About this Newsletter

The International Plant Genetic Resources Institute (IPGRI) formerly IBPGR, is one of the 16 Centres of the Consultative Group on International Agricultural Research (CGIAR) with its Headquarters in Rome. IPGRI’s mission is to encourage, support and engage in activities to strengthen the conservation and use of plant genetic resources worldwide with special emphasis on the needs of developing countries. IPGRI works in partnership with other organizations, undertakes research and training, and provides scientific and technical advice and information. IPGRI operates in five geographical areas: Sub-Saharan Africa (SSA), the Americas, Europe, West Asia and North Africa (WANA), and Asia, the Pacific and Oceania (APO). APO Regional Office is based in Singapore with offices for East and South Asia located in Beijing (China) and New Delhi (India), respectively.

The APO Newsletter is produced thrice a year and is mainly aimed at promoting overall concern on plant genetic resources, with emphasis on their conservation and use. [See box on p.2]

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Dr. R.K. Arora, Coordinator IPGRI Office for South Asia, with support from Dr. Kay Riley, Regional Director, Dr. Ramanatha Rao, Senior Scientist (G2/Conservation), Dr. Praveen Badal, COGNET Coordinator, Mr. Pala Quek, Documentation/Information at the IPGRI Regional Office for Asia, the Pacific and Oceania; Prof. Zhou Ming-De, Coordinator and Mr. Zhang Zongwen, Assistant Coordinator at the IPGRI Office for East Asia, and Dr. P.N. Mahler, Associate Coordinator in the IPGRI Office for South Asia. The addresses of these offices are:

IPGRI Office for South Asia
c/o NBIPGR, Pusa Campus,
New Delhi 110012, India
Tel : (91-11) 5731845, 578612; Fax: (91-11) 5731845
Email : IPGRI-DELHI@cgnet.com

IPGRI Regional Office for Asia, the Pacific and Oceania
30 Orange Grove Road, 8th Floor, RELC Bldg.,
Singapore 258352
Tel : (65) 738 9611; Fax (65) 738 9636
Email : IPGRI-APO@cgnet.com

IPGRI Office for East Asia
c/o CAAS, No. 30 Bai Shi Qiao Road, Beijing 100081,
People’s Republic of China
Tel : (86-10) 62174159; Fax : (86-10) 62174159
Email : IPGRI-CAAS@cgnet.com

IPGRI work on the Ethnobotany and Socio-economic of the Conservation and Use of Plant Genetic Resources

The conservation and use of plant genetic resources has a human dimension. IPGRI has now made part of its core agenda. As we increase research and other activities in on-farm and in situ conservation, social, cultural, and gender factors decision-making patterns, local institutions, indigenous knowledge and value systems, must be taken into account. IPGRI will work more with national partners to understand how the use of plant genetic resources affects the distribution and conservation of genetic diversity in agro-ecosystems. IPGRI’s collaborative work on ethnobotany and socio-economic aspects will look more closely at how local people and their institutions can contribute to the maintenance of biodiversity in agricultural environments. We will explore in greater detail the various uses and values that people attach to PGR. The focus on human aspects of plant genetic resources has important policy and development goals. One goal is to strengthen the link between plant genetic resources conservation and the development and well being of people, particularly poor rural people.

A second goal is to develop methods that address the need for decentralised PGR conservation approaches that involve resource users and local communities. IPGRI’s concern on such key issues and the work carried out and/or proposed is reflected in the following.

Supporting new conservation strategies in national programmes

Decentralisation and a broadening of institutional partnerships in PGR conservation is the trend, in many developing countries’ national programmes. This means greater involvement of local communities and users in the conservation efforts is needed. Farmers, local communities and other users of plant genetic resources can contribute to community genebanks, in situ conservation, documentation of their indigenous knowledge and in other practical and cost-effective ways. Building upon the expertise and participation of local people requires a better understanding of how they use and assign value to plant genetic resources. IPGRI will address the socio-economic and institutional implications of decentralised and participatory approaches to plant genetic resource conservation and use. This should lead to improved collaboration between formal-sector and local level institutions involved in conservation and use of genetic resources.

Ethnobotany in the Asia Pacific Region: A source of innovation and experience

Scientists, conservationists, and communities in the Asia Pacific and Oceania region have been active in ethnobotanical research and local participation in plant genetic resources conservation, maintenance and use, such as in India and China, and with emphasis on forest genetic resources in Indonesia, Thailand and Malaysia. Apart from national efforts, these studies have been supported by UNESCO, WWF, through networks of conservationists and ethnobotanists such as the People and

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Plants Initiative and includes IPGRI.

In the area of crop genetic resources, ethnobotanical approaches have been the hallmark of collaboration between international agricultural research centers such as CIP and local NGOs to identify and maintain the useful diversity that local farmers maintain in important crops such as sweet potato (see UPWARD). More recently, IPGRI’s APO office has provided a network focus for the conservation and use of taro genetic resources. Fortunately, much of the knowledge and diversity in taros (Colocasia) still remains with local farmers throughout Asia and the Pacific. Hence, ethnobotanical approaches that use and support local knowledge are important to the conservation and use of this widely used but neglected crop. Ethnobotanical surveys of taro diversity have been conducted by national scientists in Bangladesh and are now underway in Yunnan Province of China. Also, information has been synthesized for India, Sri Lanka and the Philippines. Emphasis has been laid to assess diversity and its native use, understand the threats and develop strategies for conservation.

