



Scope of dairy goat production in India

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Introduction

For thousands of years, humans have used animals for several purposes, including milk, meat, bones, wool, skin, and draught work. The goat is considered to be one of the earliest ruminant species to be domesticated about 10,000 BCE. Humans have utilized goats for their skin, bones, and hair in addition to their milk and lean flesh. Globally there are more than 300 different goat breeds which are kept for meat or milk purposes. The goat is also known as the “Poor men’s Cow” as its cost of rearing is significantly less as compared to cow or buffalo. The goat is economically significant to those who live in arid, semiarid, mountainous, and isolated tribal areas because of its resistance to extreme weather, capacity to consume crop wastes of lower quality, small size, high rate of growth, and short gestation period.

Production of goat milk has been a successful technique in developing countries like India to address the problem of undernutrition, especially among the baby population (Haenlein et al., 1996, 2001, 2004). Another draw is that small ruminant production is considered to be the best option for sustainable livestock husbandry having a great scope for socio-economic development of different categories of farmers across almost all types of agroecological situations like desert, semi-arid, and other difficult regions of the world. The goods produced, namely milk and meat (from young animals), are of exceptional quality in terms of nutrition (Boza, 1993).

Benefits of consuming goat milk

Goat Milk is a source of many macros and micronutrients. It has balanced proportions of protein, fat, carbohydrates, other nutrients and minerals that are essential for wholesome nutrition

and have various advantageous health benefits. Goat milk is considered to have several health advantages and a decreased chance of allergy, hence superior as compared to milk from other species.

- Compared to cow milk, goat milk provides 13% more calcium, which is necessary for the formation of bones.
- In comparison to cow milk, it has 20% more vitamin K. Vitamin A concentration is 25% greater, which is good for the development of eyesight. It has 27% higher selenium. The amount of riboflavin (vitamin B2) is greater.
- Goat milk is naturally homogenized as the size of fat globules is smaller than that of cow milk or buffalo milk, making it easier to digest.

There have been various studies which have shown that goat milk might be helpful in the treatment dengue fever as a supportive therapy. Selenium deficiency in dengue fever may lead to thrombocytopenia. Compared to cow and sheep milk, goat milk and milk derivatives are the highest sources of selenium (Se).

Goat milk has higher concentration of Sialiloligo-saccharides than the milk from other ruminants, which helps developing brains in human infants. Sialic acid boosts immunity and helps with brain development in young children.

Goat milk contains includes non-digestible oligosaccharides that function as prebiotics and encourage the growth of helpful bacteria in the gut while inhibiting the growth of harmful bacteria. Additionally, it aids in the rehabilitation of animals suffering from colitis and lowers intestinal inflammation. Typically, goat milk has 250–300 mg/L of oligosaccharides. It is also said to have antimicrobial properties because oligosaccharides found in goat milk serve as scavenge receptors, limit the formation of *Escherichia coli* heat-stable enterotoxin, and prevent contact between leukocytes and endothelial cells.

Additionally, it has some antioxidant qualities. Potent antioxidant peptides can be produced from goat milk proteins by in-vitro hydrolysis by enzymes or fermentation by lactic acid bacteria. It has strong iron chelation, radical scavenging, and anti-oxidation properties for polyunsaturated fatty acids.

