

AGROBIODIVERSITY AND ACCESS AND BENEFIT SHARING *

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Introduction

The Indian economy is predominantly agriculture based with nearly two third of its population engaged in Agricultural sector and one-fourth of the Gross Domestic Product (GDP) being contributed by agriculture. The Green Revolution has been one of the most striking success of the sixties in India. Green revolution also was an era of “self sufficiency” in food production and rural prosperity. However, Green Revolution also taught the Nation some valuable lessons due to the excessive application of chemical inputs like fertilizers and pesticides which affected the soil system and environment as well as the ecosystem considerably and adversely affected the soil health and sustainability. There has also been considerable erosion of agrobiodiversity in the agro-ecosystem including that of genetic resources of plants, animals, fish, insects and soil microorganisms. At present large number of high yielding varieties, hybrids and farm technologies are available and at the same time “Technology Transfer” also should address the issues of “ecofriendly”, “farmer friendly” “agro biodiversity friendly” in conserving and maintaining local farmer’s varieties and land races for the welfare of our future generations.

India is bestowed with immense richness of agro-biodiversity and a rich diversity in landraces / traditional cultivars/farmers varieties in several Agricultural and Horticultural crops. A huge number of crop plants (384) are reported to be cultivated in India. This includes 168 species earlier reported under the Hindustani centre, one of the eight Vavilovian centers of origin and diversity. Further, an enormous richness (326 species) is reported in wild relatives of crop plants. A total of 49 indigenous major and minor crops have been reported in the “History of Agriculture in India”, published by the

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ICAR. A large number of cereals, millets, oilseeds and vegetable varieties have originated and are cultivated in India, making it one of the richest Centres of Origin of crop and plant diversity in the world. Equally magnificent is the richness of livestock, poultry and fish diversity. Out of the 4,200 endemic species of higher plants reviewed (estimated figures being about 6,000), the large number (2532 species) was found to be located in the Himalayan region followed by the Peninsular region (1,788 species) and Andaman and Nicobar Islands (185 species). Other estimates were, however, still higher range (8,900 species) mainly owing to the fact that these are also included medicinal plants and religio-ritual values, which were semi-domesticated to semi-wild. Much of the country's agro biodiversity is in the custody of farming communities and tribals who followed ageold farming system, including shifting cultivation, made conscious and unconscious selections and inherited and perpetuated their seed or propagules over many generations.

Current Agricultural Scenario and Biodiversity Conservation

The Indian Council of Agricultural Research (ICAR) which is the second largest agricultural Research and Development organization in the world, has contributed significantly for achieving food and nutritional security for the growing human population, focusing on marginal farmers and, at the same time, maintaining ecological balance. ICAR has taken up lot of initiatives in the formulation of a systems and programme based approach to conservation of agricultural biodiversity which is being followed and implemented in the country.

Cultivated plants in India belong to two categories, viz; (i) indigenous, and (ii) introduced; the latter may be further sub-grouped according to the geo-political areas from where these were introduced, i.e., from Western Asia, Africa, China, Southeast Asia and Pacific Islands, the New World and the Europe. National Bureau of Plant Genetic Resources (NBPGR) have shown a preponderance of variable land race forms/primitive types belonging to different crops of cereals, millets, legumes, vegetables, fruits, forages, fibers, sugar yielding types, spices, condiments, medicinal and aromatic plants and others grown in the diverse phytogeographical and agro-ecological regions of India.

Concentration of genetic diversity comprising native species and landraces occurs more in Western Ghats, Northern Himalayas, Southern plateau, Central India and Northwestern Himalayas.

In tune with our emerging needs, India is reorienting its efforts to meet the future challenges of increased food production, while ensuring conservation and sustainable utilization. These efforts are need-based and demand-driven, and there has been a paradigm shift from a commodity and product-based approach to a systems and programme-based approach following eco-regional planning. The ecosystem approach has been followed for genetic resources conservation and crop improvement programmes in 21 agro-climatic zones of the country. Appropriate policy and legislative measures have been taken to ensure meeting increasing demands for food and other agricultural products and conservation of agro-biodiversity both *in situ* and *ex situ*, protection of farmers' rights through tackling issues such as bio-piracy, patents, *alien* invasive species.

