Intellectual Property Rights Regime for Livestock Agriculture in India - Present Status and Future Prospects

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Received 12 December 2010, revised 4 February 2011

In order to protect the interest of all stakeholders of livestock farming in India, it is necessary to protect innovations in livestock sector through appropriate IP instruments along with conservation and sustainable use of native livestock breeds and associated traditional knowledge through *sui generis* system in the modern IPR regime. The unique attributes of indigenous livestock breeds could be exploited for profits by getting some form of intellectual property rights (IPR) or protection. An appropriate internationally accepted legal system with respect to use of livestock biodiversity and patenting of novel genes may bring about economic benefit to the livestock keepers in the IPR regime through benefit sharing. Harmonization of IP regimes, access to technologies required for biotechnological research and development through easy licensing and/or patent exemptions especially for public benefit oriented research would pave way for making private investments and private-public participation attractive. Present status of IPR protection in livestock sector in India and future prospects considering the typical livestock production situation existing in the country are analysed.

**Keywords:** IPR regime, livestock sector, livestock breeds, biodiversity, animal genetic resources (AnGR)

India is one of the 17-mega diverse countries of the world. With only 2.5 per cent of the land area, India accounts for 7.8 per cent of the global recorded species. India possesses one of the largest livestock population in the world, which is more than 484.9 million with the top position in cattle (178 million), buffalo (98.7 million), goat (125.46 million) and sheep (64.27 million), poultry (505 million), and pig (16 million). Further, the country has 16.49 percent of the world cattle population and 56.78 percent of the world buffalo population. Out of the total livestock in the country, around 38.2 percent are cattle, 20.2 percent are buffaloes, 12.7 percent are sheep, 25.6 percent are goats and 2.8 percent are pigs. All other animals account for less than 0.50 percent of the total livestock population. There are unique traits of the farm animals inhabiting Indian sub-continent which hold considerable potential application or utilization through biotechnologies. India is rich in traditional and indigenous knowledge, both coded and informal. The distinctive attributes of breeds could be exploited for profits by getting some form of IPR or protection.¹

**Livestock Biodiversity**

India is bestowed with rich domestic animal biodiversity with 30 breeds of cattle, 10 breeds of buffalo, 42 breeds of sheep, 30 breeds of goat, 8 breeds of camel, 6 of horse and 18 breeds of poultry in addition to other species. However, recent decades have witnessed a loss of several breeds/populations due to neglect, urbanization and a host of other reasons. Livestock genetic diversity has been constantly neglected as well as threatened. Loss of livestock biodiversity puts in jeopardy the sustainability of animal agriculture and the ability of the sector to respond to changing environmental conditions. Livestock genetic resources with high diversity are essential for food security, to utilize environment unsuitable for crop agriculture and to respond to changes in production systems, impending climatic change, emergence of new diseases and market demand.

Biodiversity of farm animal genetic resources has been rapidly declining. As per FAO, about 1000 of the 6400 recognized breeds have become extinct during the last 100 years. One-third of these became extinct between 1985 and 2000 (ref. 3). Livestock species are unlikely at danger of extinction themselves. The level of biodiversity, which is of concern here, is that of breeds and even populations within breeds. In fact, within breed, diversity accounts for 50 to 70 per cent of total genetic variance.² Many of the indigenous breeds of livestock in India face the threat of extinction. It is difficult to save them, unless they are economic under the prevailing production