Present Scenario of Goat Milk Production in India and the World

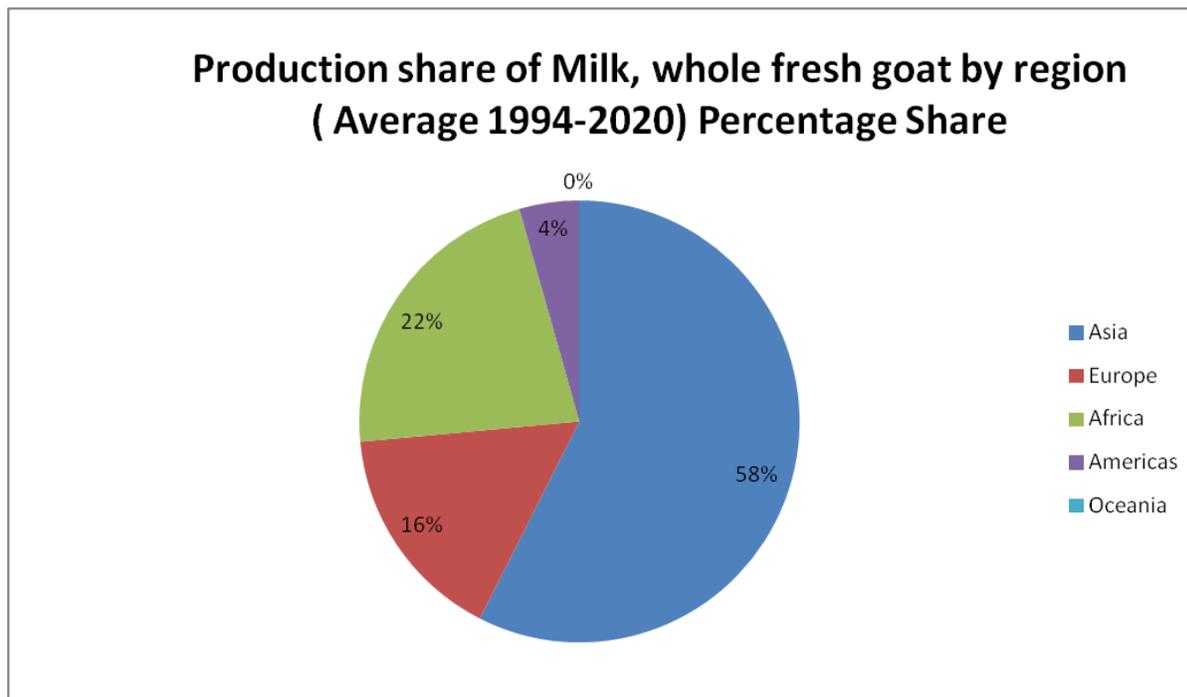


Fig.1 Chart showing share of Goat Milk Production (FAOSTAT, 2022)

India comes in second place behind China in terms of the number of goats with 148.8 million. Goat milk is produced in the world's greatest quantity in India, with 5.75 million metric tons produced in 2017.

The majority of goat milk produced worldwide was on the Asian continent. Asian nations account for 57.5% of the global output, followed by African and European nations at 22.1% and 16.1%, respectively (FAOSTAT, 2022).

Only 3% of the milk produced in India by diverse species, including cow, buffalo, etc., is goat milk (BAHS 2019-20, Govt. of India). Rajasthan had the largest goat milk output among the Indian states, followed by Uttar Pradesh and Madhya Pradesh.

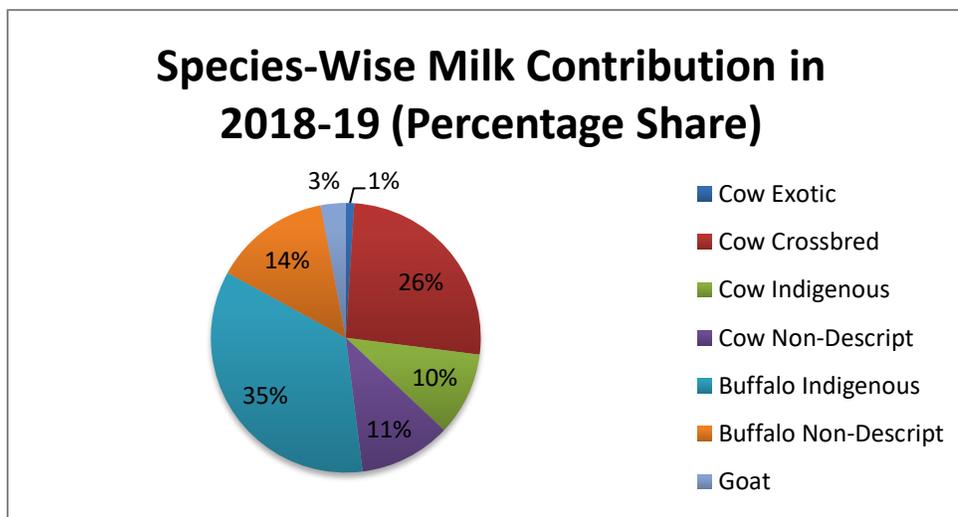


Fig. 2 Resourced from BAHS 2019

Dairy Goat Breeds

The type of dairy goat breed chosen has a significant impact on how much milk a farm can produce. There are more than 200 different goat breeds in the globe. It is crucial to choose a breed with strong physical traits, high milk output, consistent milk production, and shorter kidding intervals all year round. Additionally, one should be conscious of the surroundings in which the animal will be maintained. Not all breeds are suited to the tropical environment of India. The climate in India is often viewed as not being ideal for European breeds, which has an impact on their production capacity. One may choose local dairy goat breeds in such a situation or cross-breed them with foreign varieties.