Another area of growing concern is the conservation of micro-environments which contain high levels of diversity in plant genetic resources. Home gardens are micro-environments containing high levels of species and genetic diversity in agro-ecosystems. This diversity is intimately linked to the multiple and varied uses of plants by traditional households. Numerous and excellent studies have already been done throughout Asia and the Pacific of the important species diversity found in home gardens, their structure, and the important contribution they make to household nutrition and income. IPGRI is consulting with our regional partners to build upon this work and conduct further research to identify ways to incorporate and maximize the contribution of these dynamic micro-ecosystems to the in situ conservation of agricultural biodiversity. The current research plan would look more closely at the structure and distribution of genetic diversity (within species), using ethnobotanical, socio-economic and gender analyses. In particular, this activity will study the genetic diversity found in fragmented, patchy, human-managed micro-environments to produce a strategy and guidelines on how home gardens can be part of a complementary conservation strategy.

**Traditional Resource Rights, Indigenous Knowledge and Ethical Issues**

The fair and sustainable use of indigenous knowledge about plant genetic resources requires a better understanding of local rights and values and more active participation by local genetic resource developers in the conservation and use of genetic resources. Providing a platform where the two knowledge systems can interact equitably and around a common conservation and development ethic is not easy from a policy and technical aspect. IPGRI has already begun working in Asia and the Pacific on an information system to document ethnobotanical and indigenous knowledge on plant genetic resources that can be used by farmers, local communities and scientists.

The documentation methods should provide ways to ensure that communities sharing their knowledge get full and equal recognition and a means to claim their traditional resource rights via a-via non-traditional institutions. Fundamentally these will be four issues to consider when documenting IK. 1) The issue of ethics and participation, farmers’ rights, and traditional resource rights to ensure that communities are empowered to retain and use their knowledge; 2) Evaluate how the current techniques and methodologies to collect IK such as Rapid Rural Appraisal can be made compatible with local community concepts of intellectual property and equity; 3) Evaluate how collected IK information can be effectively stored and accessed using computer technology in an information base (info-base); and 4) Developing tools for accessing, interpreting and linking the information base developed above that are usable by both farmers and scientists.

In the Asia Pacific region the traditional resource rights, equity and ethical issues entailed in the use of indigenous knowledge by institutions outside the local community’s of plant have received significant attention from NGOs such as SEARICE, the Environmental Research Foundation of India to name only a few that have communicated these concerns to IPGRI and our partners. The Swaminathan Foundation has assembled a vast fund of knowledge on farmers rights and traditional resource rights, UNRISD in the Philippines has done important work in designing frameworks for equitable participation in conservation by formal scientific and community-based conservation institutions. The ability to continue and broaden this consultative process in the region including networks of local community experts on plant genetic resources such as those in the Honey bee Network in India and the Memory Web being tested in the Philippines has enabled IPGRI and its partners to move quickly to design an IK info-base for sharing, duplication, and modification by communities and agencies in compliance with the provisions of global conventions, agreements and protocols for the respect of indigenous people’s rights, and the use of local knowledge. As in all of IPGRI’s work, a goal is to build the capacity of traditional resource users as well as formal PGR institutions to support the maintenance and transmission of indigenous knowledge systems.

In conclusion, IPGRI’s new initiative in ethnobotany and the socio-economic aspects of plant genetic resources conservation has begun to build upon the vast fund of expertise that our Asian and Pacific partners have developed in the use of ethnobotany and community-based conservation approaches to PGR conservation and use. (Dr. Pablo Eyzaguirre, Anthropology & Socio-economics, GD, IPGRI-HQ, Rome, Italy; Phone (39-6) 518921, Fax: (39-6) 5750369, Email: Eyzaguirre@cgnet.com). For details also contact Dr. Paul Quek, IPGRI-APO, Singapore.

**APO NEWSLETTER**

Provides information on PGR activities carried out in the region, by national programmes and other centers. Information is also periodically abstracted from recent literature (books, periodicals etc.), and brief research contributions published. With over 2000 addresses on its mailing list, the APO newsletter is widely distributed to focus on IPGRI’s mandate to advance the conservation and use of plant genetic resources for the benefit of present and future generations.
The UNESCO-ICIMOD Project on Ethnobotany

In collaboration with UNESCO, ICIMOD has recently started a new programme activity entitled “Promotion of Sustainable and Equitable use of Plant Resources in the Hindu Kush Himalayan (HKH) Region through the Application of Ethnobotany”. The project is a part of the activities of the IMF International-UNESCO-Royal Botanical Gardens, Kew, initiative on People and Plants. It aims to develop local community development programmes on the sustainable use of plant resources, promoting greater involvement of local people in devising and implementing strategies for conservation of biodiversity, upgrading the skills and knowledge of local ethnobotanists, and diffusing methodological guidelines and reviews (ICIMOD Newsletter No.22). For details contact: Prof. Pei Shengji, Head, Mountain Natural Resources Division, ICIMOD, GPO Box 3226, Kathmandu, Nepal.

