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## Status, opportunities and challenges in Bihar type Bengal goats for meat production: A review

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### Abstract

Bihar is the 5<sup>th</sup> largest goat population state in India, and it is about 7.68% of India's total goat population. In Bihar, 42.9% people below poverty line and hence there is an immense opportunity of goat husbandry to meet up the large gap between demand and supply of meat. About 574500 goats are slaughtered annually in recognized slaughterhouses donating 31.20% of total meat production of the state. However, goat husbandry is not well accepted by all classes of people in Bihar. It is mostly confined to backward classes and landless farmer who are unable to rear large animals. As a result, goat farming has not been developed as an industry. Holding size is generally 1-3 goat per family depending on availability of surplus labor in the family. Village goat is mostly of Bengal breed. Male Bengal breed comes in puberty at the age of 8-9 months whereas the age of 1st kidding is on an average 14-15 months. Lactation length of this breed of goat at farmer's field has been recorded as 80-128 days and kidding interval at 250 days. Black Bengal goat breed is highly in-depth and twinning percentage has been recorded. Goats are raised on grazing. Goat has also been playing a significant role in rain-fed farming system. Marketing of goat is under the hand of unorganized sector and middleman oriented. So, there is crucial need to develop strategy in respect of breed conservation, management, health care, credit, insurance and marketing system of goat in Bihar.

**Keywords:** Status, Bengal goats, economy, chevon, twinning, reproductive performance

### Introduction

Despite of the long time neglect and prejudices shown against goats, it remains an important livestock species in agrarian economy, specially, in areas where crop and dairy farming are not economical. It is the widest ranged utility animal. It provides lean meat, alkaline milk, soft and pliable - quality skins, high fertility value manure and the best quality of natural fibre i.e. pashmina, the tough-long fibre mohair and of course, the rough hair. In addition to its blood, casings and offals as by products goats provide livelihood to a large percentage of small and marginal farmers and landless labourers. Because of its testimonial usefulness 'the silly capricious, goats after all has caught the attention of Indian planners.

However, the productivity of goats under the prevailing traditional production system is very low (Singh and Kumar, 2007) [8]. It is because they are maintained under the extensive system on natural vegetation on degraded common grazing lands and tree lopping. Even these degraded grazing resources are shrinking continuously. Moreover, adoption of improved production technologies/ management practices in the farmers' flock is very low. Therefore, rearing of goats under intensive and semi-intensive system using improved technologies for commercial production has become imperative not only for realizing their full potentials but also to meet the increasing demand of chevon (goat meat) in the domestic as well as international markets.

Rising per capita income, growing urbanization and unfolding globalization are boosting the demand for high-value commodities including meat (Birthal and Joshi, 2006) [32]. Due to these fast socio-economic changes in the recent past, a rapid shift has taken place in the dietary habits in favour of non-vegetarians. As a result, the demand for goat and sheep meats has swiftly increased and the domestic market price for chevon/mutton has risen from Rs. 200 per kg to Rs. 500 per kg over a decade. Moreover, huge expected increase in the demand for meat in developing countries (by 100%), especially in the East and South-East Asia in the next 20 years presents an excellent opportunity for enhancing export of live goat/sheep and their meat from India (Dalgado *et al.*, 1999).

Responding to the market signals, the goat production system in India has been slowly moving from extensive to intensive system of management for commercial production. However, in the absence of any systematic study, there have been questions from the entrepreneurs, progressive farmers and even researchers on the economic viability and sustainability of commercial goat farming under intensive system. No information was available on the socio-economic aspects of commercial goat farming under semi-intensive and intensive systems of production in the country.

### I. Trends in goat population and their contributions towards national economy

India claims biggest share on the goat population map of the world. It's share works out around 21 percent as compared to world stock. It has richest germ plasm resource with 20 recognized breeds. During the last 30 years the national population of goats increased approximately 75 percent

except for few years where population declined marginally. It is the only species of livestock which has maintained a continuous rising trend. This steady increase in number has occurred despite any effort and increasing developmental programmes and ever increased removal rate touching the highest 43% per annum.

The state wise census data for goats during 2012 is given in table.