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systems. For example, the dual-purpose breed Krishna Valley found in the states of Maharashtra and Karnataka is on the verge of extinction due to change in the agricultural production system and lack of efforts to make the breed respond to the changing production system. It has been reported that over the past seven years, at least one livestock breed has become extinct each month and further that around 20 percent of the world’s livestock breeds are at risk of extinction. In India, the focus on maximizing immediate financial returns by crossbreeding of valuable indigenous breeds, has resulted in a threat to the well adapted local breeds, which were earlier evolved for a variety of domestic purposes. The production and market requirements are likely to change in the future because of likely changes in consumer needs and physical environment. The United Nations proclaimed 2010 to be the International Year of Biodiversity, and people all over the world are working to safeguard this irreplaceable natural wealth and reduce biodiversity loss. Livestock genetic diversity represents one of the most neglected as well as threatened aspects of biodiversity. Livestock genetic diversity and associated traditional knowledge (TK) are vital for current and future human wellbeing and has to be protected in the modern IP regime. It is very essential to maintain genetic diversity to respond to situations like climate change and emerging diseases and to adapt to production systems. Their values are derived from the private functions for the household plus the functions of public interest. Disparities arise in the appreciation of value for genetic resources partly due to different technological tools used to access to the resource: paradoxically the researchers explore genotype - alleles, nucleotides etc., while local communities have been interested in phenotype such as adaptive traits, reproductive performance, appearance etc.

Indigenous livestock are bestowed with many unique characteristics. Darwinian adaptations of indigenous cattle in relation to their ability to tolerate heat and parasites as well as their ability to survive and produce milk and capacity to work in harsh conditions under poor quality feed and fodder is yet to be fully understood, and exploited for further improvements. The genetic secrets of these breeds have commercial value in the IPR era. Genes responsible for disease resistance, adaptation to withstand tropical heat and far greater climatic fluctuations, ability to utilize poor quality feed and fodder resources, better survivability under more recurrent drought conditions, superior growth and higher fecundity in some species/breeds, and potential to yield certain unique products in indigenous livestock could be identified and protected through appropriate IPR. Emerging diseases are a major problem in livestock and poultry production; the impact of bird flu on poultry production was quite significant. Identification of genes for unique characteristics in native breeds will go a long way not only in the advancement of science and livestock production, but also pave way for patenting of gene sequences for these traits. If a proper internationally accepted legal system is developed with respect to the use of animal genetic resources, patenting of novel genes will bring about economic benefit to the livestock keepers through benefit sharing. The natural resistance/susceptibility of various breeds will be highly useful in breeding for disease resistance. Identification and utilization of such genes/sequences could have economic implications if India could utilize the provisions under Convention on Biological Diversity (CBD) in an effective and efficient manner.

Pastoralists, small and marginal livestock farmers conserve livestock genetic diversity and thus provide a service to humanity that is currently not rewarded by market forces. The conservation of animal genetic resources (AnGR) through livestock husbandry by the poor is a hitherto unrecognized and unrewarded service to society. An international legal framework on AnGR could provide support and incentives to those conserving genetic diversity. It is reasonable to expect that in the near future, niche products from livestock are likely to get lucrative through proper branding and increased demand for organic livestock products in the IPR era from a health conscious population.

Livestock disease control has undergone a paradigm shift in recent years. A number of biological products have been developed for preventive and curative disease management. Patent protection to the innovations in the area of vaccines and diagnostics, feed technologies, value addition to livestock products, breeding and reproductive technologies, and mechatronics applied to livestock are likely to play a more influential role on livestock farming in the near future. As technological intervention increases, the importance of intellectual property protection in the livestock sector also increases many times.
The knowledge intensive technology driven growth in livestock sector has led to many challenges pertaining to control of technologies and its effect on livelihood security of farmers and international trade. The conflict between intensive system of livestock rearing and the sustainable technological innovations generated by livestock keepers based on native livestock genetic resource and associated TK will pose important challenge. Presently, livestock sector is confronted with many challenges. International conventions and treaties together with the rapid biotechnology development have led to new conditions for the access of genetic resources and knowledge. The CBD and the requirements under WTO/TRIPS have led to stricter mechanisms for access to benefit sharing and control of genetic resources as well as the new regimes for protection of biological innovations. This new environment has created both threats and opportunities for biodiversity rich countries.

