

## **NATIONAL KAMDHENU BREEDING CENTRE**

“A Centre for Conservation and Development of Indigenous Bovine Breeds”.

### **Importance of Indigenous Breeds in National Economy:**

India has the largest bovine population in the world owned by largely small and marginal farmers. Dairying is an activity that is a source of income for the 60 million rural households that own, on an average, a herd size of 2-3 milch animals. With 199 million cattle and 105 million buffaloes; the Nation has 14% of the world cattle population and 53 % of the world buffalo population. While water buffaloes are endemic to the Indian subcontinent, the country has 166 million Indigenous cattle. Most of the Indigenous cattle (80%) are ‘Non- descript’ and only 20% belong to Indigenous Breeds recognized by National Bureau of Genetic Resources. The bovine genetic resource of the country comprises 37 recognised Indigenous Breeds of cattle and 13 breeds of buffaloes. Most of the Indigenous Breeds have low genetic potential for milk production and are suited for draught animal power. However, some breeds have potential to be highly productive under optimal nutrition and farm management conditions along with selective genetic breeding.

### **Indigenous Breeds vis a vis Exotic and Crossbreds:**

Indigenous animals are sturdy, and are endowed with the quality of heat tolerance, resistance to diseases and ability to thrive under extreme climatic conditions. Exotic species, like Holstein- Friesian and Jersey- and Crossbred cattle although more productive, have a tendency to wilt under Indian conditions of extreme and harsh climatic conditions. Exotic breeds and Crossbred cattle are susceptible to tropical diseases while the Indigenous Breeds are more hardy, being both disease and tick resistant.

Furthermore, Crossbred and Exotic cattle perform optimally only under a high cost input Farm Management System. The Indian Farm Management System is typically Low Input Low Output, with the majority of the animals being raised by poor farmers.

Global warming is likely to increase incidence of animal diseases, particularly viral and protozoan, in Crossbred and Exotic animals with a lesser impact on Indigenous Breeds. Studies suggest that the decline in milk production and reproductive efficiency on account of Global Warming will have the least effect on Indigenous Breeds.

### **Existing Infrastructure:**

**Semen Stations:** At present there are 51 semen stations in the country with a production capacity of 81 million doses per year; whereas the current demand for bovine semen is close to 100 million doses and is likely to increase to 150 million in the next five years. Most of the semen stations in the country cater to the demand for buffalo semen and germplasm of exotic and cross bred cattle. Most of the semen stations produce limited semen doses for 2-3 Indigenous Breeds.

Semen stations maintain only Indigenous Breeds which are in demand or covered under the respective State Breeding Policies. Out of 37 indigenous cattle breeds, semen of only 9 breeds is presently available at the existing semen stations. Breeds for which germplasm is available at semen stations are Gir, Red Sindhi, Kankrej, Sahiwal, Tharparkar, Hariana, Ongole and Rathi.

Bulls of Indigenous Breeds in the semen stations are not produced through organised breeding programmes like Progeny Testing and Pedigree Selection. They are selected merely on the basis of dams lactation yield. Sire side information is not available. Therefore, the genetic potential of these is not known and is low. Due to this, the desired genetic gain in performance of Indigenous Breeds cannot be attained and genetic progress amongst Indigenous animals is, resultantly, stagnant.

Since quality semen for most of the Indigenous Breeds is not available in the country, thus breeders are dependent on bulls for natural service. Bulls available with breeders for Natural Service are either scrub bulls or of a genetic potential which is not known. Bulls available for Natural Service are obtained from the field without proper testing for sexually transmitted diseases (STDs) and hence STDs are spreading amongst the Indigenous Bovine population.

**Bull Mother Farms:** There are 172 Bull Mother Farms in the country run by the Central and State Governments. Many of the Breeding Farms for Indigenous Breeds were set up a few decades ago and are in a dilapidated condition. Elite animals of Indigenous Breeds are not available with Bull Mother Farms. Farms are also not in a position to replace the Herd at standardised regular intervals of 20% per annum.

**National Bureau of Animal Genetic Resources:** NBAGR, an ICAR institution, has the basic mandate to accord recognition to Indigenous Breeds. The Institute also implements programmes for development and conservation of a few Indigenous Breeds under the All India Co-ordinated Research Project (AICRP), wherein information is collected and research conducted on herds of Indigenous Breeds available with Universities and State Governments. Although live animals are not conserved within NBAGR, semen straws and embryos of a few Indigenous Breeds are stored by the Institute in the form of a gene pool.

Despite the fact that India has the largest bovine population in the World, of which Indigenous Breeds are a major component, there is no national level repository of Indigenous germplasm, as exists in most of the advanced Dairying Nations of the world, in the form of a National Breeding Centre.

