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FACTORS AFFECTING QUALITY DAIRY BULLS PRODUCTION IN INDIA

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ABSTRACT

Bovine genetic resources of India constitute an important component of animal genetic resource and they substantially contribute in the GDP as well as towards the food security of our country. The purpose of the present report is to divulge the population dynamics of breeding bulls and its consequences thereof in animal breed improvement and conservation programs. Steps that could be taken to monitor and multiply the breeding bulls of cattle and buffalo species in India are delineated in the present article.

1. INTRODUCTION

1.1. Population Dynamics Of Breeding Bulls In India

According to 19th livestock census [1] livestock population in the country has reduced from 529.7 to 512.05 million during 2007-2012 with an overall decline of 3.3%. The total bovine (Cattle, Buffalo, Mithun and Yak) population is 299.9 million, which showed the decline of 1.57% over 2007 census [2].

As per 2012 census (19th census), major dairy genetic resources in India comprise of 190.90 million cattle and 108.7 million buffaloes. According to this census, overall cattle population of the country has decreased by 3.14 per cent. On the contrary, overall buffalo population in our country has increased from 105.3 million to 108.7 million showing growth of 3.19% from 2007 to 2012 [1].

If we analyse this change in population dynamics (from 2007 to 2012) carefully, particularly sex wise, then the scenario is altogether changed and it indicates that per cent change in female population have increased both for cattle and buffaloes by 6.52% and 7.99%, respectively. Moreover, the number of cattle and buffalo in milk have also increased from 77.04 million to 80.52 million showing a positive growth of 4.51% during the period.

When we look in to the population dynamics of breeding bull's situation is completely different as the males used for breeding purposes and the parameter male: female ratio in both cattle and buffalo species have decreased, which is a concern / bottleneck for different animal improvement programmes (Figure 1 to 2). Reports from 17th, 18th and 19th livestock census indicate that the male is to female ratio (cattle) has sharply decline from 0.80 to 0.72 and 0.55, respectively. Similar trends were seen for buffalo male is to female ratio, which has also been continuously declining from 0.22 to 0.23 and 0.17 as per last three consecutive livestock census (Figure 4).

From the year 2007 to 2012 the number of breeding males have come down from 26.21 to 24.02 million in cattle and from 8.66 to 8.36 million in buffalo (Figure 3.), this decline in breeding males clearly indicate that rearing breeding bull is out of choice for farmers and male sex is completely being neglected by them. The probable reason may be due to the cost involved in rearing & management of breeding bulls. However,

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our farmers fail to realize the long term consequences which affect the dairy improvement programmes, if the decline continues to be at the same rate.