Technology Generation and Commercialization in Livestock Sector

In India, in the field of veterinary and animal sciences, many technologies are generated by the public funded institutions but technology commercialization and entrepreneurship development is quite low. Indian Council of Agricultural Research (ICAR) institutes and State Agricultural Universities (SAUs) and NGOs have focused on technologies to enhance the livestock productivity and in improving the health and reproductive status of the livestock. Apart from artificial insemination (AI) technology and prevention of diseases through vaccination, adoption of other technologies in the area of dairy production is quite low. Even in the area of dairy processing, technological interventions are not up to the desired level in India. Livestock products and process technologies will provide higher market through value addition. The IPR regime has a bearing on the development of biological products (vaccines) and diagnostics. IPR laws also have a bearing on the development and diffusion of technologies in the field of livestock farming. The present IP regime in the country is likely to enhance technology transfer from developed countries to India in the area of greener technologies aimed at reducing methane production from ruminants and quality improvement in dairy products through technological interventions. The TK concerning livestock production, animal health system and traditional products could be used effectively for bringing benefit to India in the form of benefit sharing in the IP regime.

In developing countries, including India, there is limited public investment in animal biotechnology and only modest support for more conventional livestock research and development to improve productivity, nutrition and the health of farm animals. At present, very few livestock breeding programmes exist in India where there is a possibility of applying molecular marker assisted selection and gene based selection as an aid in selection of superior breeding stock. Additional public sector investment is especially required, in developing and applying biotechnologies strategically in the characterization, sustainable use and conservation of animal genetic resources, where private sector investment is unlikely to be commercially attractive in the short and medium term. However, in the modern IPR regime, there exists possibility of private funding for research in the area of improved diagnostics and therapeutics, particularly vaccines against the major livestock diseases, where information coming from the study of pathogen genomes can help to develop more effective disease control measures.
Rapid progress in science and the number of applications of proprietary rights has led to an unprecedented growth in private sector investments in the last few decades in livestock agriculture, particularly, in animal biotechnology research in developed countries. With the advent of genetic engineering and novel multilateral IPR agreements, a new era of gene hunting has started. All applications of biotechnology, animal genetic resources and associated TK are potentially the subject matter of IP claims. Animal patenting, even in countries where it is permitted, is so far largely a phenomenon of medical and pharmaceutical research, rather than of livestock agriculture, though this may change with the introduction of transgenic animals. Patents and trade secrets are relevant to animal biotechnology research and development. It is advantageous to patent innovations of major value while trade secret is a highly useful mode for protection of process/strain/know how improvements which are often non patentable.\(^7\)

In the recent past, livestock farming has changed rapidly and become technology intensive, similar to the plant sector during 1980s. These changes are becoming more visible with precision farming, sequenced genomes, transgenic livestock and cloned animals. Researchers, innovators and companies have now started to protect their IP in the area of livestock rearing and veterinary sciences. This has alarmed and threatened the general public and raised economic, legal and ethical concerns.\(^8\) The challenge for biodiversity rich countries like India is to guard against bio-piracy, their indigenous animal genetic resources, and safeguard associated TK of livestock keepers and traditional healers.\(^8\) Another concern is the export of genetic material to countries that have not ratified the Convention on Biodiversity.

In spite of significant contribution of animals to the food security and nutrition, laws and policies including IP protection on genetic resources at the national as well as international level so far have focused only at plant genetic resources. Generally, animal breeding and production take place within the national boundaries as per customary laws whereas livestock products are marketed at global level. Therefore, national and international as well as regional laws and IPR and global commitments are relevant to Indian livestock sector. The proliferation of free trade agreements, both multilateral and bilateral, has led to an unprecedented growth in international trade in livestock products. During the last decade, cheap livestock products from developed countries flooded the markets of under developed and developing countries resulting in loss of livelihood to animal farmers from these countries.\(^12\) Differential subsidies and tax benefits enjoyed by the industrial livestock producers particularly, in the developed world and international trade agreements are impacting livestock production in developing countries including India.

