FUTURE PROSPECTS OF THE DAIRY CATTLE PRODUCTION IN INDIA

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INTRODUCTION

Milk is an essential commodity and an important source of nutrition for us. The dairy industry has been one of the most silent but one of the most important food categories globally. India ranks first in milk production, accounting for close to one fifth of the world output, but per animal productivity is low. The 140 million tonnes milk today comes from over 70 million households, which is about 50% of total number of households in India. This makes milk production highly fragmented and poses difficulties for organised dairy sector to procure quality milk and process it to meet the growing demand of consumers.

The future of the dairy cattle production in India is promising and vibrant as there is plenty of scope for genetic improvement. The cattle breeding policy of the country is well suited to the present scenario, however need to be implemented judiciously. There should be a region based and resource dependent common breeding policy suited to the various agro-climatic conditions of the country. Some of the important points to be considered for sustainable genetic improvement of dairy cattle are given below:

Upgrading of the non-descript cattle:

The large number of low producing non-descript population need to be targeted to improve their productivity through crossbreeding or upgrading. The non-descript population need to be culled gradually so as to avoid their competition for the feed and fodder resources. As the non-descript animals are mainly maintained by the rural poor, upgrading them using the exotic Jersey or Holstein Friesian breeds may not be a feasible option and hence it is recommended to use the Indigenous dairy breeds available in the region for sustainable productivity. This will also help to conserve and propagate the Indigenous cattle breed population.

Conservation and propagation of indigenous cattle breeds:

Most of the famous indigenous cattle breeds are either under the threat of extinction or in a diluted form. These breeds were evolved over the years in their native tract and are well suited to the prevailing agro-climatic and topographical conditions. Even though their genetic potential for milk production is low, they can be a sustainable milk producer to the less resourced landless, small and marginal rural farmers. These breeds are need to be conserved and genetic improvement programmes focusing on improving the economic viability of each breed need to be implemented.

Assessing and improving the draft capacity of the indigenous cattle breeds:

The indigenous cattle are traditionally used for various agricultural operations; however, the draft capacity of the cattle breeds is not well assessed so far. The shrinking agricultural land area and the expected topographical modifications may prevent the adoption of mechanized farming and in near future, it will become imperative to use the animal draft power for agricultural operations. Hence, it is the need of the hour to assess and improve the draft capacity of the indigenous cattle.

Selective breeding among the crossbred cattle for increasing milk the production:

The crossbreeding programme was implemented by using the temperate dairy breeds such as Jersey and HF cattle for improving the milk production. The crossbred cattle perform better over the indigenous cattle and hence selective breeding may be done within the crossbred cattle utilizing the proven Jersey or HF crossbred bull semen. The level of exotic inheritance should be restricted to 50%. No doubt that crossbreeding is useful in increasing the production potential of the cattle, but, indiscriminate or unplanned crossbreeding may lead to the reduction in the milk production obtained in the F1 generation. The reduction in the heterosis in the F2 generation needs to be checked through planned breeding so as to retain or increase the milk production potential of the cattle.

Establishment of bull mother units:

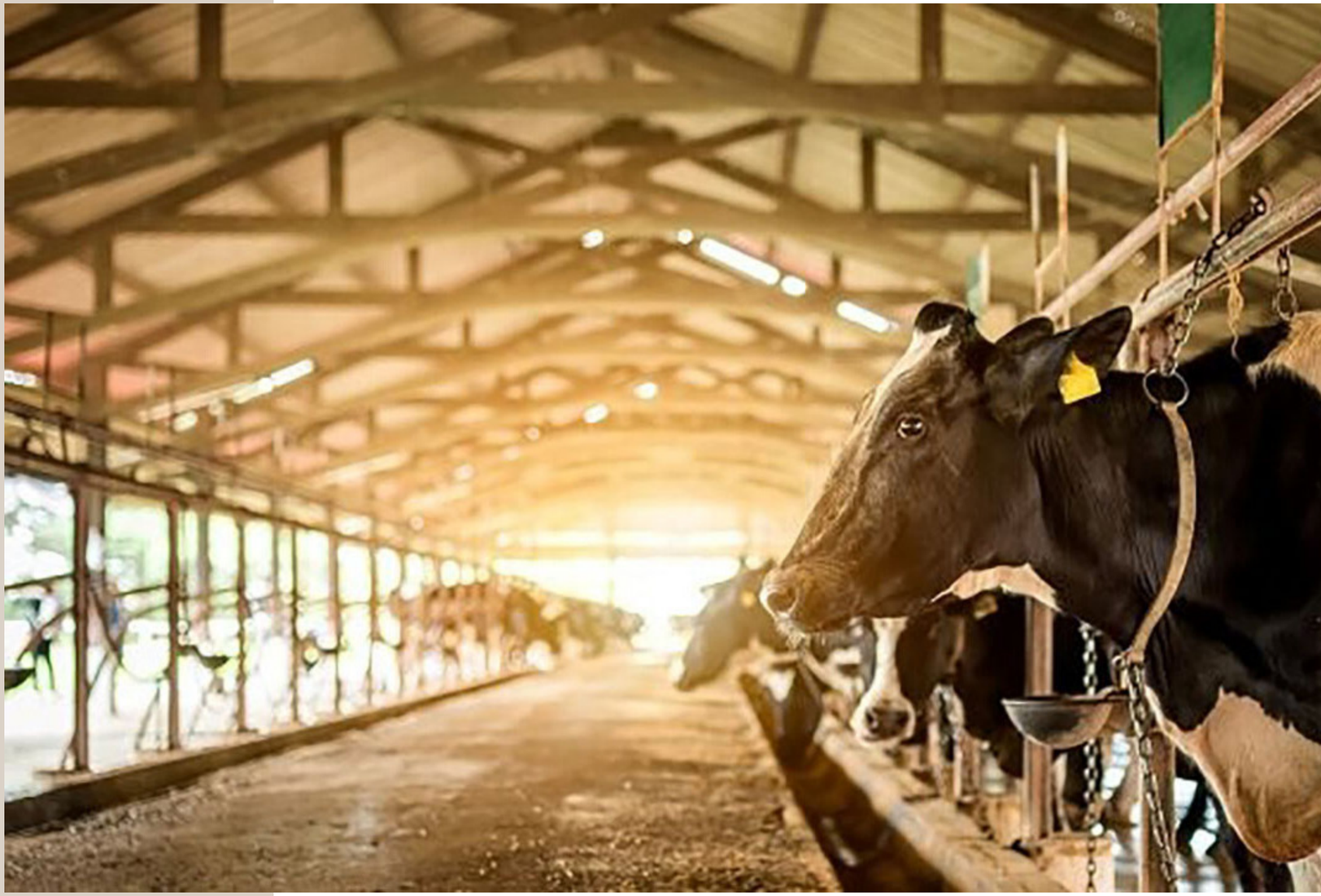
The major problem in the implementation of cattle breed improvement programme is the unavailability of proven breeding bulls. In order to cater the breeding need of the vast cattle population, it is necessary to establish the bull mother units to rear and develop the indigenous and crossbred bulls for semen collection. The states must have the nuclear breeding units which will rear the required number of proven breeding bulls for future breeding. The male calves born to elite female and proven bulls of different breeds of indigenous or exotic origin need to be reared and progeny tested using the farmers herds along with the organized herds. MOET technology may also be used to produce more number of male calves from elite females to bring the genetic gain at a faster rate.

Production of sexed semen:

It is one of the most desirable and effective reproductive technologies for the genetic improvement of cattle. It is necessary to evolve an accurate, effective, easy, non-invasive and cost effective method of sexing of cattle sperm. The sexed semen straws may be distributed to the stake holders at reasonable cost will cater the required replacement for the females and ensure the birth of male calves as potential future bulls.

Establishing and strengthening the artificial insemination facilities:

The artificial insemination (AI) helps to spread the high genetic merit of the breeding bulls to larger population of the cattle. However, the infrastructure facilities in terms of the number of breeding bulls, semen freezing labs, storage and transport with cold chain facility, number of AI centres and number of females covered under AI are to be improved. The National Programme for cattle and buffalo breeding implemented by the Government of India helps to strengthen the infrastructure facilities to ensure the AI at the doorsteps of the farmers and state like Uttarakhand also implements the programme. The Artificial Insemination (A.I.) facility needs to be extended all over the country, covering majority of the cattle population. Even though, the country has the largest A.I. infrastructure facility, it covers only 27 per cent of the bovine population and in many parts of the country it is far from satisfactory. The NPCBB needs to be strengthened in providing the A.I. facilitate to all the cattle population.