Medical Plants Network in Asia

The International Development Research Centre (IDRC) South Asia Regional Office, has initiated the creation of a Medicinal Plants Network in Asia. The objective of this network is to support and encourage local efforts in research and development in the area of medicinal plants. The network will promote interaction and dialogue between researchers, experts, and institutions. At present, the network operates in South Asia. IDRC has two ongoing projects as part of this network, one on neem and the other on medicinal plants. The neem project will further investigate the active principle of neem i.e. limonoid azadirachtin, develop economical methods to extract and separate azadirachtin, standardize its stable formulations, and produce and test botanical pesticides on a pilot scale. The medicinal plants project will, among other things, undertake an evaluation of some ten widely-used medicinal plants, select the best stocks, and develop techniques in order to propagate them, leading to their availability on a sustainable basis.

The network makes small grants for a period of up to two years to initiate grassroot level research. Financial support is available to non-governmental and public sector and teaching institutions. [Druk Forestry News issue No.10, January 1996; For details contact: Manjul Bajaj, Network Coordinator, IDRC, South Asia Regional Office, 11 Jor Bagh, New Delhi 110 003, India].

Consultation Meeting on NARS-CGIAR Partnership

This meeting was organized by APAARI (Asia-Pacific Association of Agricultural Research Institutions), co-sponsored by IPGRI, FAO, IFAD, and ISNAR. The objectives of the meeting were to: 1) discuss APAARI’s vision towards NARS-CGIAR partnership, 2) discuss ecocregional and regional collaborative approaches, 3) identify ways and means to strengthen and sustain regional NARS associations and networks, 4) discuss CGIAR priorities – NARS vision, 5) Discuss NARS-led priorities and programmes as adopted by the CG system and 6) draw up an action plan for strengthening NARS-CGIAR partnership to be communicated to TAC. Similar regional meetings have been/are being held in different regions and recommendations would be made to TAC as part of its priority setting mechanism.

The meeting was very well attended, numbering over fifty senior staff from NARS, DGs and/or DDGs from four other CGIAR centers, representatives from the World Bank (ESDAID), FAO and IFAD. Drs. Ramanatha Rao and R.K. Arora represented IPGRI. Rao made a presentation on “NARS-IPGRI collaboration in strengthening conservation and use of PGR in Asia-Pacific” prepared jointly with Drs. Riley and Arora and hinted about the idea of Pan-Asia network on PGR. The major points that emerged from the meeting are:

- APAARI endorsed 1) alleviating poverty, 2) increasing production and 3) sustaining the resource base, as the major objectives for agricultural research within Asia-Pacific.
- NARS need to make greater input to CGIAR/TAC priority-setting process, and APAARI can provide the suitable regional forum for making such an input.
- NARS should have a greater say in TAC/CIF priority setting process, to make the process transparent and NARS-driven.
- Considering different factors, including the rapid increase in the population, Asia-Pacific deserves a greater share of CGIAR resources.
- Need for stability in research priorities, particularly on staple crops and high priority for research on the conservation, sharing and using PGR.
- CGIAR was urged to continue the priority accorded to PGR issues and continue research on PGR related issues.
- CGIAR priorities may include in future, research efforts on soybeans, vegetables, under-utilised fruit species.
- CGIAR to promote information exchange, including information on ethnic knowledge.
- Human resource development is still a high priority, especially in advanced technology such as biotechnology.
- Need for expanding the membership and broadening the scope of APAARI.
- Anumber of issues related to ecoregional approaches need to be resolved such as the need for NARS driven programmes, priority for areas where resource degradation is in progress, identification of national priorities before attempting to set subregional or regional priorities. IPGRI-APO will further pursue the idea of Pan-Asia network on PGR.
BHUTAN

**Biodiversity Conservation Project**

On November 16, the RGCB and the government of The Netherlands signed an agreement for a five year biodiversity conservation project in the Black Mountain area in central Bhutan. The main objectives of the project is to design and implement an optimum biodiversity strategy for the area. Activities will include an inventory and preparation of a management plan for the protected area. Focus will be given to involve local people in conservation efforts. Biodiversity surveys are currently underway. Socio-economic surveys have been completed. [Druk Forestry News, Issue No.9, January 1996].

**National Re-Afforestation Strategy**

A three-day workshop to finalize a national re-afforestation strategy was held from December 12-14, 1995 at the Bhutan Forestry Institute (BFI) Conference Hall in Thimphu. The financial and technical support for the workshop was provided by the FAO regional project on Strengthening Re-Afforestation Programmes in Asia (STARP).