### Multilateral Agreements and Indian Livestock Sector

India is signatory to CBD and TRIPS Agreement and also ratified the Global Plan of Action on Animal Genetic Resources. Therefore, it is obligatory for India to develop suitable legislation to protect and improve livestock genetic resources and associated TK. In order to comply with CBD, India enacted the Biological Diversity Act (2002). As such, livestock biodiversity has not been the object of much specific consideration within the CBD, and no arrangements that meet the special nature and distinctive features of livestock sector have not been attended to. As a party to the UN Convention on Biological Diversity, India formulated the Biological Diversity Act, 2002 which provides that the authority to determine access to genetic resources rests with the national government and is subject to national legislation. At present, information available on India’s biodiversity is inadequate, including their potential use and value. Similarly, there is limited capacity and awareness regarding the implementation of the Biological Diversity Act, 2002. IPR issues related to biodiversity protection and conservation in India are currently managed under the Biodiversity Act, 2002. The main objectives of the Act 2002 are conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources and knowledge. Under TRIPS, provision is made for plant variety protection under patents or a sui generis system, or a combination of both. There is no comparable system for animals. Under TRIPS neither prior informed consent nor protection of TK is mandated. TRIPS also does not offer sufficient recourse for balancing the rights of the owners of AnGR.

In India, private ownership of livestock is common and public ownership is rare. The owner of the animal has the right to use the genetic resources in breeding and can have control over who is receiving genetic
material from his/her animals. However, it is difficult in secondary and further generations to have control over gene flow. In case of poultry, generally farmers are given hybrids by commercial producers. In the modern IPR era, it is essential to provide certain rights such as access to natural resources, grazing rights, participatory decision making in the plans or programmes affecting AnGR to livestock keepers through a *sui generis* system which will help in protecting native livestock and their sustainable use.

**IPR Regime and Livestock Sector**

A paradigm shift is required in livestock sector from production orientation to quality and cost orientation in the WTO era. In the present knowledge based global economy, protection of IP is critical for technology development and diffusion in all fields including livestock sector. Various forms of IPR have impact on trade and improvement in livestock sector. With respect to gene-based innovation, the most significant IPR is patents. Appropriate patent regimes have the potential to foster innovation in animal biotechnology and transfer of gene-based technologies. Inappropriate patent systems may be counter-productive. Indeed, many critics are doubtful that the current international patent standards, based as they are on a combination of the United States of America’s and European regimes, can help countries that lack the capacity to enhance life science and biotechnology research to become more innovative or contribute to the acquisition, absorption and, where desirable, adapt imported new gene-based technologies. In general, patenting of life forms is a new phenomenon in most of the countries including India. Mega-biodiversity countries want disclosure of source and country of origin of the biological resource and of the traditional knowledge used in the invention, disclosure of evidence of prior informed consent under the relevant national regime and disclosure of evidence of benefit sharing under the relevant national regime to be included in the patent application. Even if one can identify an animal carrying unique gene/gene combinations, utilizing such unique genetic characteristics is extremely difficult due to long generation intervals, low reproductive rates, high cost and low success rate of identifying and transferring unique genes in animals.

Copyright protects literary and artistic works which includes articles, books, web pages, computer software and music, and is applicable when the work is in a publishable form. Genetic material *per se* cannot be protected or covered by a trademark. A trademark can be a useful tool in livestock sector as means of value addition. The trademark can improve the value of a product. For example, semen straws from a reputed company with trademark may fetch higher price. Besides, a trademark which highlights the producer or a manufacturer of a product, a geographical indication (GI) emphasizes the geographical origin of a good and the characteristics derived from it. GI does not protect the breed or genetic material *per se* but adds commercial value to the animals of breed reared in a particular region. They may also be used as a value addition mechanism. Origin-based marketing in which control over production processes remains with the livestock keepers can empower livestock keepers and provide greater earning power. There is scope for utilizing GI based on unique characteristics of products produced from a breed in a geographical area due to natural conditions and unique production system.

