A note on Indian farm animal genetic resources

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Summary

India has a rich diversity of cattle, buffalo, sheep and goat breeds which are not only important to the people of India, but have contributed significantly to livestock programmes in many other tropical and sub-tropical climatic areas of the world. Most important is the fact that our domestic animal genetic resources (AGR) are under threat. This paper highlights the main AGR of India; the threat to biodiversity and the efforts made for conserving and improving indigenous livestock breeds.

Rich Biodiversity

India is a vast country, rich in biodiversity. With its geographical area of 329 million hectares, India has almost all the climatic conditions and ecological zones found in different parts of the world, ranging from perpetual snow cover to equatorial and tropical conditions, from mangroves to humid tropics and hot and cold deserts as well as all the intermediate conditions.

The animal wealth of India is of some 68,371 species which includes 60,000 insect, 1,693 fish and 372 mammal. The country is endowed with large genetic variability in most of the important domestic livestock species as is reflected by a number of described breeds and strains. Currently there are 26 described breeds of cattle, 7 buffalo, 40 sheep, 20 goat, 4 camel and 6 horse, 3 pig and 18 poultry breeds. In spite of such a large number of breeds, the majority of livestock and poultry have not been described. In the country there is a number of rare species viz. Yak, mithun and wild (arni) buffaloes, the ancestors of modern day buffaloes. In addition, several other forms like ducks, rabbits, donkeys, geese, quails etc. are also an important component of animal wealth and contribution to animal production.

Key words: Biodiversity, Indigenous breeds, Conservation.

Introduction

Biodiversity (biological diversity) is the variety and variability of plant, animal and micro-organisms. The fundamental relationship of diversity and germplasm is evident, the diversity of organisms being the source of all germplasm. Our planet’s essential goods and services depend on the variety and variability of genes, species, populations and ecosystems. Biological resources feed, clothe, and provide housing, medicine and spiritual nourishment.
Threat to Biological Diversity

Most of the breeds of livestock and poultry in India that exist today have evolved through natural selection for adaptation to the agro-ecological conditions and to a very limited extent through artificial selection based on the social or economic needs of the breeders. It has been contended that indigenous genetic resources are endowed with unique genetic attributes such as superior adaptability to hot-humid conditions, long migration, ability to subsist on inferior and scarce feed resources and highly brackish drinking water. They also have some resistance/lower susceptibility to tropical diseases.

There is very little appreciation of such valuable genetic resources available in many distinct types, species, breeds and forms. Some of these already face the danger of extinction and, as such, need to be conserved before it is too late. There is great concern among the officials in the Government of India that many of the unique breeds of animals will become extinct and a valuable resource will be lost. It has been recommended by several persons and groups that India make a concerted effort to describe its diverse species and breeds of livestock and that conservation measures be initiated at the earliest.

Among various reasons for the loss of indigenous genetic resources in India, the most important are:

a) introduction of exotic breeds. The improvement programmes, though expected to be restricted to crossing with non-described and low producing animals, have a spillover onto the described breeds, since initial increase in productivity of crossbreds is too large to be ignored;
b) large inter-mixture among breeds in the region where two or more breeds exist
c) no breeding societies or agencies as those existing in countries more agriculturally advanced to register animals of a particular breed to maintain herd/flock books and ensure purity of a breed or type;
d) decrease in population size resulting in inbreeding and its deleterious effects; and
e) changing preference towards a particular production trait over time.

Earlier Efforts for Maintaining and Improving Indigenous Livestock Breeds

Earlier the Government of India had initiated a herd registration scheme. The scheme did not make any serious impact on improvements of the breeds or maintenance of their purity, neither did it provide data on pedigree progeny which could be utilised for progeny testing of bulls nor did it assure the use of bulls conforming to the breed type. Even the pedigree information was not properly utilised in selection of prospective bulls.

The Indian Council of Agricultural Research has published bulletins containing breed characteristics of important breeds of buffalo and cattle and revised them from time to time. More recently, efforts to describe the breeds of sheep and goats along with their productivity and associated characteristics and those of other livestock and poultry has been made both by the Acharya and Bhat (1984).

Breeds Needing Conservation Efforts

Although very little information is available on the breeds needing priority attention for conservation, more recent work done shows that all the sheep breeds in Jammu and Kashmir, the Magra Pugal and Chokla breeds of Rajasthan and the Mandua breed of Karnataka, and the Barbari and Jamnaparti breeds of goats, the Sahiwal, Red Sindhi, Tharkpar, Vachur, and Punganur breeds of cattle; the Nili Ravi and Toda breeds of buffaloes, the Karknath and Naked Neck breeds of poultry need immediate attention for conservation.
Animal Genetic Resources

It said that Zebu cattle can stand heat better than the temperate cattle. They do perform better than *Bos taurus* under harsh climates. Perhaps the presence of more sweat glands in Zebus does not allow their body temperature to rise fast when the air becomes hot and dry. They do not pant in the heat and nor does their milk yield drop. Their milk yielding capacity is less and perhaps they are less distressed by tropical diseases and physical environment. They are multipurpose and are used for milking, ploughing and hauling. In the Indian sub-continent as many as 26 defined breeds, constitute germplasm resources.