The highest goat population in India is in Rajasthan (2012) which is 21.66 million and the next followed by U.P. 15.58 million. Aravali & Vindhya plato regions are sprawling area for range systems of goat management providing better goat environmental module for adaptation. But as rain precipitation range increases their nos. seems to decrease due to high humid and high rainfall causing the rise of incidence of diseases. Their body conditioning are also significantly found to be improved during early summer before onset of monsoon and gradually declines as the rainfall increases.

**Table 1:** Details of Goats by Age, Sex and Use in Rural & Urban Areas of Certain States of India & National total

S. No.	State / UT	Male			Female				Total Goats	
		Under 1 year	1 Year and Above	Total	Under 1 year	1 year and Above				Total
						In Milk	Dry	Not Calved once		
1	Bihar	2072248	1450303	3255551	2269007	2969362	1888941	1503659	8630969	1153520
2	Madhya Pradesh	1159474	859500	2018974	1527726	2187336	1893080	386820	5994962	8013936
3	Maharashtra	1278924	620849	1899773	1717312	2641128	1871351	305743	6535534	8435307
4	Odisha	1077872	1224081	2301953	1167236	1305935	1313564	424399	4211134	6513087
5	Rajasthan	2917310	1342826	4260136	4201700	7006860	4930805	1266438	17405803	21665939
6	Uttar Pradesh	2346554	2037128	4383682	3222189	4242904	2664516	1072324	11201933	15585615
7	West Bengal	2348021	2069423	4417444	2338144	2243694	1755164	751504	7088506	11505950
	National Total	20448968	17168153	37617121	26545045	36252342	25305100	9453485	97555972	135173093

The data however, reveal two facts, firstly, there are certain states where the density of goat is quite high thereby showing the saturation point for the goat development. India is a rich repository of goat germplasm and is the home of 20 internationally recognised breeds for the purpose of meat, milk and fibre. Amongst well defined breeds distributed all over the land and well adapted to specific habitats, a few are being used in various research programmes directed towards their improvement for different purposes, i.e. meat, milk and fibre. Indeed, Beetal, Jamunapari, Malabari are used for milk, Sirohi, Black Bengal, Assam Local, Barbari, Sangamneri for

meat; and Chegu, Chantangi (pashmina) and Deccani (Mohair) for fibre.

Goats contribute significantly towards the national economy. Accordingly, it is imperative to make some estimates about its contributions in terms of meat, milk and fibre. Such an attempt based on certain assumptions is presented in table 2. As per our estimates, about 81 million of goat pieces contributed 0.54 million tonnes of meat in 2012. But there is a vast scope for improving the export market in meat, particularly to the Middle East, which could be achieved by expanding total number of goats on commercial farming.

**Table 2:** Estimates of goat meat and skin production in India

Year	Goat population (in million)	Number of Pieces* (in million)	Quantity** of Meat (in million tonnes)	Skin*** (in million sq.ft.)
1961	59.80	35.88	0.14	143.52
1966	64.57	38.74	0.16	154.96
1972	67.52	40.51	0.16	162.04
1977	75.62	45.37	0.18	181.48
1982	95.25	57.15	0.23	228.60
1987	85.60	51.36	0.20	205.44
1992	92.62	55.57	0.22	222.28
1997	100.62	60.37	0.24	241.48
2002	108.45	65.07	0.26	260.28
2012	135.17	81.10	9.54	324.41

\* Assuming 60% of goat population,

\*\* Assuming 10 kg body weight and 40 percent recovery rate

\*\*\* Assuming the average size of skin as 4 sq.ft./animal

### Status of goat in Bihar

Bihar state is a rich hinterland of Bihar type Bengal breed of goats with a population of 12.15 million goats accounts for more than 36.89% (2012) of total livestock population of the state and contribute significantly in the state economy

providing the farmers income at every point of needs. These goats are mostly kept in extensive production system under favourable to harsh environmental condition. The State (agro climatic zone 2 of the country) holds 12.15 million goats reared by 41.27 lacs farm families which on an average comes

to 2.94 goats per family and provide food and nutritional security to the millions of marginal and small farmers & agricultural labourers.