In his keynote speech, the Secretary of the Ministry of Agriculture, Dasho (Dr.) Kinzang Dorji, drew attention to the efforts being made worldwide to arrest forest degradation. While the Secretary considered the design of a re-afforestation strategy for Bhutan to be timely and relevant, he urged the participants to consider cost effectiveness, bearing in mind the limited financial and human resources currently available to the RGCB. He pointed to the involvement of the private sector, the industry, individuals / communities. The draft document of the national re-afforestation strategy is currently being finalized, incorporating the decisions made at the workshop. [Druk Forestry News, Issue No.9, January 1996].

CHINA

**Progress and New Initiatives on PGR Programmes**

During the Eighth Five-Year Plan (1991-1995), Institute of Crop Germplasm Resources of CAS cooperated with other relevant institutes nationwide and has multiplied and stored 110 000 accessions of various crop germplasm in the National Seed and Field Genebanks. Upto now, the total collections have reached 330 000 accessions of various crop germplasm. At the same time, a duplicate genebank (−10°C) was established in Qinghai and about 300 000 accessions of national collections stored in the National Genebank in Beijing have been duplicated in this genebank. The field genebanks for sugarcane, sweet potato and potato have also been established. The 110 000 accessions being stored in the national genebank have been characterized and cataloged for agronomic characters. For some of these collections, the assessment were carried out on quality, stress resistance, disease resistance, etc. About 15000 accessions of elite germplasm have been identified. About 1400 samples of promising materials have been provided to users and the usefulness of some germplasm has been identified. The collecting missions were conducted in 62 counties in Daba Mountain situated in South Sichuan and South and West of Guizhou provinces. Total of 14000 accessions of crop germplasm were collected. The National Crop Germplasm Information System was enlarged and modified with about 7 million data items newly added to the databases. The progress has been made in the studies of technologies for crop germplasm storage, characterization and evaluation, taxonomy, germplasm enhancement and genetics.

In the Ninth Five-Year Plan (1996-2000), crop germplasm is placed in the national key projects. The further evaluation and utilization will be a priority in the new genetic resources programmes. The major activities will include:

1. The evaluation of 3000 accessions of germplasm with special characteristics. About 200-250 accessions of elite germplasm with stable genetic characters will be identified and provided to users.

2. Studies on the techniques of molecular markers and finger-printing for germplasm evaluation.

3. The exploration in Three Gorge Region and the mountainous regions along "Jingjiu" railway, including 25 counties of several provinces.

4. Studies on monitoring seed viability of genebank seeds, the treating techniques on special germplasm before entering into genebank, cryopreservation and very low moisture seed storage.

5. Establishing elite germplasm information and service system with multimedia techniques.

It is expected that the activities in the Ninth Five-Year Plan will greatly improve the use of germplasm in breeding programme and crop production in China. [Prof. Fang Jiah, Institute of Crop Germplasm Resources of CAS, 30 Bai Shi Qiao Road, Beijing 100081, China].

**Chinese Hawthorn Germplasm**

Since 1980s the Institute of Special Plants and Animals of CAS, in cooperation with ten other research institutes, has been carrying out the activities on collecting, conservation and evaluation of hawthorn germplasm.

China is a centre of diversity for hawthorn. There are 18 species of Crataegus, of which, C. pinnatifida, C. scabrifolia and C. brettschaedera are cultivated. C. pinnatifida is mainly distributed in North and Yellow River Region of China. Most of cultivated varieties were selected from this species. C. brettschaedera is mainly distributed in the cold region in northeast of China.

The cultivars of C. pinnatifida can be divided into these groups according to the colour of fruit surface, i.e. yellow, red and orange. C. scabrifolia is divided into three groups of dark yellow, pink and green colour on its fruit surface. During the collecting and evaluation, a number of rare, promising germplasm have been found, for example, some varieties with strong resistance to cold and drought and tolerance to alkaline situations, and a number of germplasm with red and yellow flesh, large fruit, and sweet flesh, and medical use. In addition, some hawthorn germplasm can be used as root stock in the breeding programmes for dwarf types with resistance to cold, such as C. aurantia, C. alta and C. kansuiensis.

In recent years, evaluation has been carried out on agronomic/botanical characteristics, and on processing, chromosome number, and chemical composition of hawthorn germplasm collections. The results indicated considerable variation; 100-fruit weight varied from 250 - 1600g; total carbohydrate 1.51-4.04%; total proslgesterone 18-81 mg/100 g flesh; Vit E 18-118 mg/100 g fresh.

The collections comprising of about 300 accessions are kept at Shenyang Agricultural University, Institute of Special Plants and Animal of CAS and Institute of Forest and Forestry Sciences.

The compilation of "Records of Hawthorn Varieties" was completed in 1995 and it will be published in 1996. It includes more than 160 varieties of hawthorn, of which 142 varieties are of C. pinnatifida, 17 of C. scabrifolia and 5 of C. brettschaedera. In 1995,
hawthorn descriptor list was developed by the Institute of Special Plant and Animal of OAS with support of IPGRI-APO and this is being reviewed for publication at IPGRI Headquarters. [Jiao Peijuan and Guo Taijun, Institute of Special Plant and Animal of OAS, Zhejiang, JiuLin City, JiuLin Province 312003, China].

