



Experiences on Conservation of Indian Dairy Animal Biodiversity

SB Gokhale

Director Research, BAIF Central Research Station Uruli Kanchan, Pune-412202, Maharashtra, India

India is home to about 8% of the world's biodiversity on just 2.4% of global area and has one of the highest diversity of ecosystems in the form of forests, wetlands, grasslands, marine areas, deserts, glaciers, mangroves among others (8). Biodiversity is crucial to the alleviation of poverty, due to the basic goods and ecosystem services such as agriculture, forestry, fisheries and tourism, on which more than seventy percent of country's 1.3 billion people depend on for their livelihood. Sustainable development cannot be achieved if biodiversity is compromised by development efforts. With regard to Farm animal Biodiversity status in India, 40 breeds of cattle and 17 of buffalo among total 163 registered breeds of different species besides populations/breeds of other species which have not been classified in breeds and registered so far. Population of many indigenous breeds is declining due to large increases in human population, urbanization, mechanization and increased food demands over-time leading to change in the utility pattern of animal genetic resources (8). Endangered status of cattle breeds like Krishna Valley (7) and similar other breeds warrant immediate steps for correction. Small-scale livestock keepers and pastoralists over centuries have developed animal breeds that are well suited to local agro-climatic conditions of scarce food and water resources, frequent draughts, hardy and resistant to many tropical diseases (9). In spite of they being low producers (although many having potential of enhancing production) can continue producing meat and milk in areas where modern, imported breeds succumb without expensive housing, feed and veterinary care (7). Social changes have greatly influenced Animal Genetic Resources (AnGR) because present generation is not keen to continue their ancestral occupation of rearing livestock in migratory system of grazing (2). This calls for an immediate action for systematic conservation, genetic improvement and sustainable utilisation of indigenous livestock breeds.

Need of Conserving Biodiversity

The task of conservation, management and evaluation of vastly distributed native animal genetic resources is of gigantic magnitude for the country especially when the animal holding per family is one or two (1). Since the genetic improvement through selection is limited to organized herds and concept of conservation of AnGR is poorly understood by development agencies and farmers, undertaking suitable programmes of survey, conservation, characterization and evaluation of different types of animal genetic resources by cooperation of various agencies such as Indian Council of Agricultural Research (ICAR) institutes, universities, research centres and Animal Husbandry Department (both Central as well as States), NGOs, animal rearing communities etc. becomes essential. Farming community expresses that strains of many cattle and buffalo breeds exist but are not being studied and recognized (3,4). Strong backing from Govt. and technology is needed (6).

Status of Dairy Animal Conservation and Improvement

While reviewing the progress of ongoing programs on conservation of threatened breeds, the important gaps identified are the absence of participation of livestock keepers, inadequate multiplication, production and dissemination of germplasm of breeds from established or strengthened nucleus farms, poor impact on conservation of breed, inadequate infrastructure development for production of semen and AI facilities under field condition, delays in implementation of programs, poor technical monitoring etc. The need is felt for adequate funding in consonance with technical program and activities, strengthening institutional frameworks, sensitization of field functionaries, formulating breeding policies for conservation and development of breeds, empowerment of technical monitoring and implementing committees, their accountability and exit plan with self

*Author for Correspondence: Email- suresh.gokhale45@gmail.com

sustainability approach. The breed conservation units must act as demonstration cum training centers for the livestock keepers and other stake holders engaged in management of AnGR.

In situ and *ex situ* conservation are best ways of preserving/conserving a breed and if the sample size is fairly large, it can maintain sufficient genetic diversity in the breed population. The models of conservation are developed by NBAGR for providing technical inputs and incentives to the farmers/breeders of the breeding tract and can be adopted through the State Agricultural and Veterinary universities/State Animal Husbandry Departments/ICAR Institutes and NGOs (5). Ex-situ conservation through frozen semen, embryos, Somatic cell lines etc. at National Animal Gene/Somatic cell Bank established at NBAGR are useful.

Constraints Faced

Since the priority of state animal husbandry department is more for improvement of productivity rather than conservation of AnGR, uncontrolled breeding at farmers' herd leads to difficulty in implementing conservation and improvement programs. This would result in dilution of genetic purity of the breeds. Inadequate capital resources, non availability of genetically superior breeding males, infrastructure for Artificial Insemination (A.I.) and animal health support, lack of Breed Societies or associations and patronage, lack of legal framework/Act for implementation of breeding policies and performance recording in the field and legislation for protection of Animal Breeds and Animal Keeper's rights, habitat erosion e.g. squeezing grazing lands, absence of regular system of monitoring of the breeds at risk, lack of farmers awareness about the long-term impact of conservation of biodiversity and no or negligible immediate financial benefit also make them less interested, entire funding and implementation by government agencies and negligible participation by farmers and private sector, make the implementation of conservation program more difficult and not sustainable.

