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ORIGINAL ARTICLE



Implications and comparison of sustainable and commercial dairy farming in India

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Milk is a complete feed as it is a rich source of nutrients like carbohydrates, protein, fats minerals and vitamins. India contributes more than 20 percent of total world milk production. Milk production in India was 187.96 millon tonnes and is almost double than the second positioned United States of America (Anonymous, 2018). The value of output from dairy is 21 percent of total agricultural output in India and it has emerged as a commodity with highest value across agricultural sector and even higher than the value of paddy, wheat and sugarcane combined. Milk and milk products are the principal source of protein for majority of population of our country who are lacto-vegetarians. Milk forms an essential part of beverages like tea, coffee, butter milk and lassi in India. Byproducts of milk like Dahi, Paneer, Shrikhand and Mawa sweets are the part of daily cuisine of millions of Indians. Dairy sector and especially if we talk of Cow, it has mythological importance since ages. Cow is worshipped as mother (*Gao-mata*) in our country and can be very well explained by shlokas as

"SARVE DEVAAH STHITA DEHE SARVA DEVAMAYEEHI GAOU"

The shloka means that all the deities dwell in the body of a cow. Therefore, the cow itself is as holier, as the deities. Before we go into main concept of sustainability vs Commerciality, we need to understand the history and development of Dairy industry in India.

BRIEF HISTORY AND DEVELOPMENT OF DAIRY INDUSTRY IN INDIA

Livestock husbandry was the integral part of livelihood in India since ancient India. Development of Indian Dairy industry can be described in following phases in short as,

1. Neolithic period- Barley and wheat cultivation along with the rearing of cattle, sheep and goat in Mehrgarh as early by 8000-6000 BCE.



2. Medieval period- Importance of livestock rearing was seen in the book Ain-i-Akbari written during Akbar's period. It mentions that one major object of taxation apart from the cultivated fields was cattle (Randhwa, 1980).



3. Colonial period- It has two facets. On one side community pastures were destroyed by Englishmen resulting in reduced herd size of livestock owners. While, commercialization of dairy industry was also started though at small scale in this phase to fulfill the demands of English troops and newly arising urban cities like Bombay, Madras etc.



4. Post-independence to pre-operation flood period- Characterized by Policy indecision of improvement of breeds through selective breeding of native cattle vs adoption of crossbreeding throughout the country. We can see that per capita milk production was stagnant throughout this period from 131g/day in 1951 to 132 g per day in 1981.



5. Operation flood period- Milk production in 1968-69 prior to the launch of Operation Flood was only 21.2 million tonnes (MT) which increased to 51.4 MT by 1989-90 and 84.6 MT by 2001-02. India has become the world's largest milk producer in 1997-98.



6. Present overview of dairy industry in India- Total bovine population in India is 302 with production of 187 million metric tons of milk and per capita availability of milk is 394g/day in 2018-19.

SUSTAINABILITY VS COMMERCIAL DAIRY FARMING

A. COMMERCIAL DAIRY FARMING:

It is a type of dairy farming where resources like land, water, energy are utilized at fullest for economic purpose. Even dairy animals are kept under intensive pressure of milk production, weight gain and reproduction and fed without taking into account the health aspect. It results into,

1. Adverse effects on health:

Animals becomes more susceptible to diseases in crowding sheds. Animals becomes prone to many metabolic and infectious diseases due to higher level of stress.

2. Adverse effect on productivity:

Increase in the stress of animals leads to subacute disease conditions leads to lowered milk production.

3. Adverse effects on environment-

Imbalanced nutrition and feeding may lead to production of higher green house gases. Moreover animal waste if not treated properly it may contaminate the water bodies especially with high nitrogen content and and threaten the ecosystem's biodiversity.

B. SUSTAINABLE DAIRY FARMING- It is type of dairy farming where we have to meet the needs of present without compromising on the needs of future generations as well. Sustainability of any industry include dairy industry have three spheres

1. Environmental sustainability- It includes the total effects of human activities for dairy production unit on ecosystem. It includes the flow of inputs like land, water and energy towards production system and any emissions like methane emission, faecal nitrogen entry etc. into the environment system.

2. Economic Sustainability- Means economic return is achieved not at the cost of heavy burden on natural resources.

3. Social Sustainability- It is least attended aspect of sustainability. Social sustainability can be defined as the development of social structures and processes that meet the needs of the present in a community at the same time as laying a foundation for the community to continue to develop in a sustainable way in the future (Segekvist *et al.*, 2020). It includes aspects such as community development, community resilience, livelihood, social equity, etc.

APPROACHES AND STEPS FOR SUSTAINABLE DAIRY FARMING IN INDIA

For development of a dairy farm with sustainable approach following steps takes into consideration,

1. Establishment of farm and Selection of animals:

After studying the market, local conditions, availability of land, labours, water and other resources determine the size of herd as well as stocking density. In India, according

to climatic conditions, buffaloes, crossbred cattle or improved indigenous breeds like Gir, Sahiwal etc. can be chosen. If the area is hot, humid and constraints of feeds and fodders are there buffaloes are preferred animal over cattle.

2. Feed, fodder and water requirement:

Water source should be created on farm for 24 hours supply to animals. Green fodder should be grown on own farm throughout year and techniques like hay making and silage making can be used for preservation of good quality forage throughout year. Maximum nutrient can be supplied through green fodder with limited use of concentrate mixture by balancing the diet of animals. It will not only reduce the methane emission but also the nitrogen toxicity in water bodies. Ensure appropriate storage conditions to avoid feed spoilage or contamination and reject mouldy. Also, feces production can be subjected to gobar gas plant for loss of gases in air and use of CH₄ gas for productive purpose. Gobar gas manure is also a very quality manure for agricultural use.

3. Hygienic milk production:

Healthy milking practices like washing of animals, washing of udder, milker's hands, use of proper method of hand milking, use of cap etc. should be employed so that it does not injure the animals or introduce contaminants into milk. Also, spoilage of milk after milking should be avoided and refrigerate and store the milk under hygienic conditions.

4. Health management of herd:

Prevent the entry of disease in the farm through visitors. Strict visiting guidelines can be followed. Vaccination of different categories animals should be carried out timely. Regularly check animals for signs of disease Sick animals should be attended to quickly and in an appropriate way. Manage animal diseases that can affect public health (zoonoses)

5. Animal welfare:

Animals should be kept according to the following 'five freedoms'

- ❖ Freedom from thirst, hunger and malnutrition
- ❖ Freedom from discomfort
- ❖ Freedom from pain, injury and disease
- ❖ Freedom from fear
- ❖ Freedom to engage in relatively normal patterns of animal behaviour. (FAO and IDF, 2011)

CONCLUSION

Commercialization of Dairy has not happened in India at large scale except some states or urban localities. In India, share of milk production by large number of small and marginal farmers is higher. However, sustainable dairy farms are in view of animal health as well as hygienic milk production is very important aspect. A dairy farm who can cater the growing needs of animal protein through milk and milk products in a holistic way is the need of the hour.

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