### **Status of Indigenous Breeds:**

The existing population of all indigenous bovine breeds as per last National Breed wise Census is listed Annexure-I. Population of some of the Indigenous Breeds is rapidly declining. Breeds like Tharparkar, Krishna Valley, Sahiwal, Deoni, Gaolao, Red Sindhi, Mewati, Amrit Mahal, Bargur, Binjarpuri, Ghumsuri, Ponwar, Siri and Pulikulam require attention; while breeds like Punganur and Vechur are under extinction and warrant urgent intervention.

The performance and productivity of most of the Indigenous Breeds is deteriorating rapidly, due to absence of quality genetic germplasm for selective breeding in the breeding tract.

In this scenario setting up National Breeding Centre(s) is vital to ensure development and conservation of indigenous bovine breeds. The National Kamdhenu Breeding Centre will meet imperative need to: function as a national repository of germplasm of the fifty Indigenous Breeds of the country; enhance their performance and productivity; make elite indigenous animals available for genetic upgradation programmes in their respective breeding tracts and in existing Semen Stations and Bull Mother Farms and supply certified elite germplasm to Farmers and Breeders and Institutions like Bull Mother Farms.

### **National Kamdhenu Breeding Centre:**

“National Kamdhenu Breeding Centre” for development, conservation and preservation of Indigenous Breeds will be set up, as a Centre of Excellence to develop and conserve Indigenous Breeds in a holistic and scientific manner. A Nucleus Herd of all the Indigenous Bovine Breeds (37 Cattle and 13 Buffaloes) will be conserved and developed with the aim of enhancing their productivity and upgrading genetic merit.

The National Kamdhenu Breeding Centre, besides being a repository of indigenous germplasm, will also be a source of Certified Genetics in the Country. Elite certified germplasm - in the form of bulls for artificial insemination and natural service, heifers, male and female calves, semen doses and embryos-will be made available to Farmers, Breeders, Breeding Institutes and Trusts maintaining Indigenous Breeds.

### **Objectives:**

The National Kamdhenu Breeding Centre will be implemented with the following objectives:

- a) To conserve and preserve Indigenous Bovine breeds;
- b) To enhance production and productivity;
- c) To upgrade genetic merit;
- d) To supply certified elite germplasm;
- e) To protect threatened breeds from extinction.

### **Components of the Scheme:**

#### **I. Core Activities:**

- i) Establishment of nucleus herd of all Indigenous Breeds
  - a) Construction of sheds
  - b) Construction calf pens
  - c) Isolation shed
  - d) Procurement of elite animals from the breeding tract
- ii) Establishment of state-of- art semen station

- a) Construction of bull sheds
- b) Procurement of elite bulls
- iii) Establishment of embryo transfer technology (ETT) Lab

## **II. Peripheral Activities**

- i) Veterinary dispensary with AI facility
- ii) Fodder Production, Silage Making and Fodder Block Making
- iii) Genomics and Biology of Indigenous bovines ( in collaboration with National Institute of Animal Biotech, Department of Biotechnology)
- iv) Milk processing plant & milk product making facility
- v) Bio gas and Green Power
- vi) Urine Distillation
- vii) Training and Extension Wing
- viii) Administrative Block and Monitoring Cell
- ix) Rain water harvesting

Major Components for the aforementioned Core and Peripheral activities are given at Annexure-II

### **Funding Pattern:**

Funds for core activities for establishment of National Kamdhenu Breeding Centre will be provided under the Project. Funds will be released on the basis of the estimates submitted by the States.

Peripheral activities will be funded from schemes being implemented by the Department of Animal Husbandry, Dairying & Fisheries.

National Institute of Animal Biotech, Hyderabad, Department of Biotechnology will collaborate and provide technical and financial support for Genomics and Biology of Indigenous Bovines

Land (Approximately 80 acres) for establishing the National Kamdhenu Breeding Centre will be provided by the State Government. Manpower for establishment and running of National Kamdhenu Breeding Centre will be provided by State Government.

Recurring expenses and maintenance cost will be met out of the sale receipt of elite germplasm produced, scientifically in the NKBC, in the form of semen, embryo, calves, heifers and bulls. Any gap in the maintenance cost will be borne by the State.

### **Implementing Agency:**

Livestock Development Boards and Milk Federations will be selected as End Implementing Agencies (EIAs), for implementation of the Project, on the basis of their capacity and capability to manage National Kamdhenu Breeding Centre.

### **Strategy:**

“National Kamdhenu Breeding Centres” for development, conservation and preservation of Indigenous Breeds will be set up, as National Breeding Centre to develop and conserve Indigenous Breeds in a holistic and scientific manner.