**Brown Lint Cotton Germplasm**

Brown Lint RT was selected by Cotton Research Institute of OAS from a cross between a accession of *Gossypium hirsutum* of race *richmondii*, a brown lint germplasm from Mexico, and Texas Mark 1 (3M-1). The line is 80-90 cm high with a desirable plant type. The boll setting is good with single boll weight of 5.3 g. It shows early maturity (about 125 days) and good fibre quality, 2.5% span length range from 27 to 28 mm and micronaire reading is 4.3 Dp/inch. The fibre length is also much better than that of other colour fibre cotton lines the Institute holds, and similar to that of white fibre cultivars used in production, but only lint percentage is lower, about 30%. In 1994 experiment, the seed yield of Brown Lint RT was about 3000 kg/ha, and lint output was about 900 kg/ha. Brown Lint RT possesses a great market potential. It is expected that the further research and utilization of colour lint cotton germplasm can be conducted in cooperation with relevant interested organizations. [Xiongming Du, Cotton Research Institute of OAS, An Yang, Henan 455112, P.R. China].

**In Vitro Storage of Citrus Germplasm**

IPGRI-supported project on citrus germplasm conservation *in vitro* was begun in 1994 and implemented by Citrus Research Institute of Chinese Academy of Agricultural Sciences at Chongqing, China. The effects of environmental conditions, mannitol and test tube cover materials on citrus plantlet survival *in vitro* and the effect of adding retardant compound in the medium on which the plantlets grow slowly. However, in case of citrus plantlets, it seemed that the effect was not significant. When the concentrations were higher than 2%, it had adverse effect. This may be because citrus plantlet grows very slow even in the basic medium without adding mannitol. Therefore, it is not necessary to add retardant compound in the medium for citrus *in vitro* conservation.

3. Usually mannitol is used as a retardant compound in the medium on which the plantlets grow slowly. However, in case of citrus plantlets, it seemed that the effect was not significant. When the concentrations were higher than 2%, it had adverse effect. This may be because citrus plantlet grows very slow even in the basic medium without adding mannitol. Therefore, it is not necessary to add retardant compound in the medium for citrus *in vitro* conservation.

4. Different species or cultivars have different response to the conditions of *in vitro* conservation. It seemed that mandarins, sweet oranges and limes were easy to get stem-tip culture and conserve *in vitro*. The survival rate could reach above 60% after one year storage. However, it was difficult to get stem-tip culture and conserve them *in vitro* for some species or cultivars. The survival rate for such species or cultivars was very low after one year storage. The studies indicate that not only different species respond differently but also different cultivars within a species respond differently. Therefore, more research needs to be done for the difficult species or cultivars so that those could be conserved *in vitro*.

**Genetic stability of citrus plantlets conserved *in vitro* was conducted through isozyme and chromosome analysis and based on observations, using grafted plantlet. *in vitro*. No difference was found in RXX and GOT isozyme patterns and chromosome number is also stable, 2n=18.

Now about fifty varieties of citrus accessions have been conserved *in vitro* storage. Work on stem-tip culture and conservation for some difficult species will be continued this year.

**More research details will be given in next issue of this newsletter.**

**INDIA**

**AHEAD - An Effective Source of Information Retrieval**

The Publication and Information Directorate (PID) of the Council of Scientific and Industrial Research (CSIR), New Delhi has recently developed Asian Health, Environmental and Allied Databases (AHEAD). AHEAD is an international consortium sponsored and supported by the International Development Research Centre (IDRC), Canada to catalyse information dissemination in the Asian region. AHEAD CD-ROM series are available with the following titles: Disk D1 – Environmental & Resource Management – "Environmental Asia"; Disk D2 – Traditional Asian Medicines & Natural Products – "Health Asia"; Disk D3 – Tropical Diseases, Natural toxins & occupational safety and health – "Health Asia". Health Asia contains full text database on Indian raw material resources including plants, animals and minerals. It also covers bibliographic database on world literature covering all aspects of medicinal and aromatic plants viz., cultivation, botany, chemistry, pharmacy, and marketing of various plants and database on tropical oilseeds covering fields like cultivation, management, breeding, genetics, taxonomy, physiology, biochemistry, crop protection, economics and marketing and oil product quality. [For further details, Contact: Dr. G.P. Phonde, Executive Director, AHEAD, Publication and Information Directorate, Dr. K.S. Krishnan Marg, Pusa, New Delhi 110 012, India, Phone: 574 6024; Fax: 578 7062; Email: pid@ipirid.org; Telex: 031-77213].