*Milk breeds*: Gir, Sahiwal, Red Sindhi and Tharparkar.


*Dual-purpose*: Nimari, Dangi, Hariana, Mewati (Kosi). Rath: Ongole, Kankre; and Deoni.

One of the best buffalo breeds of the world, Murrah, is found in India and is being used as an improved breed for increasing milk production potential in other countries. Other useful breeds like Nili-Ravi whose home tract is now in Pakistan, Surti, Mehsana, Jaffarabadi and Bhadwari, also play an important role in milk production.

A number of breeds of goats are available in the country. Some breeds like Lohi, Beetal, Marwari, Sirohi, Surti and Osmanabadi do well in semi-arid, arid and desert conditions of the North Western part of India; other types like Gaddi, Chegu and Changthangi live only in cold and mountainous areas. Other important breeds like Jamunapari and Barbari are found in Central India; Black Bengal, White Bengal and Assam Hill in the eastern part; and Sangamneri, Malabari and Konnai Adu and Deccani in coastal areas. The Jamunapari breed of the chambal ravines in the Etah district (UP) has been extensively used for improvement of native breeds in India and many other countries. The dwarf breeds of goats like Black Bengal, Barbari, Malabari and Assam Hill are famous for high prolificacy (multiple births), early sexual maturity and generally produce two crops in a period of 14 months. The Pashmina (Cashmere) goats of Leh-ladakh produce the fine quality Pashmina fibre which has no substitute so far.

A wide biodiversity exists among the sheep breeds of India. The Indian breeds of sheep are mostly of coarse carpet wool types except those in the northern temperate region which produce softer and slightly finer wool. As many as 40 distinct breeds are available in many geo-climatic conditions. Among the apparel wool types of breeds are Kashmir Merino. Nilgiri, Hissardale and Karnah: among carpet wool and meat type are Chokla, Nali, Patanwadi, Gaddi, Changthangi, Muzzafarnagri, Deccani, Marwari, Magra, Jaisalmeri, Malpura and Sonadi and among meat types are Nellor, Mandya, Hassan and Madras Red.

The Indian wild pig is found in the Shiwaliks and Tarai areas throughout northern India. All domestic varieties except the Chinese are the descendants of the Indian wild pig.

The one-humped camel known as ‘dromedary’ is the most common type available in desert areas in India especially the North-western region comprising the states of Rajasthan, Gujarat and Haryana. The Yak is another milk animal for people living in the high mountain regions of Himachal Pradesh. India is considered as the original home of the red jungle fowl. Aseel, Desi, Kadaknath, Naked Neck, Chittagong and Basara are still considered as the important indigenous breeds of India. They are active and can easily withstand adverse conditions. Aseel or Malay fowl are reported to have given rise to all the present day breeds of poultry in the world.

The National Bureau of Animal Genetic Resources (NBGAR) in India has established indigenous farm animal literature and a germplasm resources data bank. Strategies for the establishment of an animal gene bank *in-situ* and *ex-situ* conservation have been formulated. Pilot breed surveys for
characterisation of several farm animal breeds have been undertaken by the Bureau. These included surveys on Hariana, Rathi, Nagori and Suri Cattle, Bhadawari Buffaloes, Yak and Mithun. The field surveys led to the generation of information on population dynamics, utilisation and management practices vis-à-vis the conservation status of these breeds in their respective breeding tracts. Work plan monographs, a manual on the National Animal Gene Bank of India, characterisation and description of the Tharparkar and Rathi breeds of cattle have been published. Genetic evaluation of animal genetic resources through cytogenetic characterisation of several breeds of cattle, sheep, goats camels, equines, pigs and poultry is in progress. Intensification and expansion of a Network programme on evaluation and conservation of animal genetic resources and work on physical mapping of genes will be undertaken in the immediate future.

With a large number of species (both domesticated and wild relatives of some) that exist in India, as well as the different status of knowledge regarding their population size, location and composition of populations, some ordering of priorities for identification, characterisation etc. is necessary. In addition, some decision must be made regarding optimum technical procedures to be applied within each species for their characterisation, evaluation and conservation. NBAGR should prepare a Memorandum of Understanding to be carried out with each of the collaborating agencies specifying in each of the terms under which co-operative programmes it would be carried out including those of proprietary rights and management of data and information. While the proprietary rights to data of the originator must be respected, safeguards should be provided in the policy statement which would prevent undue delay in making such data available for Bureau use.

The International institution, the World Trade Organization (WTO) will form a strong instrument for international economic affairs. Now efforts need be concentrated on finding ways to utilise the new system to the maximum benefit. It would be prudent for Indian researchers to take out patents on their products/strains/breeds to prevent them from being misappropriated by outsiders. For Indians the real importance of WTO lies in the role that a dynamic export industry can play in the nation’s development. This will inject a new dynamism into the economy by finding new markets to sell our best valued germplasm of livestock for entering into a new economic regime.

**Selected References**

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