- National Kamdhenu Breeding Centre will be established by Livestock Development Boards, Milk Federations, State Animal Husbandry Departments, Central Cattle Breeding Farms and Central Herd Registration Scheme.
- Two ‘National Kamdhenu Breeding Centre’ one in north and one in south will be set up in the country.
- Each Centre will maintain nucleus herd of all 50 indigenous bovine breeds
- Approximately 20 elite animals per indigenous breed will be maintained
- Purity of the breed will be maintained by the centre through selective breeding with high genetic merit bulls.
- The herd will be replaced annually in order to ensure variability.
- Indigenous bovine breeds will be maintained under scientific management (breeding, feeding and heeding).
- Biosecurity of NBC will be crucial to the success of the project
- Balanced nutrition and health care of animals will be provided within the NKBC.
- National Institute of Biotech will collaborate for genomics and biology of indigenous bovines in the centre.

- Certified elite Germ-plasm will be made available to farmers, breeders, Institutions, NGOs and Trusts working in the area of development of indigenous breeds.
- NKBC will meet the demand for certified elite germplasm, within the country in the form of :
  - Semen
  - Embryos
  - Male and female calves
  - Heifers
  - Bulls
- Traceability and tracking of germplasm will be ensured
- Export of certified elite germplasm of indigenous bovine breeds from NKBC will be allowed as per existing trade policy.
- Centre will be made self sustainable through sale of: certified elite germplasm; milk & milk products; manure vermin-compost; green power; and other eco-friendly by products like urine distillate.
- Budgetary support to fill possible gaps in recurring expenditure will be provided by the concerned State Government.
- A sanitized visiting site with National Kamdhenu Breeding Centre complex will be developed for introducing the cultural heritage of India to visitors, while ensuring bio-security of the Centre.

**Time Frame:**

The indicative time line for establishment of the Core components of National Kamdhenu Breeding Centre, by the State, is one year from the date of receipt of the first instalment. The Peripheral activities are expected to be completed by 2015-16.

**Expected Out Comes:**

- Conservation of Indigenous Breeds - specially threatened breeds
- Enhanced productivity through superior nutrition and genetics.
- Increase in population of individual breeds.

- Source of Certified Genetics in the Country- in the form of: bulls for artificial insemination and natural service, heifers, male and female calves, semen doses and embryos- for genetic up-gradation of non-descript animals; thereby enhancing their productivity.
- Enhanced production and productivity of the indigenous bovines will in turn augment the income from dairying and improve the economic status of sixty million rural households engaged in dairying.

**INDIGENOUS BREEDS OF CATTLE**

S. No	Breed	Breeding Tract	Population as per latest livestock census
<b>Dairy Breeds</b>			
1	Gir	Gujarat (Junagarh, Bhavnagar, Amreli Distt )	21,03,307
2	Rathi	Rajasthan (Bikaner, Jaisalmer & Ganganagar distt)	9,24,087
3	Red Sindhi	Pakistan (Karachi and Hyderabad distt)	5,49,432
4	Sahiwal	Pakistan (Sahiwal Distt), Ferozpur and Amritsar Distt of Punjab	4,57,405
<b>Dual Purpose Breeds</b>			
5	Deoni	Maharashtra (Latur, Parbani, Nanded and Osmanabad distt), Karnataka (Bidar)	1,66,025
6	Gaolao	Maharashtra (Wardha distt), MP (Balaghat, Chindwara distt) Chhattisgarh (Durg, Rajnandgoan)	2,22,663
7	Hariana	Haryana (Rohtak, Hissar , Jind distt), Rajasthan (Alwar, Bharatpur)	26,00,122
8	Kankrej	Gujarat (Kutch, Mehsana, Ahmedabad, Kaira, Sabarkantha distt), Rajasthan( Barmer & Jodhpur)	38,87,152
9	Krishna Valley	Karnataka (Belgam, Raichur, Bijapur distt) Maharashtra (Satara, Sangli, Solapur)	2,314
10	Mewati	Rajasthan ( Alwar, Bharatpur), Uttar Pradesh (Kosi, Mathura distt)	75,427
11	Ongole	Andhra Pradesh(Chittoor, Kurnool)	2,58,240
12	Tharparkar	Rajasthan (Jodhpur, Barmer, Jaisalmer)	5,57,679
<b>Draught Breeds</b>			
13	Amrit Mahal	Karnataka (Hassan, Chikmaglur Chiteradurga)	98,169
14	Bargur	Tamil Nadu (Erode Distt)	21,312
15	Bachaur	Bihar (Sitamari, Madhubani, Darbhanga distt)	4,51,659
16	Binjarpuri	Orissa (Jajpur subdivision Cuttack Distt)	43,680
17	Dangi	Maharashtra (Nasik, Ahmednagar distt.)	3,04,238
18	Ghumsuri	Orissa (Cuttack Distt)	82,815
19	Hallikar	Karnataka	21,96,698
20	Kangayam	Tamil Nadu ( Erode Distt)	3,16,114
21	Kenkatha	Uttar Pradesh (Lalitpur, Hamirpur, Banda distt), Madhya Pradesh ( Tikamgarh distt)	1,85,886
22	Kherigarh	Uttar Pradesh ( Lakhimpur Kheri distt)	1,71,414

