 12 months of age where 44% male and 17.5% female animals have been sold from the population.

The average sale price of males (0-3 months old, 3-6 months old, 6-12 months old and adult males) were Rs. 650.00, Rs. 1250.00, Rs. 2000.00 and Rs. 3750.00 per goat respectively. Whereas average sale price of females at the same ages were Rs. 450.00, Rs. 800.00, Rs. 1200.00 and Rs. 1650.00 per animal respectively. If we consider the estimated income and the body weight of goats at concerned age, the average sale price of male and female is around Rs. 300.00 and Rs. 150.00 per kg live weight.

Table 3: Income from different age group of goats

Age Group (Month)	Sex	No. available	No. sale	Sale %	Rate (Rs.)
0-3	Male	997	2	0.20	600.00 - 700.00
	Female	916	5	0.55	400.00 - 500.00
3-6	Male	1002	62	6.19	1000.00 - 1500.00
	Female	876	60	6.85	700.00 - 900.00
6-12	Male	908	378	41.63	1500.00 - 2500.00
	Female	823	157	19.08	900.00 - 1500.00
Above 12	Male	342	172	50.29	2500.00 - 5000.00
	Female	1236	203	16.42	1500.00 - 1800.00

CASTE OF GOAT KEEPERS *VS* INCOME FROM GOAT REARING

Analysis of the data revealed that the goat farming is much popular amongst the Scheduled Caste (SC) (47.06%), followed by General castes (33.99%) and Scheduled Tribe (ST) community (13.39%), whereas only 5.56% of goat farmers belong to other backward community (OBC).

Table 4: Caste of goat keepers *vs* income from goat rearing

Caste	No. of Farmer (No.)	Avg. Reg. Doe (No.)	Flock size (No.)		Annual Income (in Rs.)	
			Opening	Closing	Per Family	Per Doe
ST	41 (13.39%)	2.52	4.95	4.38	4368.88 ± 611.04^{c}	1744.44
SC	144 (47.06%)	2.78	6.04	6.42	6178.04 ± 373.87^{b}	2717.05
OBC	17 (5.56%)	2.08	5.53	6.53	5190.15 ± 835.57^{bc}	2356.06
General	104 (33.99%)	2.66	7.30	5.73	10382.68 ± 385.77^{a}	3564.61

Means with different superscripts differ significantly ($p<0.05$)

The income from goat sale among the General category, SC, OBC and ST goat keepers were Rs. 10382.68 ± 385.77, Rs. 6178.04 ± 373.87, Rs. 5190.15 ± 835.57 and Rs. 4368.88 ± 611.04, respectively. Annual income per family is significantly higher (10382.68 ± 385.77) in General caste community and lowest (4368.88 ± 611.04) in case of Scheduled Tribe (ST) community. Results reflect that the caste-wise income in goat keepers from goat rearing is inconsistent in nature, but higher income is always related with larger flock size.

LAND HOLDING *VS* INCOME FROM GOAT REARING

It is observed that maximum number of farmers have around 20 katha of land and have goat holding size around 6.5 and their average annual income from goat was Rs. 8270.33 ± 351.79. Per doe income was highest in case of landless farmers.

Table 5: Land holding *vs* income from goat rearing

Land holding	No. of Farmer (No.)	Avg. Reg. Doe (No.)	Flock size (No.)		Annual Income (in Rs.)	
			Opening	Closing	Per Family	Per Doe
Landless	4	1.75	4.50	2.75	6850.00 ± 1524.83^{ns}	3914.29
Upto 20 *Katha*	168	2.51	6.57	5.79	8270.33 ± 351.79^{ns}	3185.05
>20 to 40 *Katha*	70	2.38	5.31	5.43	5527.37 ± 449.48^{ns}	2356.95
> 40 *Katha*	64	2.46	6.84	6.75	7063.68 ± 489.53^{ns}	2532.14

ns: non-significant

The annual income per family for the farmers holding different amount of land was estimated non-significant to each other. The pattern of land ownership *vs* flock size *vs* annual income suggests that there is a scope for goat raising by the goat keepers having more lands.

FLOCK SIZE *VS* INCOME FROM GOAT REARING

Majority of the goat keepers in all the clusters kept 1 to 4 goats with average flock size of 2.76 goats and earned Rs. 3633.76 ± 374.98 annually, followed by the farmers had 5 to 8 goats with average flock size 6.31 and annual income Rs. 7042.10 ± 381.44, and the farmers had 9 to 12 goats with average flock size of 9.93 goats and annual income Rs. 9423.25 ± 596.11, while very few farmers had more than 12 goats with average flock size of 17.25 goats and earned annual income Rs. 24644.44 ± 1117.44 . Per doe income was also highest in this group. It indicates that goat rearing with flock size of upto 12 goats is profitable; thereby problems may be raised due to uncontrollable situations with existing resources of the goat keepers.