**NBPR Conducts Research on Recalcitrant Seeds**

The ODA funded project R6110 (H) on "Development of cryopreservation techniques for the long term conservation of recalcitrant seeds and vegetatively propagated plant species in India", began in January, 1996. The research work has been carried out on:

- Litchi (*Litchi chinensis*) and jackfruit (*Artocarpus heterophyllus*), with strictly recalcitrant seeds, have been chosen for study. Surveys were conducted at Horticulture Garden, IARI and HETC, Saharanpur. Both the species showed profuse flowering and the times of desirable varieties/types in litchi and in jackfruit have been marked from the day of anthesis. Immature, partially mature and fully mature fruits from these trees will be harvested in coming months for studies on desiccation and freezing sensitivity and subsequent cryopreservation of embryonic axes. Associated biochemical and ultrastructural parameters will be studied for determining the causal factors for recalcitrance. Though not exactly recalcitrant, seeds of large
The number of important cvs of almond (*Prunus amygdalus*) are grown in temperate regions of India. Under the project, 8 accessions of almond were processed for cryopreservation. The excised embryonic axes were desiccated to about 7% moisture content (on fresh weight basis) and plunged in liquid nitrogen. Fresh and rehydrated axes were tested for viability by culturing on MS and WPM Medium. The viable axes on retrieval from −196°C initiated regrowth within 13 days of culturing. Small plantlets were obtained within 13 days of culturing. All the cvs showed high percentage recovery.

Vegetatively propagated species
Attempts have been made to cryopreserve *in vitro* grown shoot apices of sweet potato using encapsulation-dehydration techniques. The results indicated that encapsulation per se does not have any adverse effect on regrowth of shoot apices in sweet potato. Efforts are continued to standardize optimum concentration of presatue solution, optimum duration of desiccation etc., to ensure beads having minimum water content but limited mortality before plunging in liquid nitrogen.

Employing the same techniques of encapsulation-dehydration, cryopreservation was achieved in 4 species of yams comprising 2 cultivated (*Dioscorea alata* and *D. bulbifera*), one wild edible type (*D. wallichii*) and one medicinal yam (*D. floribunda*). The encapsulated shoot apices showed various degree of survival (based on regrowth) after exposure to liquid nitrogen. Standardization of recovery growth media for producing increased regeneration of plantlets from cryopreserved apices of *D. alata* and *D. floribunda* are being continued. (Dr. K.P.S. Chandel, Neeta Chaudhary and B.B. Mandal NEPR, New Delhi, India).

New Director at NBPRG

Dr. K.P.S. Chandel took over as the new Director of the National Bureau of Plant Genetic Resources, New Delhi, India on 18 September 1995. Dr. Chandel had his doctorate degree from the Indian Agricultural Research Institute, New Delhi. Besides, he also holds a Masters degree in plant genetic resources conservation from the University of Birmingham, U.K. Dr. Chandel has pursued his career in plant genetic resources for over 3 decades. Prior to taking over as Director NEPRG, Dr. Chandel has held important positions - as Joint Director, National Facility for Plant Tissue Culture Repository, and as Head, Division of Plant Exploration at NEPRG. He has widely travelled across the globe and participated in several national and international meetings.

INDONESIA

Institute for Research on Legumes and Root Crops

The former Malang Research Institute for Food Crops (MARIF) in East Java has been renamed as the Research Institute for Legumes and Tuber Crops (RILET). It now forms part of the group of six food crops research institutes directly coordinated by the Central Research Institute for Food Crops (CRIFC) in Bogor.

Under the new mandate, RILET will carry out research on breeding, agronomy and physiological aspects of legumes and tuber crops, including cultural techniques, crop protection, agroecosystem analysis, agro-economics, postharvest technology and mechanization, environmental impact, cropping systems and commodity analysis. Additionally, it will be responsible for the exploration, evaluation, maintenance and utilization of legume and tuber crop germplasm. The present collection of the Institute includes 325 sweet potato and 232 cassava accessions. Meanwhile, its rootcrop breeding programme has so far released two improved cassava varieties, Malang-1 and Malang-2, and one sweet potato variety, Mendur.

RILET is also expected to provide technical assistance services, to forge links for collaborative research, and to disseminate research results to the wider scientific community and other users. The Institute carries out research activities at its headquarters in Malang and in five experimental stations across East Java located in Kendalpayak, Jambegede, Muneng, Ngale and Genteng. The legumes and tuber crops R&D agenda of RILET is based on the research priorities set by CRIFC and for socioeconomics, research and development work will be undertaken in close collaboration with the newly created regional agencies called Assessment Institute of Agricultural Technology (AIAT).

Sweet potato research at RILET received a big boost in 1987–93 from the International Development Research Centre (IDRC) which supported the research project on Rootcrop Improvement in Indonesia. Also, RILET researchers have been involved in various research projects and activities of UPWARD and CIP. (UPWARD, Vol.4, No.2, December 1995).

JAPAN

Fruit Tree Genetic Resources in MAFF Genebank

Fruit Tree Research Station MAFF (FTRS), the headquarters of which are located at Tsukuba, is responsible for the management of MAFF Fruit Tree Genetic Resources. FTRS has four branch stations: Morioka Branch, Oita Branch, Akita Branch and Kochinotsu Branch. As of 1995, the total number of fruit tree genetic resources in MAFF Genebank amounted to ca. 8,000 accessions, with the largest germplasm of ca. 1,800 accessions of apple, followed by *Citrus*.

