

①

National Level Consultation on "Agro-biodiversity Hot-Spots and Biodiversity Heritage Sites" held at NEHU during June 1-2, 2007

Plant Diversity: Importance and Conservation

Professor Pramod Tandon
Vice-Chancellor
North-Eastern Hill University, Shillong

The Indian Gene Centre

- Rich in multiplicity of life forms, diversity of ecosystems, species and genetic pool within species
- Among world's important 'mega-diversity' countries
- Eastern Himalayas and Western Ghats - among the 25 'hot-spots'
- Enormous variation in the vegetation pattern due to mosaic of geo-climatic conditions
- Plant wealth - 49,000 species (12% of the plant species of the world)
- Flowering plants of India - about 17,000 taxa (5,725 endemic, represent 33.5% of the flora located in 26 endemic centres)
- About 348 crop plants are cultivated
- ~168 economic plants, whose centre of origin/ diversity lies in India along with their wild relatives (326 species) and land races
- Northeast India - 50% of Indian flora; Centre of Origin
- Rich diversity in orchids, rhododendrons, bamboos, balsams, primulas, medicinal and aromatic plants
- Under the Indian Wild Life (Protection) Act, 1972, the MoE&F has set up:
- 92 national parks, 500 sanctuaries, and 13 biosphere reserves (15.76 million hectares or about 7% of the area)

Plant Genetic Resources: Significance and Need for Conservation

- Indian economy predominantly agriculture based
- ~93% of the human foodstuffs - products of plant origin
- PGR - very basis of the human survival and economic well being
- The rural people in India have always known that crops and forests mean their survival

- Need for integration of indigenous and community knowledge systems related to biodiversity to mainstream knowledge systems
- Remote sensing from space for biodiversity assessment and its monitoring
- Biotechnology to become an integral part of all aspects of germplasm acquisition, characterization, inventorization, conservation, exchange and genetic resource management
- To prepare databases on biodiversity; establishment of patenting cells
- Computer aided storage and retrieval systems of PGR -for developing technology packages for conservation and ensuring exchange of information
- Safe guards against bio-piracy; Intellectual Property Rights issues and exchange of germplasm - need for strict compliance of International and National legislations
- Conservation biotechnology programme with a long-term perspective
- Threat to agri-diversity by replacement of traditional land races by high yielding crop varieties and moving over to cash crops; need to conserve much wider spectrum of germplasm
- More biosphere reserves, sanctuaries and germplasm banks need to be established
- Close linkage between universities - research institutions - industry
- Agriculture Universities in India to act as 'Genetic Enhancement Centres'
- Universities' participation in location specific problems related to biodiversity conservation and development of biological resources
- Introduction of a course module on biodiversity for all students at under graduate and post graduate levels
- Enhanced funding for R&D in the area of PGR conservation, particularly for rare and endangered germplasm
- Role of 'Information Technology revolution', aimed at distance learning and electronic networking for and targeted at plant genetic resource management

India with her vast plant genetic resources can be a big bargaining power among Nations in the 21st century.

- ①
- 70-80% of the population relies on plants as the only source of medicine; over 7,000 plants (out of 8,900 species of ethno botanical interest) are medicinal
 - PGR as integral part of genetic improvement programmes
 - Need to conserve crop genetic diversity, as cultivated crops are inbred for uniform desirable traits and narrow genetic base can be disastrous
 - Biodiversity generates economic value- extractable plant products, compounds, genes and species to meet the industry needs
 - An estimated 40% of the global economy- based on biological products and processes
 - US \$ 63 billion annual turnover of herbal products in India
 - Floriculture export from India- US \$ 64 million annually

Depletion of Plant Diversity

- Depletion of PGR at an alarming rate
- Decline in vegetation cover resulting in serious ecological imbalances
- Genetic erosion, the reduction of diversity within the species, means losing the variation required for plant improvement
- Plants may have limits in their rates of growth, reproduction and adaptation
- Of 2,70,000 plant species in existence about 34,000, i.e., 1 in 8, are endangered (IUCN, 1998)
- In India, 15-20% of the plant species is considered to be threatened
- Extinction of plant species means loss of opportunity to discover more useful forms
- The current rates of extinction demand immediate concerted efforts; biological resources are likely to be the basis of all future welfare and security of Nations

Challenges and Action Plan

- Diversity of Earth's plant life is under threat as never before
- Conservation, sustainable utilization and management of PGR - key to the survival and economic well being of human kind in the 21st century