Bihar type of Bengal goats are one of the most prolific breeds of goats with high incidence of twins, triplets quadruplets. In addition to its early maturity and 3 kidding in 2 years results in multiplication of more than 300 percent per year (14 months) and indicated the possibility of a development, of highly prolific strain of goats eminently suitable for meat to mutton due to visceral concentration of fat and non distribution of fat all over the body like that of with sheep and swine. Compared to sheep the dressing percentage in which generally vary from 43 to 53% is also reported to be higher in goats. From the choice and meat consumption point the goat meat constitute a major source of mutton supply both at state and national level.

The Black Bengal goat is famous for finest quality of chevon, and skin among the world breeds of goats. The goat meat (chevon) is considered as principal non-veg items of large section of the population and is sold as costliest item in comparison to boilers and fishes. Since it is a taboo less profession and can be reared in back yards with kitchen refuge, cereal & non-cereal by products of small homes of all class of people. By simple rearing of two nannies, 6-7 kids will be available in 14 months, thus raising the living standards above poverty level. Since more than 70% of the farmers of the state are small, marginal & landless and the goat rearing for them is highly favourable in rural areas as it is free from land size. Grazing of goats exclusively on wasteland is the most profitable proposition.

### Reproductive efficiency

From the reproductive performance point Bihar type Bengal breed excels in age at puberty, kidding intervals, gestation period and multiple birth (Table-3) which in turn give 300% growth rate in 14 months duration and making it better performing goats among the meat breeds of India.

The average duration of oestrus in Black Bengal goats has been reported to be  $33.94 \pm 0.66$  hours by Singh *et al.*, (1985). Significantly lower duration of oestrus as also reported by them during the post - monsoon season in October ( $30.18 \pm 2.01$  hours). They also reported the duration of oestrus in local Bengal goats to be varying from 6 to 60 hours. 50% of the females exhibited minimum duration of oestrus and 10% showing oestrus to be 20 hours and 31% to be more than 40 hours. Singh *et al.*, (1980) also reported the average duration of oestrus and post-partum oestrus  $32.72 \pm 1.07$  hours and  $67.91 \pm 2.52$  days respectively. They also found that within 2 months of kidding 21.73% primiparaus and 60.53% multiparus came in heat. They recommended mating of goat after 30 days of kidding for better conception rate.

The average age of first conception, age of first kidding, service period, kidding interval, gestation length and litter size in Black Bengal goats had been estimated by Singh *et al.*, (1986) to be  $296.23 \pm 12.26$  days,  $439.40 \pm 12.26$  days,  $94.34 \pm 11.44$  days,  $237.56 \pm 5.75$  days,  $143.45 \pm 0.55$  days,  $1.37 \pm 0.044$  respectively. They noticed increase in litter size with kidding sequence, the average litter size being  $2.0 \pm 0.06$  in the 4<sup>th</sup> kidding.

**Table 3:** Reproductive performance of certain meat breeds of Goat

Sl. No.	Characteristics	Breeds				
		Barbari	Sirohi	Malabari	Black Bengal	Sangamneri
1.	Lactation yield (kg)	78.50 to 95.58	80.28 to 115.93	$49.40 \pm 10.24$	$58.86 \pm 4.64$	$83.40 \pm 3.43$
2.	Lactation length (days)	127.0 to 179.0	133.69 to 176.58	$139.50 \pm 20.25$	$118.9 \pm 9.58$	$167.80 \pm 5.25$
3.	Age at puberty (days)	$307.89 \pm 6.02$	–	$425.00 \pm 15.00$	326.00	418.48
4.	Age at first kidding (days)	$493.74 \pm 16.90$	–	$495.05 \pm 18.86$	$506.00 \pm 21.99$	–
5.	Kidding interval (days)	$265.93 \pm 10.79$	–	$284.69 \pm 18.15$	$248.10 \pm 10.97$	$364.04 \pm 4.56$
6.	Gestation period (days)	$144.90 \pm 0.29$	–	$147.40 \pm 1.20$	$142.40 \pm 0.80$	$147.14 \pm 0.89$
7.	Prolificacy					
	(a) Singlet	45.6 to 49.6%	95.7 to 91.5%	55.2	22.10	57.10
	(b) Twins	47.6 to 59.9%	4.3 to 8.5	42.5	41.10	42.90
	(c) Multiples	1.1 to 5.5	–	2.3	38.80	–