In France, the Bresse breed of chicken is produced in the Bresse geographical area only as defined by law under protected designation of origin and sold at 50-60 per cent higher price. Similarly, to save the Sambucana sheep from extinction, a consortium was set up and a special brand name for guaranteed Sambucana meat was set up in Italy. GIs are used to protect interest of livestock keepers in developing countries also like Karoo lamb (South Africa) and Chos Malal goat meat (Argentina). Typical curd made from milk of Chilika buffaloes, and milk products with typical flavour made from Banni, Dharwari buffaloes are other examples which could be considered for protection.

Trade secrets are important in livestock breeding where commercial breeders want to keep their nucleus stock and the pedigree information (or other information) from their competitors. Sometimes the right to use the animal in breeding is determined through formal or informal contract. In the case of dogs, in many places an informal contract is followed whereby the male dog owner gets one male pup after successful breeding.

**Patenting in Livestock Sector**

Patenting of life forms is the most controversial aspect even among WTO members. Patent laws and their interpretations are subject to change, especially when new technologies are introduced. Mega biodiversity countries provide genetic resources for
modern animal breeding and biotechnology industry. Traditional livestock keepers have greatly contributed and continue to contribute towards the improvement of AnGR and also towards maintenance of genetic diversity. The genetic resources have been transferred freely to other countries in the past; under the understanding that these are common heritage of humanity. With the development of modern biotechnology, there is possibility that indigenous breeds/varieties may be genetically altered and the new variety/breed may later be substituted for the original breed/variety from which it was developed particularly in poultry and pigs. Biotechnology firms are interested in patenting processes and genes used in animal breeding as such. Patent protection will encourage the natural selection that, at present, takes place at farmers’ level. The patenting of broad traits like increased milk yield or broad claims on genes/animals may lead to monoculture and monopoly which would result in hardship to the pastoralists, small and marginal livestock keepers.\textsuperscript{7}

In the livestock sector, patents have been granted for gene sequences with utility such as genetic markers. A New Zealand company, Agmark, claimed a patent on the ‘Booroola’ gene, which regulates the ovulation rate in sheep. The Booroola gene can be traced back to Bengal sheep which were imported from Kolkata and crossed with Merinos.\textsuperscript{14} The patent covers animals produced in a breeding programme in which the DNA test was used, but not those animals that carry the gene naturally. The open question is whether the patent also covers the offspring of the animals that have been tested for the presence of the gene. Another notable patent application is one by Monsanto for a series of twelve patents on pig breeding.

One of the first conflicts in quantitative animal breeding resulted from a patent entitled ‘Method of bovine herd management’ granted to the Cornell Research Foundation (Cornell University) in the USA in 1994 and Canada in 1998. The invention for the ‘test-day model’ includes gathering of data, mathematical treatment and use of the data by dairy producers.\textsuperscript{15} The novelty and non-obviousness of the patent has been seriously questioned since the practices of gathering, manipulating and using data by dairy producers have existed for nearly 100 years.\textsuperscript{16} In South Africa, these principles have been in use since 1917. The novel features in the patent are a specific mathematical model and procedures developed for the analysis of test day yields. In European Union and some other countries patents can also be granted on normal animals which have merely been subjected to certain techniques like a gene diagnosis, or a process for determining the animal’s sex. The European Patent Office granted a patent (EP 849990) on Dolly, the cloned sheep, to the Roslin Institute in Edinburgh in 2001. The US Company XY Inc was in 2005 granted patent EP 1257168, which covered a method for selecting sperms by sex for the artificial insemination of mammals. The first European patent on genetically manipulated dairy cows was granted in 2007. In EP 1330552, ‘inventors’ from Belgium and New Zealand claim processes for breeding cows that give more milk or milk with altered constituents. The cows are produced either by marker assisted breeding and bred normally, or by having more milk genes additionally incorporated into their genome. Such patents are however, not yet granted in India.