There are many indigenous goat breeds which can be used for milk production such as Jamunapari, Beetal, Barbari, Surti, Mehsana etc.

Indigenous Goat Breeds

Breed	Milk Yield/Day (in kg)	Yield/ lactation (in kg)	Female Body Weight (in kg)
Jamunapari	1.5-2.0	200	40-50
Beetal	2.0-2.5	150-190	35-40
Barbari	1.5-2.0	140	23-25
Surti	2.0-2.5	178	20-23



Fig.3 Jamunapari doe



Fig. 4 Sannen doe

Exotic Goat Breeds

The majority of European breeds are effective milk producers. Due to the tropical environment, they are unsuitable for the majority of India, which is a disadvantage. These breeds can be raised in the country's colder areas. Additionally, they can be crossed with native animals to boost the milk output of our native breeds. Sannen, Toggenburg, Nubian, Alpine, Anglo-Nubian, and other good examples of exotic European breeds.

The Sannen breed of dairy goat has one of the lowest butter fat percentages at approximately 3% but the highest milk output among exotic dairy breeds, with a potential to produce 4Kg milk/day and a lactation time of about 300 days. According to reports, the Nigerian Dwarf breed has the highest butter fat percentage at around 6.4%.

Dairy Goat Confirmation Characteristics

According to American Dairy Goat Association (ADGA), the body conformation for dairy goats required are as follows-

General Appearance- A tall stature and robust body-frame having perceivable upstandingness, length, and smoothness of blending and graceful gait.

- a. Deep and wide brisket with moderate strength of brisket
- b. Squarely placed front legs
- c. Strong back and rump with well-defined vertebral column and slightly uphill withers; level chine
- d. Straight and wide loin
- e. Smoothly set, wide hips levelled with back; strong and uniformly wide rump

- f. Rump needs to be wide enough to comfortably house the udder Well angulated rear legs, cleanly moulded hocks, nearly perpendicular angle from hock to strong and flexible pastern.
2. **Head and Breed Character-** broad muzzle; well-sculpted, alert eyes; strong jaw with angular lean junction to throat; true to the breed characteristics
3. **Mammary System-** Strongly attached, elastic, well-balanced udder with adequate capacity, quality, ease of milking

Dairy Goat Production Systems

1. **Village Herds:** In tiny village farms, small flocks of 2–10 goats are kept. These goats are given leftovers to eat, or they can graze on nearby rangelands or along the sides of the road. Frequently, there is no designated land for the cultivation of fodder available to the farmers. These goats, which are primarily bred by women and kids, provide extra income through the sale of their milk, flesh, and skins.
2. **Extensive System** – In this system, the farmers move around looking for excellent grazing grounds. The majority of nomadic people use this approach. In this method, the animals are free to roam around and can graze anywhere they like. The milk obtained in this way may be sold in the neighborhood market. In regions with a chilly temperature, such as Jammu & Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, etc., this sort of system is typically observed.
3. **Intensive System:** It is crucial for the production of goat milk for commercial use. The animals are often kept in the same area and only moved to another location for milking. Compared to feed or grasses, concentrates are more dependent on them. Animals' needs for energy can be satisfied. To boost the quantity and quality of milk produced, a variety of cutting-edge scientific, hygienic, and reproductive techniques can be used.