The status of components of agro-biodiversity is being monitored regularly in the context of adopting of high yielding varieties in place of locally adopted varieties, changing nature of cropping systems and infrastructural development. On-farm conservation of genetic resources and diversified farming practices are being promoted to overcome some of these challenges. The negative impacts of agriculture on biodiversity, productivity and sustaining on livelihoods are now getting attention and, thus management practices, technologies and policies are being identified to mitigate the same. These include promotion of integrated crop and livestock farming, revival of traditional watershed management practices and discouraging the indiscriminate use of chemical fertilizers and pesticides. Sustainable agricultural practices are now receiving greater attention with a renewed focus on integrated crop farming and livestock production systems for generating additional income to farm families. On-farm *in situ* conservation approach, with *ex situ* conservation providing a safety back-up, is being explored under different ecosystems with a view to develop workable models.

Sustainable use of Plant Genetic Resources

Plant genetic resources for food and agriculture are the product of natural evolution and human intervention. The important roles played by generations of men and women farmers and plant breeders and by indigenous and local communities in conserving and improving plant genetic resources. They have contributed a lot in terms of collection, conservation, and sustainable use of plant genetic resources for food and agriculture. The diversity is being eroded in the fields and other ecosystem and intensive efforts are required to collect and conserve the genetic resources for sustainable utilization for the progress and development in agriculture.

Many plant genetic resources for agriculture are the result of human intervention and they have been consciously selected and improved by the farmers since the origins of agriculture. It should be recognized that Plant Breeders have played substantial and vital role in utilizing the rich diversity for developing new varieties with desirable characters. Because of diffusion of agriculture and association of major crops with human migrations many crop genes, genotypes and populations have spread all over the world since ancient times.

The natural ecosystems hold important plant genetic resources for food and agriculture including endemic and threatened wild crop relatives and wild plants. Many of these wild plants and wild relatives are not maintained sustainably. The genetic diversity because of interactions which generate new biodiversity is potentially and economically important component of natural ecosystems and can not be maintained in *ex situ* conditions. Unique and particular diverse populations of these genetic resources must be protected in *in situ* conditions.

Modern plant breeding has been remarkably successful in increasing the yields per unit area and considerably increased the potential resistance to pest(s) and disease(s) and nutritional quality of food products particularly under favourable environmental conditions. While small number of species provides a large proportion of National or Global food requirements, hundreds and thousands of other species utilized at local level

either through organised cultivation or harvesting under natural conditions. These under-utilized species contribute substantially to livelihood security and they are often managed or harvested by women farmers. Many under-utilized plants have potential for more widespread use and their promotion could contribute to food security, agricultural diversification and income generation particularly in areas where the cultivation of major crops is economically marginal.

Farmers' privilege and rights

The farmers should be permitted to freely produce his requirement of seeds and also to exchange the seed material with other farmers of the country. As long as the farmer remains as a grain producer and does not form himself into a large scale commercial seed producer of the protected varieties his freedom to use farm seed or exchange seed with other farmers should not be affected by plant breeders' right.

The farmers and tribal people who are responsible for conservation of the genetic variability. During the course of collection, if a scientist comes across a new variability preserved by a farmer (includes tribal people) the right of patenting should be informed to the farmer or it can be patented jointly by the scientist with the farmer. Such innovative selection process should be recognized with awards and certificates.

Biological Diversity Act, 2002 and Access and Benefit Sharing

The word "fair" and "equitable" both means "Just" or unbiased. Fair means having the qualities of impartiality and honesty and free from prejudice, favoritism and self interest. Equitable also means just comfortable to the principles of justice and right.