Table 6: Flock size *vs* income from goat rearing

Goat Holding	No. of Farmer (No.)	Avg. Reg. Doe (No.)	Flock size (No.)		Annual Income (in Rs.)	
			Opening	Closing	Per Family	Per Doe
1-4 goats	131	1.44	2.76	2.87	3633.76 ± 374.98^{d}	2728.72
5-8 goats	121	2.47	6.31	6.49	7042.10 ± 381.44^{c}	2793.45
9-12 goats	45	3.53	9.93	9.65	9423.25 ± 593.11^{b}	2738.89
> 12 goats	9	5.50	17.25	9.44	24644.44 ± 1117.44^{a}	4146.94

Means with different superscripts differ significantly ($p<0.05$)

EDUCATION STATUS *VS* INCOME FROM GOAT REARING

Most of the goat keepers in all adopted villages were educated upto Secondary level and having 6.07 goats each with an annual income about Rs. 7278.65 ± 318.04 in 2016 - 17. But higher annual income from goat rearing was recorded as Rs. 8342.86 ± 1110.73 and Rs. 6761.15 ± 379.01 respectively among the goat keepers who were educated up to Primary level and illiterate. These results indicate that income from goat keeping is not directly related with education level of the farmers, but for proper care and management of their goats basic education is definitely required and higher income is related with larger flock size.

Table 7: Education status *vs* income from goat rearing

Education status	No. of Farmer (No.)	Avg. Reg. Doe (No.)	Flock size (No.)		Annual Income (in Rs.)	
			Opening	Closing	Per Family	Per Doe
Illiterate	8	2.79	6.64	5.93	8342.86 ± 1110.73[b]	2808.70
Primary	127	2.62	6.32	5.58	6761.15 ± 379.01[ab]	2525.26
Secondary	171	2.26	6.07	5.94	7278.65 ± 318.04[a]	3127.34

Means with different superscripts differ significantly (p<0.05)

CLUSTER WISE INCOME FROM GOAT REARING

It is observed that majority of the goat keepers in Nadia cluster sold their goats and accordingly their annual income from goat rearing is also higher than the other three clusters. Maximum annual income has been recorded in Nadia cluster (Rs. 10675.15 ± 392.74) having higher flock size of around 7.73 goats, followed by Murshidabad cluster (Rs. 6879.17 ± 871.93) of flock size 3.94, Sundarban cluster (Rs. 5584.38 ± 384.43) of flock size 5.96 and Jhargram cluster (Rs. 3647.27 ± 578.08) with flock of 4.40 goats. It indicates that more income is always related with larger flocks.

Table 8: Cluster wise income from goat rearing

Cluster	No. of Farmer (No.)	Avg. Reg. Doe (No.)	Flock size (No.)		Annual Income (in Rs.)	
			Opening	Closing	Per Family	Per Doe
Nadia	123	2.69	7.73	5.36	10675.15 ± 392.74[a]	3595.48
Sundarban	102	2.39	5.96	7.00	5584.38 ± 384.43[b]	2209.57
Murshidabad	35	1.71	3.94	3.91	6879.17 ± 871.93[b]	3753.85
Jhargram	46	2.23	4.40	4.55	3647.27 ± 578.08[c]	1685.86
Overall	306	2.43	6.20 ± 0.09	5.80 ± 0.22	7150.00 ± 239.29	2860.81

Means with different superscripts differ significantly (p<0.05)

The average annual income from goat rearing in the AICRP farmers (mostly women) is Rs. 7150.00 ± 239.29 (with a range of Rs. 700/- to Rs. 47,500/-). The average flock strength of the farmers has been observed 5.80 ± 0.22. However, women are involved in goat rearing in the project area and the income generated from goat rearing i.e. Rs. 7150.00 ± 239.29 per family per year and Rs. 2861/- per doe per year enabling them to solve many family financial crisis which has a social value.

CONCLUSION

Thus it can be concluded that income from goat keeping is not directly related with education level and caste of the farmers, but for proper care and management of their goats basic education is definitely required and more income is always related with larger flocks. Generally goat rearing with flock size of upto 12 goats is profitable thereby problems may be raised due to uncontrollable situations with existing resources of the goat keepers.

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