Suggestions for Future Approach to Sustenance of Biodiversity

The suggestions for sustenance of biodiversity include undertaking sample survey at periodical interval for determining breed population and for preparing breed watch lists, establish/strengthen and accredit breed specific nucleus farms of all stake holders to produce genetically superior males for breeding, characterization

and documentation of lesser known breeds/populations for breed registration, formation of breed organizations, value addition through identification and exploitation of breed specific unique products, finding niche markets for these products for ensuring survival of breeds. Unraveling of unique genes and bio-prospecting the special utility traits like disease resistance, adaptation to harsh climatic conditions and low input, bio-molecules, products, etc. and their commercialization for enhancing utility of local breeds, documentation of traditional knowledge (TK) regarding customary practices, innovations, etc. related to indigenous breeds need to be collected, evaluated, validated and commercially exploited to benefit the communities rearing these animals, strengthening National Gene Bank, formulating comprehensive scheme on conservation and sustainable utilisation of threatened breeds in the country covering the species of cattle and buffalo, conserve local breeds through sustainable use before they become endangered, finding niche markets for their products is one possible way of ensuring the survival of these breeds, and enabling the people who keep them to earn more from their existing lifestyle etc. are some of the ways suggested.

Conclusions

India is home to 8% of the world's biodiversity on just 2.4% of global area and status wise includes Farm Animal Biodiversity resources of 40 breeds of cattle, 17 of buffalo among total 163 registered breeds of different species. Biodiversity is crucial to alleviation of poverty, due to the basic goods and ecosystem services it provides. Social changes have greatly influenced Animal Genetic Resources (AnGR) because of present generation not keen to continue their ancestral occupation of rearing livestock in migratory system of grazing. Emphasis need be given on breed development, their conservation, genetic improvement and sustainable utilisation, in-situ and ex-situ conservation models developed by National Bureau of Animal Genetic Resources (NBAGR), developing Artificial Insemination network in the country etc. Constraints include – absence of pedigree breeding, improper data recording, selection limited to organized herds only, poor understanding of AnGR conservation concept by development agencies and farmers, inadequate availability of superior genetic material, lack of Breed Societies, coordination among various agencies, inadequate capital resources, lack of legal framework/Act for implementation of breeding policies and performance recording, squeezing grazing lands

etc. Suggestions include undertaking regular periodical sample surveys, preparing breed watch lists, establish / strengthen and accredit breed specific nucleus farms for production of genetically superior males, characterize and document lesser known breeds/populations for breed registration, formation of breed societies to help AnGR, value addition through identification and exploitation of breed specific unique products and finding niche markets for them, documentation of traditional knowledge (TK), strengthening National Gene Bank by collection of the germplasm of economically important and endangered livestock breeds and their utilisation, undertaking comprehensive scheme on conservation and sustainable utilisation of threatened breeds in the country covering the species of cattle and buffalo.

References

1. Ahlawat SPS and PK Singh (2005) Conservation and improvement of Indigenous cattle breeds, VIIIth National Conference on Animal Genetics and Breeding, 8-10 March, 2005.
2. Bhavana Rao K and Ramkumar Bendapudi (2013) Watershed Organization Trust (2013) Livestock Systems, Vulnerability and Climate Change, Pp 8, December 2013.
3. Gokhale SB (2003) Final report of Network Project on Survey, Evaluation and Characterisation of Dangi Cattle Breed. pp. 73.
4. Gokhale SB (2006) Final report of Network Project on Survey, Evaluation and Characterisation of Khillar Cattle Breed. pp. 55-60.
5. Gokhale SB and RL Bhagat (2012) Present status of Krishna Valley cattle: An endangered breed of cattle, *Ind. J. Anim. Sci.* **82(9)**: 1075-78.
6. James D Dargie, John Ruane and Andrea Sonnino (2013) Ten Lessons from Biotechnology Experiences in Crops, Livestock and Fish for Small holders in Developing Countries, *Asian Biotechnology and Development Review* **15(3)**: pp 103-110 © 2013, FAO.
7. Joshi BK and Aytar Singh (2005) Indigenous cattle milch breeds—Their potential and improvement programmes, VIIIth National Conference on Animal Genetics and Breeding, 8-10 March, 2005.
8. Policy paper (14) (2001) Conservation and Management of Genetic Resources of Livestock – National Academy of Agricultural Sciences 2001, pp. 4-5.
9. Report of the Sub-Group on ‘Conservation of Animal Genetic Resources’ 12th Five year Plan (2012-17).