Fig. 5 Commercial Dairy Goat in Intensive System

Remove Goat Odor from Goat Milk

Lactic acid, which is present in high concentrations in goat milk and grows rapidly, especially when the milk is held above 38 °C. This has an impact on the flavors and aroma of milk. Does (female goats) generally create a lot of pheromones, and when they are kept near to bucks, they are impacted by the odor of the latter, which is carried into milk. Breeds like the Toggenburg and Oberhasi are well recognized for having strong body odors. The scent of the crop's seeps into the milk if the goat is fed a diet rich in onions and garlic. The flavor of milk may also be impacted by water consumption. The "poor" flavor is caused by excessive copper or iron levels in the water.

How to remove the smell?

The does and bucks should be kept away from one another. Farmers should if at all feasible, only permit the does and bucks only to interact during the breeding season. This aids in getting rid of the goaty taste in milk. Keeping things clean is essential during milking. Before milking, the udder must be properly cleansed with warm water and the coat combed.

Value of Addition of Goat milk and marketing

Goat milk may be used to make a variety of goods that can be made and sold for greater prices on the market, eliminating the need for cold storage and minimizing wastage. Additionally, the number of individuals who consume fresh goat milk in a region may be restricted. As a consequence, items made from goat milk can be shipped across greater distances for consumption

in regions where there is a demand but no supply, fetching a higher price and generating income for the farmer.

According to a study report of Innovative Technology based Business Model- Rajasthan Competitiveness Agricultural Project, the various products prepared will fetch the following prices in the market-

1. Flavored Milk: MRP Rs 40 Per 200 ml
2. Goat Milk Cheese: MRP per kg will be Rs. 1,600/Kg
3. Goat Milk Ghee: MRP will be Rs. 2,000/Kg
4. Skimmed Milk: MRP will be Rs.40/L

Distribution Channels- The goat milk produced can be marketed through various channels such as

- Supermarkets and Hypermarkets
- Specialty Stores
- Convenience Stores
- Online Sales

Targeting a niche market- The production of goat milk cannot take the place of our current traditional dairy industry, which is reliant on cows and buffaloes. Those who choose to drink goat milk for health reasons might be the target market for a goat milk farmer. Additionally, since there is a larger demand for goat milk during the dengue season, a farmer might schedule the production of the milk to enhance the price at which it is sold.

SWOT Analysis of the Dairy goat sector

Strengths-

India has the second highest goat population in the world after China. Goats are exceptional hardy animals with the capacity to adapt to the harshest environments, and the ability to move with ease across difficult terrain. Moreover, our native and indigenous breeds have good production potential. These animals have low expenses in comparison to cows and buffalo.

Weakness-

The majority of this industry is unorganized and lacks capabilities for various types of marketing infrastructure that would add value, such as cold chain, milk processing, storage, and refrigerated trucks. Public-private partnerships are also lacking in this sector. Due to a lack of demand, breeding stock for raising these types of goats is difficult to come by. People also prefer meat-type goats over dairy goats. Due to a dearth of veterinary and extension services, farmers are

unaware of what is necessary to maintain these goats. The government offers no assistance in raising these goats.

Opportunities-

There has been a continuous rise in demand for goat milk and its products as people are becoming more aware of its benefits over cow and buffalo milk. The start-up cost is also less in this sector. One may not solely depend on goat milk for his/her income and can easily rear it in a mixed farming or integrated farming set-up. The products produced have good export potential to various countries in the middle east and south Asia. As technology is developing day by day, a farmer can adopt these modern production technologies to increase his/her production and reduce labor.

Threats-

Extreme weather patterns and natural disasters are becoming more commonplace, and they might have an impact on animals' ability to produce. Mortality on a farm is brought on by the invasion of many diseases like Peste de Petits Ruminants. The amount of grazing land is shrinking daily as a result of the expansion of metropolitan areas.

Conclusion

Goat milk production in India has tremendous potential given, the right opportunities and support from both the government and private sector. Goats are very hardy animals and can be reared at a minimal cost. These goats can act as means of livelihood for the poorest of the poor sections of society and for women who want to become financially independent. Looking at the commercial aspects of goat milk production, there is ample scope for this too. No doubt the production of goat milk cannot replace cow or buffalo milk, rather it can act as a healthier alternative for people who cannot consume cow or buffalo milk. If we look at our Ayurvedic texts, numerous benefits of goat milk have been mentioned and this can be a unique selling point for companies. There is scope in India to produce goat milk and this area needs to be explored.

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