Patenting of Livestock Breeds in Various Countries

Hungary is one of the few countries that grant patent protection for animal breeds\textsuperscript{17}, as specified in Articles 110 and 111 of the 1995 Hungarian Law on the Protection of Inventions by Patents. The Bulgarian Law for Protection of New Plant Varieties and Animal Breeds has been enforced since 1996. In terms of patentability of higher life forms, such as animals, they are not treated any differently by the Australian Patent Office from the way in which lower life forms are treated. The East African Boran cattle breed has been patented in Australia.\textsuperscript{15} The practice in New Zealand is similar to that of the Australian Patent Office. In general, animal patents are also allowable in Japan. In contrast to these countries, animals (whether transgenic or otherwise) are not patentable in countries such as Argentina, Brazil and China\textsuperscript{18} and India.\textsuperscript{7,8} Animals and animal varieties per se are also not patentable in South Africa.

Registration of Livestock Breeds in India

Accreditation of indigenous livestock breeds by way of registration is warranted.\textsuperscript{19} Under the Central Herd Registration Scheme of the Department of Animal Husbandry & Dairying, animals belonging to Hariana, Gir, Kankrej and Ongole breeds of cattle and Murrah, Surti, Mehsana and Jaffrabadi breeds of buffalo are registered depending on the conformation to breed characteristics and prescribed milk
production norms. Owners of registered animals are provided certificate and prizes/incentives to encourage conservation of indigenous breeds and production of high quality cows and buffaloes.

Recently, recognizing the need for an authentic national documentation system of valuable sovereign genetic resource with known characteristics, ICAR initiated a mechanism for registration of animal germplasm at National Bureau of Animal Genetic Resources (NBAGR), Karnal. This would help to protect valuable animal genetic diversity and facilitate access for genetic improvement of animal breeds.

However, both the herd registration scheme and breed registration system developed by ICAR lack legal enforcement authority and hence there is an urgent need to develop a suitable legally binding sui generis system for protection of livestock breeds/varieties/strains and establishment of animal genetic resources authority of India for protecting the interests of livestock keepers and animal breeders through a law comparable to the Protection of Plant Varieties and Farmers’ Rights Act, 2001 and PVP and FR Rules 2003 with due consideration for the special characteristics of AnGR. Such an authority will be a boon for conservation and sustainable use of native livestock genetic resources.

Defining and enforcing IPR, which bestow on the creator of an innovation/invention the exclusive right of use for a certain period of time, may be a powerful tool for encouraging private companies to invest in livestock research. In most countries, IPR laws are structured around TRIPS, which establishes the minimum levels of protection that governments should give to the IP of other WTO members. There is wide variation in the level of protection among the countries, some countries grant patents on genes and transgenic animals; others do not allow patenting of transgenic animals. It is challenging to identify the correct balance between the legitimate interests of IPR holders and those of end-users in the case of livestock sector. The benefits of IPR are, in fact, variable over space and time because they depend not only on the characteristics of the innovation but also on the time horizon and the region’s/country’s level of development. Research institutes and large firms are able to comply with all the rules and procedures involved in having their intellectual inventions protected. However, as livestock keepers and local communities are rarely, if ever, in a position to patent their inventions, there is a risk of these inventions being misappropriated by others. Until now, the enforcement of IPR in livestock sector is not so rigid in India which reduces the effectiveness of IPR laws and regulations. It also generates a bias towards research outputs primarily marketed in industrialized countries with functional rule of law.

