



**MAHARASHTRA ANIMAL AND
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BREEDING STRATEGIES FOR GENETIC IMPROVEMENT OF LIVESTOCK IN INDIA

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Cattle and buffalo breeding strategies

- Dairy cattle and buffalo production has undergone a major transformation resulting into a substantial increase in milk production.
- Thus it helping our country to achieve top position in milk production in the world.
- Optimize the use of resources and undertake realistic breeding policy strategies are required for increasing **milk production** in cattle and buffaloes and to **increase their life time productivity**.

Breeding Programme Planning

➤ For proper breeding plan following points to be considered :

- Comprehensive details of population size of breed
- Farmer/Breeder's perceptions
- Socio-economic levels
- Agriculture and livestock production systems
- Available feed and fodder resources
- Animal genetic resources
- Breeding organizations
- Infrastructure and development facilities

Breeding strategies for bovines as recommended by Government of India

Sr. No.	Type of Animal	Breeding Strategy	Purpose
1	Indigenous dairy breeds of cattle and buffaloes	Selective breeding	Milk production
2	Indigenous draught breeds of cattle and buffaloes	Selective breeding	Draught power
3	Indigenous dual purpose breeds of cattle	Selective breeding	Milk production and draught power

Breeding strategies for bovines as recommended by Government of India

Sr. No.	Type of Animal	Breeding Strategy	Purpose
1	Non-descript cattle	1. Grading up with improved indigenous cattle breeds 2. Crossbreeding with exotic dairy breeds followed by selective breeding	1. Milk production / Draught power 2. Milk production
2	Non-descript buffaloes	Grading up	Milk production / Draught power

Genetic improvement of indigenous cattle breeds by selective breeding

- To meet the massive requirement of superior bulls of well-defined zebu cattle breeds and multiplication of their quality germplasm for enhancing **productivity**.
- This method is best suited for elite milch breeds and dual breeds of cattle in India.
- The adoption of **open nucleus breeding technique** will enhance genetic gain not only on organized herds but also in the farmer's herds.
- Eg **Sahiwal, Red sindhi, Gir, Tharparkar, Harynana, kankrej** etc.

- By selective breeding, it is expected that genetic improvement can be achieved ranging from 1 to 1.5% per annum in organized herds and
- 8-10% per annum in farmer's herds in initial generations.
- This will help their **proliferation, conservation and genetic upgradation.**
- Intrusions of crossbreeding in their defined breeding tracts will be avoided.

Genetic improvement of indigenous buffalo breeds by selective breeding

- This method is best suited for elite buffalo breeds such as Murrah, Niliravi, Jaffarabadi, etc.
- To exploit the large degree of genetic variability between and within the buffalo breeds, the genetic improvement of buffalo herds in the country can be brought through selective breeding within breeds.
- Using net-working approach of progeny-testing of bulls associating **multiple organized herds** as well as **farmer's herds** under **field conditions**.

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- It is expected that genetic improvement of **1 to 1.5% per annum** in milk production will be achieved at **organized farms** by selective breeding, through networking of multi-herds of a **particular breed**
- In **farmers' herds 8- 10% per annum** through introducing germplasm of high yielding buffalo bulls.
- Selective breeding of established native breeds, and upgrading low producers through breeding with defined high milk yielding breeds will be undertaken.

Genetic improvement of non-descript buffaloes by grading up

- The low producing, local non-descript buffaloes are generally reared under low to medium input production system in areas where resources and market places are limited.
- The production potential of low producing non-descript buffaloes can be increased rapidly through mating with superior sires of improved breeds like Murrah, Surti and Mehsana.
- Murrah is recommended for grading up of medium body sized non-descript buffaloes.

Genetic improvement of non-descript zebu cattle by crossbreeding

- **Holstein Friesian** cattle have been recommended as the breed of choice in the **irrigated plains** and **Jersey cattle** as breed of choice in **hilly terrain and coastal areas** for crossbreeding.
- The optimum level of exotic inheritance in crossbred cattle should range **between 50 and 75%**

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- The crossbreeding in dairy cattle has relatively shown good results mainly under **semi-intensive and intensive animal production systems**.
- Under semi-intensive animal production system, it is advisable to restrict **exotic inheritance between 50 and 62.5%** through *inter-se mating* in crossbred cattle.
- The **milk yield and milk constituents** (fat and protein percentages) should be used as criteria for selection of crossbred bulls as well as import of frozen semen of exotic bulls of **high transmitting ability**.