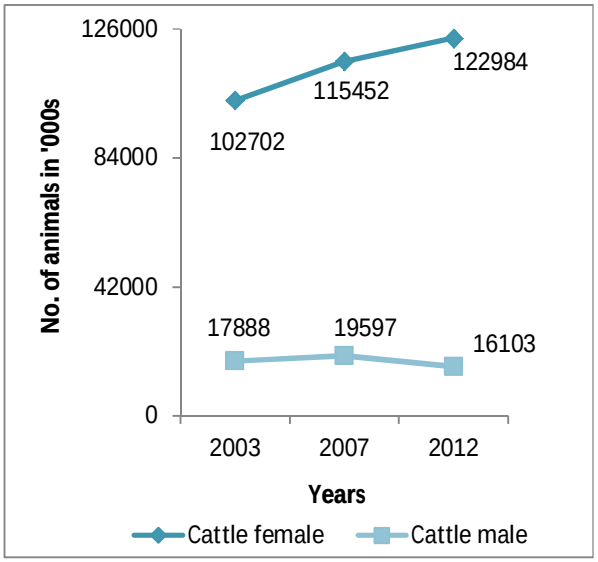

Figure 1

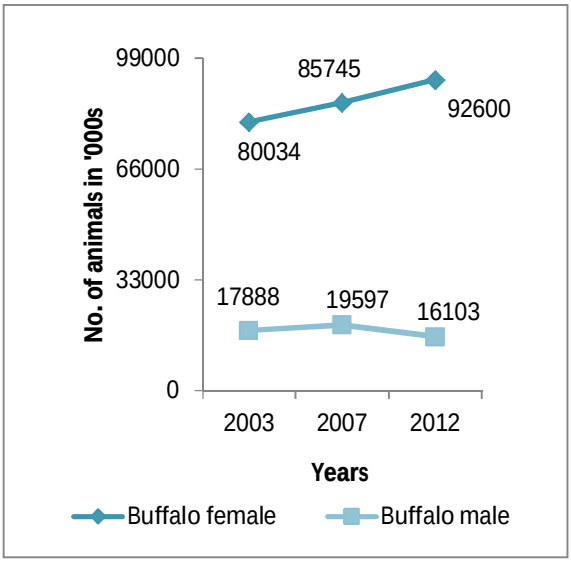

Figure 2

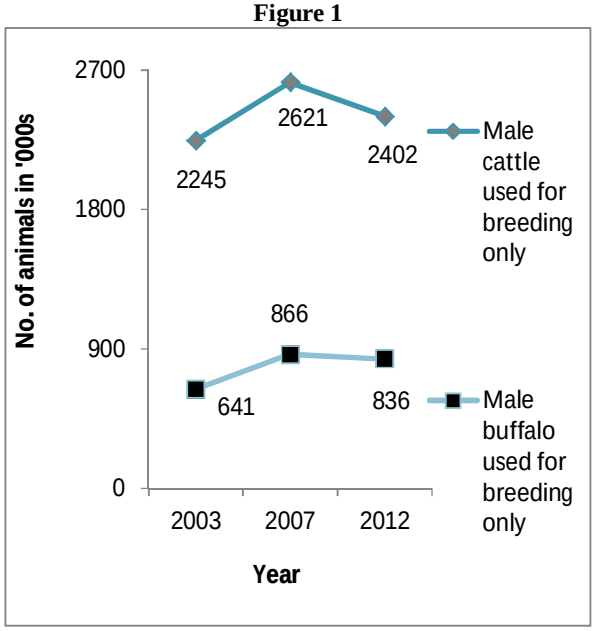

Figure 3

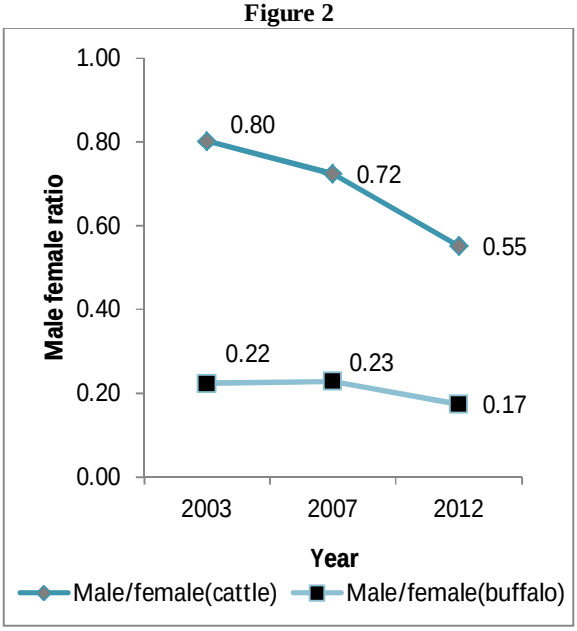

Figure 4

2. SIGNIFICANCE OF MALE GERMPLASM

"Bulls are more than half of the herd". This famous quote clearly emphasises the significance of male germplasm and its role in genetic up-gradation and improvement. The use of A.I. and frozen semen technology has further extended the extensive use of a bull to many herds. Therefore, Bull rearing and their subsequent selection is not only important between or within a herd, but is also equally important in meeting the requirements of various grading up and crossbreeding programmes initiated by the government of India, where only the male progeny produced by elite dams mated to best sire, are selected for breeding and improvement programmes. The total genetic gain obtained through sire-to-sire path and sire to dam path comes out to about 64 per cent, which results in greater accuracy for estimating the breeding value of sires and the production of a larger number of daughters which make contributions as replacement stock for the next generation. Only few sires are needed for breeding a herd and hence, selection can be made more intense in case of males, consequently selection differential will be much larger. But this selection and breeding methodologies could only be used for genetic improvement and conservation related programs, once the sufficient breeding bull stock is available for use. Therefore, in the absence of sufficient number of elite dairy bulls, improvement of productivity in dairy animals will be hampered.

3. CONSEQUENCES OF DECLINE IN DAIRY BULL POPULATION

1. *Effective population size (Ne) / inbreeding*: The rate of inbreeding (ΔF) is inversely proportional to effective population size which in turn depends upon the number of males available in a population / herd. It is this effective population size which determines the level of inbreeding in a herd. Due to non-maintenance of bulls or smaller number of males inbreeding depression may occur which counterbalances the positive effect of genetic selection. The inbreeding has been linked with adverse effects on reproduction traits, vigour & fertility, growth traits which cumulatively affect the performance of the herd. Therefore, effective population size should be such that rate of inbreeding is not more than 1.0% per generation. It is thus essentially required to maintain adequate number of males in a population.
2. *Loss of genetic variance*: Due to inbreeding the characters are fixed in an inbred population, and due to gene fixation the existing genetic variability of the population is reduced.
3. *Hamperdness in genetic up gradation and progeny testing programmes*: Large number of males and male is to female ration are required to progeny test the breeding bulls for better comparison and ranking among the different breeding males. It is only through progeny testing programme the genetic improvement could be done in dairy animals.
4. *Selection intensity*: Due to lower herd size, the proportion selected individuals (males) will be higher, therefore, selection intensity will decrease and consequently selection differential will decrease leading to selection of males with poor genetic merit. In case of males, selection differential should be as large as possible and the same can be increased if fewer males are selected out of many.
5. *Unavailability of true to breed male germplasm*: There may be considerable loss of superior quality germplasm due to decrease in the male population of a particular indigenous breed. This will affect the availability of breeding bulls for natural services and also unable to meet the required frozen semen doses, to be used in future for artificial insemination / breeding the available breedable females.