Genetic resources of fruit trees are classified into these groups: working collection, base collection and active collection. The headquarters and four branches are involved in the breeding of specific fruit trees and also management of genetic resources of specific fruit groups. For safe preservation of PGR, so-called duplicate preservation is implemented with the cooperation of the National Center for Seeds and Seedlings.

At the headquarters, Tsukuba, breeding of Japanese pear (*Pyrus pyrifolia* Nakai var. *culta* Nakai), peach (*Prunus persica* Sieb. et Zucc. var. * vulgaris* Maxim.), apricot (*Prunus armeniaca* L. var. *ansu* Maxim.), plum (*Prunus salicina* Lindl.) and chestnut (*Castanea crenata* Sieb. et Zucc.) is carried out. The FGR activities on these fruit trees are managed by the staff of the Division of Fruit Breeding of FTRS. Apple tree breeding is carried out at the Morioka Branch in the northern part of Japan. PGR management of
APPLES are also carried out from this station. The climate of the Akutsu Branch, which is situated in the center of the main island of Japan, facing the Pacific Ocean, is temperate without frost, and suitable for the cultivation of early maturing Citrus species, particularly satsuma mandarin (Citrus unshiu Marc.). Development of satsuma mandarin cultivars has been carried out at the Okitsu Branch and PGR management of Satsuma mandarin has also been carried out from here. The Akutsu Branch faces the Seto Inland Sea. PGR of kaki (Dispyros kaki L.), grapes (Vitis spp.), and kiwi fruit (Actinidia delicosa L.) are preserved at the Akutsu Branch. At the Kuchinotsu Branch, which is the southernmost branch and faces the Sea of Amakusa, development of late maturing Citrus species, such as, pomelo (Citrus grandis Osbeck), sweet orange (Citrus sinensis Osbeck) and ponkan (Citrus reticulata Blanco) has been promoted. Geographical of these citrus oranges are preserved at the Kuchinotsu Branch. (Dr. Silavanh, Dr. Ouedraogo)

LAO PDR

Dr. Ramanatha Rao travelled to Lao PDR for follow-up activities. Dr. Oudara Souvannavong, FAO, Rome; Dr. Tim Boyle, CIFOR and Mr. Jim Coles, ASEAN-Canada Tree Seed Centre joined the team for discussions with the Department of Agriculture, Ministry of Agriculture and Forestry.

Activities at Nepal Agricultural Research Council (NARC)

NARC to implement long term strategy

The Reappraisal and Evaluation Task Force of the NARC in its report has made some recommendations in adopting and implementing a long term strategy for more capable research system in the country, enhancing the autonomy of the Council. Some of the basic recommendations include:

1) institutionalize and improve inter-unit relations and coordination, 2) make recruitment on the basis of qualifications and competitions, 3) establish guidelines for management policies and related issues. The NARC in the last four years has generated interest in research among the government and non-government organizations by cultivating its own institutional identity. The recommendations will facilitate the progress of NARC in a planned manner.

NARC - Cornell University signed MoU

NARC and the Cornell University, USA has signed a Memorandum of Understanding (MoU) for scientific and technical cooperation in Rice and Wheat improvement. The MoU aims to develop, promote and accelerate close collaborative efforts in the field of micro-nutrients in the sustainability of the Rice-Wheat System based on a work plan developed for mutual cooperation. The activities would relate to collaborative research projects, exchange visiting scientists, joint publications, exchange of scientific literature, information and methodology, promotion regional collaboration within tropical Asia and import and export scientific materials and equipments as required in the programme of common interest.

PACIFIC ISLANDS

Breadfruit Collection Update

Breadfruit has long been an important staple crop in the Pacific Islands, where it is part of an agricultural complex well adapted to island conditions.
3. STANTECH-South Asia Regional Course, 17-28 June

A COGENT regional training course on Standard Research Techniques in Coconut Breeding (STANTECH) will be hosted by the Coconut Research Institute at Lunuwa, Sri Lanka to train participants on germplasm characterization, coconut breeding and practical agronomic techniques. Participants are expected from Sri Lanka, Bangladesh, India, Pakistan and also from Myanmar, Oman and Abu Dhabi. The course will be taught by the COGENT Genebank Task Force, experts from IPGRI, CIRAD, the World Bank and from AARD. It was hosted by the Agency for Agricultural Research and Development (AARD) and funded by the Asian Development Bank, FAO and IPGRI. The work plans and budgets are being refined and the draft agreements are being cleared with the respective governments of the four host countries namely, Indonesia (Southeast Asia), India (South Asia), Papua New Guinea (South Pacific) and Cote d’Ivoire (Africa).

4. STANTECH - Pacific Regional Course, 5-14 August

A similar COGENT STANTECH regional training course will be hosted by the Vanuatu Agricultural Research and Training Centre. Participants are expected from Fiji, Papua New Guinea, Solomon, Tonga, Western Samoa, Vanuatu and Cook Islands. Trainers will consist of participants from the Cote de’ Ivoire and Manado workshop/trainers’ course. The course will also be funded by the Asian Development Bank.