**Traditional Knowledge Associated with Livestock**

Indian livestock keepers are also holders of a large amount of traditional knowledge. TK associated with biological resources including livestock are integral part of the resource itself. In India, patent applications have to disclose the source of genetic material and associated TK in relevant cases. In case of wrong patenting, the process of revoking is very expensive. Protecting TK, particularly associated with biological resources is difficult unless proper documentation is done. TK associated with AnGR is by and large collective, developed over a period and may either be codified in text or held in oral traditions over generations and often in parallel. TK has the potential of being translated into commercial benefits by providing leads for development of useful products and processes. The valuable leads provided by TK save time, money and investment of modern biotech industry into any research and product development. Hence, creators and holders of TK must get a share of benefit. The Jeevani (herbal medicine derived from the leaves of the *Arogypaacha* plant based on TK of Kani tribe) case highlights the possibility of benefit sharing for the TK associated with local livestock breeds. It might be worth paying attention to the need and possibility for developing a clearing-house mechanism to be operated at the Department of Animal Husbandry and to the possibility of conducting an IPR audit.

**Bioprospecting and Biopiracy**

Bioprospecting is the exploration, extraction and screening of biodiversity and TK for commercially valuable genetic and biochemical resources. Frequently, the term bioprospecting refers to the use of TK in finding leads for pharmaceutical research. Biopiracy is stealing of knowledge from traditional and indigenous communities or individuals. An example is a controversy over biopiracy of the unique dwarf Indian cattle breed ‘Vechur’. The unique genetic quality of this breed is the high milk fat content ranging from 6.02 to 7.86 per cent. Roslin Institute and the PPL Therapeutics (Scotland) Ltd
have 14 patent applications at the European Patent Office (EPO) and one of these (EP 0765390) for the gene construct of bovine alpha-lactalbumin is based on studies in Bos indicus (of which vechur is a breed). Biodiversity rich countries like India should promote bioprospecting to upgrade local capabilities and to prevent biopiracy.

Need for an International Treaty on AnGR

In spite of significant contribution of animals to food security and nutrition, laws and policies including IP protection on genetic resources so far focused only on plant genetic resources. The drive towards full harmonization of IP laws in livestock sector across countries with different types of livestock production systems are creating problems for the biodiversity rich countries. In the modern biotechnology era, there is danger of animal genetic material from biodiversity rich countries being exploited by others, including large international companies. The development of a legal binding ‘International Framework on Animal Genetic Resources’ is therefore, a matter of urgency. During the First International Technical Conference on Animal Genetic Resources held at Switzerland delegates from 109 countries including India adopted a Global Plan of Action for Animal Genetic Resources held at Switzerland delegates from 109 countries including India adopted a Global Plan of Action for Animal Genetic Resources held at Switzerland delegates from 109 countries including India adopted a Global Plan of Action for Animal Genetic Resources held at Switzerland delegates from 109 countries including India adopted a Global Plan of Action for Animal Genetic Resources held at Switzerland delegates from 109 countries including India adopted a Global Plan of Action for Animal Genetic Resources. The first internationally agreed framework to halt the erosion of livestock diversity and support the sustainable use, development and conservation of animal genetic resources. In future, IP protection is likely to influence pricing and international trade of livestock products in a significant way.

Conclusion

In order to improve the productivity of livestock in India, it is absolutely necessary to increase technological interventions. Development and diffusion of knowledge intensive technologies in all sectors including livestock sector are greatly influenced by IPR regime. Protection of native livestock breeds and associated TK through appropriate sui generis system is essential for conservation and their sustainable use in the modern IPR regime. Knowledge of the unique characteristics of India’s indigenous livestock breeds will come handy in responding to present and future challenges in livestock sector. If proper internationally accepted legal system is developed with respect to use of livestock biodiversity, patenting of novel genes will bring economic benefit to the livestock keepers in the IPR regime through benefit sharing and help in conservation and sustainable use of native livestock breeds. Granting of extensive patents to multinational companies in relation to livestock breeding could become a bane to livestock keepers. There is an urgent need to establish Animal Genetic Resources Authority of India to protect the interest of all stakeholders and for sustainable use of vast animal genetic resources available in India.

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