23	Kheriar	Orissa	
24	Khillari	Maharashtra (Solapur, Sangli Satara distt)	14,23,742
25	Malvi	Madhya Pradeash( Dewas, Ujjain, Sajapur distt), Rajasthan (Jhalawar distt)	15,18,452
26	Nagori	Rajasthan (Nagaur distt)	8,37,344
27	Nimari	Madhya Pradesh (Khandwa, Khargooan and Barwani distt)	3,09,859
28	Motu	Orissa (Koraput distt)	7,02,347
29	Ponwar	Uttar Pradesh (Pilibhit distt)	24,072
30	Red Kandhari	Maharashtra (Nanded distt)	1,78,758
31	Siri	West Bengal (Darjeeling) and Sikkim	61,764
32	Umblachyery	Tamil Nadu ( Thanjavur, Nagapattinam distt)	2,18,315
33	Vechur	Kerala (Vaikam, Kottayam distt)	3,170
34	Punganur	Andhra Pradesh (Chitoor Distt)	771
<b>New Breeds</b>			
35	Malnad Gidda	Karnataka (Chikmaglur, Dakshina Kannada, Uttar Kannada, Hassan, Kodagu, Shimoga, Udupi)	1281000
36	Kosali	Chhattisgarh (Raipur Durg Bilaspur Janjgir)	1500000
37	Pulikulam	Tamil Nadu (Madurai)	45000

### INDIAN BUFFALOES

S. No.	Breed	Breeding tract	Population (as per 2007 census)
1	Murrah	Haryana (Rohtak, Hissar distt)	2,04,88,438
2	Nili Ravi	Punjab (Ferozepur distt)	5,91,659
3	Bhadawari	Uttar Pradesh (Agra, Etawah distt), Madhya Pradesh (Bhind, Gwalior distt)	7,29,013
4	Jaffarabadi	Guajarat (Amreli, Junagarh, Bhavnagar distt)	18,43,848
5	Marathwada	Maharashtra (Marathwada region)	1,83,238
6	Mehsana	Guajarat (Mehsana, Ahmedabad)	33,76,196
7	Nagpuri	Mharashtra (Vidhharbha region)	1,42,765
8	Phandharpuri	Maharashtra (Kohlapur, Sangli, Solapur distt)	2,72,802
9	Surti	Guajarat (Kheda, Vadodara, Bharuch distt)	29,88,245
10	Toda	Tamil; Nadu ( Nilgiris, Udamanglam, Coonoor distt)	54,755
11	Banni	Guajarat (Kutch distt)	5,27,576

12	Chilika	Odisha (Cuttack Ganjam, Puri)	...
13	Kalahandi	Kalahandi, Rayagada	80,000
	Total		

**NATIONAL KAMDHENU BREEDING CENTRE**  
**COMPONENTS**

S. No.	Equipment/Infrastructure Required
<b>Core Activities</b>	
I	Procurement of breeding stock @ 20 animals /breed Total 1000 animals
II 1.	Cattle Sheds
2.	Calf Pens
3.	Isolation shed
4.	Quarantine shed
5.	Semen station (including bull sheds, semen processing lab equipments and biosecurity)
6.	Embryo transfer technology laboratory
7	Rain Water Harvesting
8	Veterinary Dispensary
9	Bio Gas Plant
10	Agricultural Equipments including harvesters rippers
11	Ration Balancing: Computers
12	Urine Distillation Plant
13	Weighing Balance
14	Vermi-compost pits
15	Silage pits
16	Chaff Cutter (mechalical)
	Total
<b>Peripheral Activities</b>	
1	Training and extension wing:
2	Administrative Block: Monitoring Cell
3	Bulk Milk Cooler*
4	Milk processing and milk product making unit
5	Semen storage and Liquid Nitrogen Storage facility: Cryo-containers, LN and semen transport vehicle
6	Fodder Block Making Unit
7	Others as per requirement
	Grand Total

**\*Funds for establishment of BMC augmented from NPBBDD**

**Funds for establishment of veterinary dispensary augmented from LHDC Scheme.**