**Feed efficiency:** The Bihar type of Bengal and Malabari breeds are famous for the fast growth, early maturity, short lactation interval, wide range of adaptability and high dressing percentage. These breeds are famous for their maintenance on low grade ration particularly roughages that

are not much used by other animals and converting such roughages into the high quality protein, milk and meat breeds finest skin of the world standards. The feed efficiency appears to highest in Bengal breeds as compared to other meat breeds (Table-4).

**Table 4:** Production performance of Goat Breeds for meat

Sl. No.	Breed	Birth weight (kg)	Weaning wt. at 3 months	Market wt. at 6 month	Milk Yield (kg)	Lactation length (days)	Multiple birth (%)	Feed efficiency
1.	Sirohi	2.78	9.79	13.49	71.18	174.80	7.10	8.50
2.	Barbari	1.76	6.71	8.75	95.582	152.30	50.30	7.00
3.	Sangamneri	1.87	7.28	10.06	83.40	167.80	37.20	–
4.	Bengal	1.13	4.75	6.81	52.839	118.80	77.60	5.80

### Development of Meat Breed

For evolving superior strain of meat goats, foundation population with wide genetic base with high level of performance are needed. Nearly 90% of goat population in the state are reported to be of non-descript. It is, therefore,

necessary to raise genetically stable population through selective breeding for providing regular source of supply of superior germ plasm for development of meat breed of goats. In such breeding system various phenotypic parameters are essential to be studied in all out measures in addition to

improvement of traits like body weight, multiple birth etc. the population will also serve as useful material for conduction of experiments and researches in different facets of management, nutritional, physiological, functional health disorders etc. The approach thus would serve a long way in the preservation and improvement of indigenous germ plasm resources in Bihar type of Bengal goats.

### **XB in goats**

The benefit of this approach is questionable as a possible Genotype x Environment- effect is ignored and the animals have never been tested under the conditions of an extensive system and farmers reported bad-experiences with breeding bucks of exotic dairy breeds (Excarenó *et al.*, 2011).

### **Flock Size, Breed and Investment Pattern**

The size of initial flock of goats for the new entrepreneurs is an important factor for the success of a commercial goat-farming. The new entrepreneurs, who start with a large flock of over 100 goats without gaining experience of managing small flocks are likely to fail and suffer from losses and some of them even have to leave the business (Shailendra Kumar, 2007)<sup>[8]</sup>.

The minimum number of breeding goats in a commercial unit should be 50 to make it a self-sustaining unit that can provide livelihood to at least one household.

### **Mortality**

Kumar Shailendra (2007)<sup>[8]</sup> reported that in Inter-breed comparisons, the mortality rate was lower in Sirohi and Osmanabadi than Barbari and Black Bengal. Based on empirical evidences, it has been suggested that the medium and large sizes of goats reared under intensive system for commercial production should attain more than 25 kg body weight at the age of 6-7 months for achieving their full economic potential. He further reported that mortality on the average was found to be 27.12%.

The use of vaccines such as PPR, HS and FMD and medication for internal as well external parasites need to be used as recommended for effective prevention of diseases and improved productivity. On many occasions, farmers could not use vaccines due to their non-availability.

Mortality and morbidity losses due to diseases in goats have been a major constraint in the traditional flocks (Kumar *et al.*, 2003)<sup>[8]</sup>. The risk of certain diseases increases in large flocks maintained under the intensive system. On overall farms, the estimated losses due to diseases in goats were 23.22 percent of net returns and 5.21 percent of gross returns.

Mortality rate among kids of Bengal goats up to 30 days of age was reported to be the highest. Kids having birth lower than 800 gm at birth had the lowest chance of survival. Pneumonia and enteritis accounted for 15.81 and 21.2% of the deaths in kids of Bengal goats respectively (Singh *et al.*, 1983)<sup>[22]</sup>.

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