Application of other reproductive technique such as IVF, IVF, cloning etc.:

The reproductive efficiency of the cattle can be improved by the application of various advanced technologies such as in vitro fertilization, in vitro maturation, cloning, stem cell technology, nanotechnology etc. These technologies will help in faster multiplication of the elite germplasm and enhance the lifetime productivity of the animals. It will also help to reduce the generation interval, increase the rate of genetic gain and reduce the unnecessary expenditure on non-producing cows.

Application of marker assisted and genomic selection:

The marker assisted and the genomic selection methods can be used as alternatives for the traditional selection methods. Marker-assisted selection (MAS) is a selection approach in which the relative breeding value of a parent is predicted using genotypes of markers associated with the trait. The information developed through the molecular markers such as PCR-RFLP, RAPD, AFLP, minisatellite (VNTR), microsatellite, SNP etc. can be used as the criteria for selection of animals. The genomic selection is a form of marker-assisted selection in which genetic markers covering the whole genome are used so that all QTL are in linkage disequilibrium with at least one marker. It enables prediction of the genetic merit of animals from genome wide SNP markers and will allow faster improvement in productivity as well as health, reproduction and longevity. Recording of accurate and authentic data on families and individuals on production, health, reproduction and other important traits will be crucial even while using genomic selection. In genomic selection variation in DNA sequences among individuals is used along with pedigree and individual performance data, to predict the predicted transmitting ability (PTA) of individuals with increased reliability.

Use of advanced sire evaluation methods:

The genetic evaluation of sires is one of the most important aspects of any breed improvement program. The use of recent advancement in the area of sire evaluation will help to predict the expected breeding values of sires more accurately thus helping to increase the selection efficiency. The application of mixed model methodology, BLUP animal model, REML for single and multiple trait evaluation, random regression model (RRM) etc. will be useful to predict the breeding value of bulls with greater accuracy.

Improving the availability of quality feed and fodder:

The main cause of low milk production of our dairy animals may be due to the availability of poor nutrients in quality as well as quantity. Even the high genetic metric of the crossbred cattle could not be fully exploited due to the inadequate availability low quality of feed and fodder. The increased cattle population size coupled with the shrinkage in the agricultural land led to the wide gap in demand and supply of feed and fodder which needs to be addressed to increase the milk production. The unconventional feed resources available need to be fully exploited and immediate action need to be taken to develop and adopt alternative advanced feeding technologies, if any.

CONCLUSIONS

The dairy cattle production in India is rural based mixed farming system as nearly 80 per cent of the livestock is maintained by the rural farmers. Even though India is bestowed with a range of cattle and buffalo genetic resources, these defined breeds constitute hardly 20-25% of the total cattle and buffalo population and the rest are non-descriptive. India is now the highest milk producer in the world with a total production of 132.43 million tonnes during the year 2012-13. The majority of milk production is contributed by the bovines (96.26%). The crossbreeding of indigenous cattle with temperate dairy breeds has played significant role in increasing the milk production. However, the availability of a larger population of non-descript cattle, poor coverage of A.I. to the cattle population of the country, erosion of the indigenous breeds due to indiscriminate crossbreeding, health and reproductive problems in crossbred cattle, shrinkage of agricultural land, shortage of feed and fodder resources, unorganized dairy collection and distribution facilities and poor milk pricing policies etc. are some of the major constraints which are need to be addressed efficiently to increase the bovine milk production of the country.

The future dairy farmer will be more knowledgeable about commercial dairy farming, will use mechanisation and automation for improved efficiency and profitability, focus on high quality feed, silage, have high productive cattle, the average farm size will be 50 to 100 cattle or more and will remain in dairy farming because as this business finds to be attractive when compared to other options. The overall cattle population in the country will reduce but productivity per cattle will improve thus making each farmer profitable and environment friendly.