Genetic improvement of non-descript cattle by grading up

- The local non-descript low producing cattle are reared mainly under Low-Input Production System across the different agro-climatic zones.
- It can be genetically improved by grading up using high genetic merit pedigreed and preferably progeny tested proven bulls of well known indigenous cattle breeds.
- Such as Sahiwal, Tharparkar, Red Sindhi, Gir, available in their breeding tract.

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- Proper monitoring of grading up programme of nondescript cattle on regular and long term basis can improve the milk yield by 500 to 800 kg in the first generation.
- In a period of 5-6 generations of continuous grading up, the non-descript stock will also be transformed into well-defined.

Grading up Programme

Generation	Level of pure bred blood of sire used %
Foundation stock	0
First generation	50
2 nd generation	75
3 rd generation	87.5
4 th generation	93.75
5 th generation	96.8
6 th generation	98.73
7 th generation	99.23

Advanced technologies required for genetic improvement

- It has been observed that livestock genetic improvement programmes are based upon the technologies developed in the areas of quantitative genetics and reproductive biology.
 - **Expected producing ability for female**
 - **Expected predicted difference for male**
 - **AI**
 - **Embryo Transfer Technology**

Contn,..

- We require huge number of genetically **superior breeding bulls** along with **adequate networking of AI and animal health infrastructure**.
- According to an estimate, to cover even 30% breedable bovine population in the country for breeding through AI as many as **1050 proven bulls of crossbred cattle, 5700 proven bulls of well-defined indigenous cattle breeds and 11400 proven buffalo breeding bulls** are required.

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- National Project on Cattle and Buffalo Breeding initiated by Department of Animal Husbandry & Dairying, Government of India.
- It has played a vital role in evaluation, production and dissemination of adequate number of genetically superior bulls and their frozen semen doses through involving various research and development organizations.

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- Formation of breed associations by involving farmers for improvement of indigenous breeds of various species and identification/registration of animals having good genetic potential would be promoted by providing **financial, technical and organizational assistance.**

Breeding Policy for Sheep and Goat

- This will aim to improve **growth, body weight, reproductive efficiency, meat and wool quality and quantity**, and to **reduce mortality**.
- An area specific approach would be adopted to improve quality and quantity of coarse wool and fine wool.
- Main focus will be to produce and **distribute good quality rams/bucks** of quality indigenous breeds which can thrive in different agro-climatic conditions.

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- Artificial insemination would also be encouraged.
- Cross-breeding with high yielding exotic and other native breeds of goats will also be considered.
- **Both selective pure breeding and crossbreeding** can be adopted based on the need of the **locality, demand for the market,** traits under consideration.

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- **Jamunapari, Beetal, Jakhrana and Surti** could be used as improved breeds in other regions for boosting up both **milk and meat production**.
- Crossing of **low producing non-descript** may be taken up with **Sannen** goat breeds.
- The crosses of Sannen have exhibited optimal performance in milk production, survivability and reproduction.

Breeding Policy for Pig

- This will focus on improving growth, prolificacy, quality and quantity of meat produced, survivability and utilization of low cost locally available feed and managemental conditions.
- While efforts will continue to conserve some of the meritorious indigenous breeds of pigs in their defined local tracts.
- Non desript pigs crossbreeding with high yielding, disease resistant exotic breeds will be encouraged, with maximum 50% level of exotic germplasm in crossbreeding.

Breeding of Yak and Mithun

- It would be supported in high altitude agro climatic regions for preservation and further development through selection and where necessary, through crossbreeding with exotic germplasm.

Breeding of Equines

- Breeding of horses, mules, and donkeys would be promoted to produce high quality stock for **draft power and sports purposes.**
- **Selective breeding of indigenous breeds** and cross breeding, where necessary, will be considered.

Breeding of Camels

- It will aim at improving their desert specific draft power, milk production, disease resistance and sports traits.
- Breeding of Double hump camel in high altitude areas would be supported with import of semen to minimize otherwise high chances of inbreeding.