4. PROBABLE REASONS FOR NEGLECT IN BULL PRODUCTION BY FARMERS

a. Animal rearing is done mostly by small and marginal farmers and landless labourers with holding size of 2-3 animals per farm household. These small and marginal farmers prefer to maintain female stock for milk production and male bullocks for draught purpose. For breeding bulls they are dependent on the village/ community bull, Government agency or AI centre. As emphasis is on milk production, the female calves are preferred and male calves ignored.
b. Majority of our farmers are not organised, follow unscientific breeding, and grapple with inadequate resources like nutrition, health care and management [3]. They are more focused to have female animals got pregnant, so that subsequent lactation is commenced, and are interested to have a female calf. General perception of the farmers is that male animals are used only for draft purpose with little attention towards breeding males, this intensify the problem.
c. Lack of farmer's awareness to use good quality bulls**:** It is only recently that farmers have started enquiring about the quality of germplasm being used on their female animals. Concept of breed is limited to only breeding tracts (that too with commercial and progressive breeders) and or at organized herds; otherwise most of the farmers get their animals mated with any bull available in the area or otherwise.
d. Absence of performance recording and quality assurance systems: Except a few organizations, which monitor performance of their AI operations on an individual animal basis, most AI service providing agencies have not given enough attention to monitor AI performance on an individual animal basis and doesn't help farmers improve productive and reproductive performance of their animals. The number of bulls put to test under progeny testing programme is limited (10-20 bulls/batch per year), the number of daughter records used for estimating breeding values of bulls is also limited (generally less than 40 records per bull) and the time taken to estimate breeding values is very long (7 to 8 years). However, progeny testing programme and field performance recording being undertaken by the ICAR institutions and State Agriculture Universities are being implemented but they are on a limited scale covering only institutional herds. There is little coordination, amongst various agencies involved in breed improvement and for monitoring performance of genetic improvement programmes and AI service providing organizations. Thus, limited information is made available regarding the performance of the breeding bulls used. If the number of available breeding bulls goes down then hardy any improvement could be done in dairy animals.
e. Economics: Lot of monetary assistance is required to raise a bull from birth and due to poor economic condition of the farmers/ livestock keepers they are not able to maintain separate breeding bulls.

f. Poor genetic potential of indigenous livestock: About 70-75 % of the indigenous cattle and buffaloes do not come under any well-defined breed and are designated as non-descript. Their average productivity is much lower than the animals of milch breeds available in the country. Further, the productivity of most of the defined indigenous breeds barring a few is less compared to developed countries. Moreover, the dairy industry in India is not much organized or under cooperative system, but majority is being done through traditional dairy system. Therefore, available male genetic resource of cattle and buffalo in India may not be even suitable for bull production, this may further lead to decline in number of dairy bulls to be used for breeding and genetic improvement programmes.

5. STEPS NEEDS TO BE INITIATED FOR QUALITY DAIRY BULL PRODUCTION

1. Progeny testing program should be taken up in the field using farmer's herds. This would provide a wider genetic material for testing a large number of males of indigenous breed of cattle and buffalo as well exotic and crossbreds.
2. Import of frozen semen and embryo can be made from high producing herds in case of exotic breeds like Jersey and Holstein – Friesian for breeding of the exotic herds maintained in the country for the purpose of production of breeding bulls. This should be strictly done keeping in mind the government of India's bovine import-export policy.
3. The progeny testing programs implemented by the existing institutions should be strengthened to produce the part requirement of the quality bulls. In addition, a few new institutions could be set with private-public partnership including NGOs for specific breeds in the specified pockets to produce the desired number of quality bulls.
4. Attempt should be to identify best male from the available germplasm. A programme of production of quality bull should be initiative on State Livestock Farms and through use of farmers' herds. The embryo transfer technology (ETT) should be made use of in production of bulls, in absence of progeny testing.

6. REFERENCES

[1] Anonymous. 2014. 19th Livestock Census All India Report, DAHD&F, Ministry of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India. 34-35.

[2] Anonymous. 2007. 18th Livestock Census All India Report, DAHD & F, Ministry of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India. IX-X.

[3] Anonymous. 2012. Report of the working group on Animal Husbandry and Dairying 11th five year plan, Government of India, Planning Commission, New Delhi. 39-40