The Biodiversity Act -2002 primarily addresses access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of benefits arising out of the use of these genetic resources and associated or Traditional knowledge to the country and the people. Section 3 and 4 in the BD Act, 2002 are the important sections for access of bioresources, traditional knowledge as well as transfer of research results (Technology) on biodiversity of India. .

To regulate the access of biodiversity a three tier structure at the national, state and local level is established under the Biological Diversity Act, 2002. National Biodiversity Authority (NBA) deals with all matters relating to requests for access by foreign individuals, institutions or companies, and all matters relating to transfer of results of research to any foreigner and approval for IPR related bioresources. State Biodiversity Boards (SBB) deals with all matters relating to access by Indians for commercial purposes. The Indian industries are required to provide prior intimation to the concerned SBB about the use of biological resource. The SBBs have the power to restrict any such activity, which violates the objectives of conservation, sustainable use and equitable sharing of benefits. The Biodiversity Management Committees (BMCs) are set up by the State Biodiversity Boards at local level in every Panchayat in their respective areas for conservation, sustainable use, and documentation of biodiversity and chronicling of knowledge relating to biodiversity in People's Biodiversity Register (PBR). Any person referred to in sub section (2) of section 3 of the Biodiversity Act, 2002, who intends to obtain any **biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio survey and bio utilization or transfer the results of any research relating to biological resources** occurring in, or obtained from, India, shall make application to the National Biodiversity Authority. The NBA and SBBs are required to consult the concerned BMCs on matters related to use of biological resources and associated knowledge within their jurisdiction. Also to check bio piracy, the Biodiversity Act, 2002 provides that access to biological resources and associated knowledge is subject to terms and conditions by way of agreements between the access applicant and NBA, which secures equitable sharing of benefits to the local community through National Biodiversity Fund (NBF).

The National Biodiversity Authority while granting approvals under Section 19 or Section 20 ensures that the terms and conditions subject to which approval is granted secures equitable sharing of benefits arising out of the use of accessed biological resources, their by products, innovations and practices associated with their use and applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned

and the benefit claimers. Fair and **equitable share of benefit is governed by section 21 of BD Act, 2002 and Rule 20 of Biological Diversity Rules, 2004 on case by case basis.** The share of benefit sharing out of the use of bioresources shall be decided by NBA in consultation with the local bodies. The benefit claimers are conservers of biological resources, creators and holders of knowledge and information relating to the uses of biological resources. While granting approvals, NBA will impose conditions, for securing equitable share in the benefits arising out of the use of biological resources occurring in India or knowledge relating to them. These benefits includes **monetary gains, grant of joint ownership of intellectual property rights, transfer of technology, association of indian scientists in research and development, setting up of venture capital fund etc.** The act also provides exemption to growers, farmers and cultivators of biodiversity and to *Vaids* and *Hakims* to use biological resources. Through notification of guidelines from NBA, normally traded commodities are exempted from the purview of the BD Act 2002 and exemption for collaborative research through government sponsored or government approved institutions subject to overall policy guidelines and approval of the Central Government. The policy guidelines have been developed by National Biodiversity Authority and recently notified by the Central Government for undertaking collaborative research with an agreement to share the benefit arising out of the biological resources.

Conclusion

Rich crop landraces and traditional farmers' varieties are prevalent in several pockets and areas. These constitute an invaluable reservoir of genes that are needed by plant breeders for development of superior crop varieties. However, the diversity is being lost from the "natural" habitats due to the expansions of agricultural production to frontier areas and also from the agricultural fields due to the adoption of improved varieties and other technology by the farmers. Hence, scientific management of these invaluable resources has assumed greater significance over time. Also, the wild species and relatives of crop plants contain valuable genes that are of immense value as genetic resource for further use in crop breeding programmes. These resources are likely to play a unique role in the development of new cultivars and also in restructuring the existing

ones which lack one or the other attribute. The most important inheritance factor obtained from the wild has been that for disease(s) or pest(s) resistance or drought tolerance.

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