Underutilized and New Crops–Germplasm Introduction

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The region of South Asia is very diverse in its physiography, agro-ecology and climate, and possesses rich biodiversity in cultivated crops. Several under exploited and underutilized species occur which include native diversity and also, well acclimatized species introduced particularly in the past few decades.

In India, a total of 15,258 accessions of 60 underutilized and new crops have been introduced since independence. Out of these, 3361 accessions of 21 underutilized plants have been evaluated under the aegis of All India Coordinated Research Project on Underutilized Crops, which led to identification of 395 promising lines. Some of these materials, have been very useful as food and industrial crops and through germplasm evaluation several promising varieties have been released for cultivation at national level. To mention among are Suvarna in amaranth, Himpriya in buckwheat, BRS 1 in rice bean, VH 82-1 in faba bean, Arizona-2 in Guayule and EC 33198 in jojoba. These are now well adapted to diverse agro-ecosystems/agricultural systems. Further, about 70 species of underutilized crops have been identified to have promise in Asia pacific region and can play a pivotal role in diversification of the agriculture, management of wastelands and meeting the nutritional requirements of the people.

Similar diversity of known potential has been documented for other centres of diversity of crop plants, so as to introduce germplasm from the respective mega diversity regions and evaluate these for their adaptation and usefulness in South Asia region. In this paper, which is based on work carried out by NBPGR and other centres in India, an attempt has been made to assess the impact of such diversity and the opportunities envisaged through further exotic introductions.

Policy Issues in Germplasm Management

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Plant genetic resources have played significant role in the development of agriculture, providing food, feed and fodder and also numerous medicines and industrial products. In general, the genetic diversity in plant is mostly located in tropical and sub-tropical regions of the world and countries are inter-dependent on their germplasm needs. The first international and intergovernmental discussions on access to genetic resources related to food and agriculture were initiated in 1979 and a formal agreement, the International Undertaking on Plant Genetic Resources (IUPGR) was adopted in 1983. It established the principle of plant genetic resources as the "heritage of mankind" and consequently these resources were available to *bonafide* users without restriction. The scientific and technical achievements in the field of plant genetic resources thus have earlier focused mainly on their conservation, use and management since access to genetic resources was not an issue. However, the international development related to the intellectual property rights and trade in the last two decade have witnessed access to genetic resources emerge as a central topic of debate at national -global forum. The Convention on Biological Diversity in 1992 recognized the sovereign right of nations to exploit their own resources pursuant to their own environmental policies. It also established a new participatory relationship between provider and user of genetic resources incorporating the instruments of 'Mutually Agreed Terms' and 'Prior Informed Consent' for access to genetic resources for fair and equitable

sharing of benefits derived from the use of genetic resources. In November 1993 the Commission on Genetic Resources for Food and Agriculture initiated the negotiations for the a legally binding instrument for Plant Genetic Resources and adaptation of the IUPGR in harmony with the CBD. After sustained intergovernmental discussions and negotiations the International Treaty on Plant Genetic Resources for Food and Agriculture was adopted in November 2001. The Treaty provides a framework of Multilateral System of exchange to ensure access to plant genetic resources, especially for plant species that are of importance for food security and of crops on which countries are interdependent. These global developments and the intricate relationship among them with regards to genetic resources have created a highly complex situation for the management of these resources. The world opinion today is clearly divided into two groups one advocating a strictly regulated policy and other suggesting flexibility for controlling access to genetic resources. The developing countries are legitimately concerned about current developments that provide trans-national corporational opportunities for monopolizing the control and use of biologically derived materials, specifically through product or process patents or plant breeders' rights. Genetic resource managers thus are confronted today with new dimensions of obligations of some that are legal while others that are political and ethical. The respective nations are obliged to enact legislation and develop suitable regulatory mechanisms to ensure the enactment of the commitments made in the various negotiations. Not undermining the interdependence of nations in sharing and exploitation of genetic wealth on a sustainable basis, reaching a balanced and equitable agreement, seems a long drawn and difficult task.

International Crop Germplasm Exchange at ICRISAT

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Success of crop improvement programmes depends on the availability of diverse germplasm resources. Collection of the crop germplasm got impetus in the 1920s and as a result, presently, over six million germplasm accessions are held in over 1300 genebanks across the world. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is one of the important crop germplasm centers and holds 114 870 accessions of sorghum, pearl millet, chickpea, pigeonpea, groundnut, and six small millets. The germplasm collection has been built up by the generous donations of several national and international institutes and collections from the farming communities around the world. A large portion of this germplasm consists of landraces (78.6%) followed by breeding lines (15.4%), wild relatives of crops (2%), released cultivars (1.3%), and precise information is not available for the remaining 2.6% of germplasm accessions. About 99% of the collection has been characterized for a number of morphological, agronomical, and the nutritional quality traits, and the information has been computerized under an easy retrieval system. The germplasm accessions are maintained following high scientific standards and conserved in a sophisticated facility. Besides managing the genetic resources, ICRISAT also has mandate for the genetic improvement of above cited first five crops. ICRISAT scientists generate breeding research materials of these crops and provide it to the scientists in national research programmes. As of now, over 1.2 million germplasm samples from ICRISAT genebank have been distributed to scientists worldwide. About 30% of these samples have been shared with the Indian national program scientists. This germplasm sharing has resulted in release of 544 varieties (478 from bred- and 66 from basic germplasm) supplied from ICRISAT.

ICRISAT has adhered to the policies of NBPGR/ Government of India while importing and exporting the germplasm using the Plant Quarantine Facility at ICRISAT-Patancheru where NBPGR and ICRISAT scientists have been working closely. So far there is no instance of the occurrence of any disease or insect-pest from the ICRISAT supplied germplasm material to other countries.