5. Users’ Perspective to Promote Coconut Multi-purpose Uses, 26-28 September

A workshop which will bring together researchers on processing and utilization and coconut germplasm and breeding and the private sector will be hosted by the Horticulture Research Institute of the Thailand Department of Agriculture in Chumphon, Thailand. The workshop will discuss what kinds of varieties are needed by the industry and village-level sectors and what conservation, breeding and socio-economic strategies and research activities should be carried out to promote multi-purpose uses and competitiveness. The workshop will be attended by participants from 13-15 coconut-producing countries in the Asia-Pacific region, IPGRI experts and industry representatives. The workshop will be funded by the International Fund for Agricultural Development (IFAD) and the Asian Development Bank with the BUROTROP, the Asian and Pacific Coconut Community (APCC) and the South Pacific Commission (SPC) serving as co-sponsors.

6. CGRNAP Annual Review and Planning Meeting, 30 September - 2 October

The 13 countries participating in the "Coconut Genetic Resources for Asia and the Pacific Region" (CGRNAP) will hold the annual meeting which will be hosted by the Horticulture Research Institute, Thailand Department of Agriculture also in Chumphon, Thailand. The meeting will review CGRNAP accomplishments in the past year and formulate plans for the coming year. It will also discuss the proposed extension of the 3-year project. The meeting will be attended by new members and representatives of IPGRI and ADB. [For more information contact: Dr. Pons Batugal, COGENT Coordinator, IPGRI-APC, Singapore].
environments. There are two species of breadfruit in the Pacific Islands, *Artocarpus altilis* (Parkin) Fosberg and *A. mariannensis* Trecul, as well as possible hybrids. Hundreds of cultivars have been named, with distinctions based on bearing season, fruit shape, skin colour or texture, flesh colour, presence of seeds, cooking or storage qualities of the fruit, tree form, leaf shape and horticultural requirements. The need to preserve and study this valuable crop was first recognized on a regional basis in the 1950's, when the South Pacific Commission began a widespread collection of cultivars. Agriculture Departments in Chuuk, Fiji, French Polynesia, Kiribati, Kosrae, Pohnpei, Solomon Islands, and Western Samoa all established collections in the past 30 years.

The National Tropical Botanical Garden (NTBG), formerly the Pacific Tropical Botanical Garden, a privately funded, non-profit institution, established a small collection of breadfruit in Hawaii in the 1970s. Collecting trips were undertaken by Dr. Diane to Western Samoa, Tonga, Tokelau, and Fiji, with support from SPRAD, IRETA, and NTBG. The International Board for Plant Genetic Resources and the US Department of Agriculture funded more widespread collections in 1987. All accessions were planted in the existing collection at Kahanu Garden on Maui, Hawaii. This breadfruit collection now consists of 226 trees of 173 accessions representing 16 Pacific Island Groups. Of these, 145 accessions have reached reproductive maturity and are bearing fruit. The breadfruit collection has been completely mapped and labelled, and an extensive computerised database containing location, accession numbers, provenance information, general descriptors and ethnobotanical information has been developed. The genetic variability of the collection has been characterized with respect to variation in isozymes and chromosome number. Ethnobotanical and cultural uses (such as food preparation, storage, seasonality, and specialized uses) and local names have been recorded. A preliminary study to document seasonality and productivity of cultivars was started in October 1994.

While the plantings at Kahanu Garden represent the largest and most comprehensive breadfruit collection in the world, it is by no means complete. Examples of the materials needed to develop a definitive collection include: a greater diversity of seeded cultivars of *A. altilis* from Papua New Guinea, Fiji, Solomon Islands and Vanuatu; additional seedless cultivars from Samoa and Tonga; *Artocarpus mariannensis* and inter-specific hybrids from throughout Micronesia; and diverse cultivars from island groups currently under-represented in the collection. [SPC Agricultural News, Vol.4, No.2, February 1996. For more details contact: Dr. Diane Ragone, National Tropical Botanical Garden, P.O Box 340, Lawai, Kauai, Hawaii 96765. Tel: (808) 332-7323; Fax: (808) 332-9765].

**New Director at PGRC**

Dr. A.H.M. Jayasuriya assumed duties as the new Director of the Plant Genetic Resources Centre, Gannoruwa, Peradeniya, Sri Lanka on 16 January 1996. Dr. Jayasuriya, has a Master degree in plant ecology and systematics from the Peradeniya University and a Ph.D from City University of New York for research in plant systematics he carried out at the New York Botanic Gardens. He was Government Systematic Botanist and Curator of the National Herbarium at Peradeniya from 1977 to 1996. From November 1991 to March 1995 he carried out an assessment of the biodiversity in Sri Lanka as a consultant to the National Conservation Review Project established to review environmental management in forestry development in Sri Lanka, implemented by IUCN and supported by UNDP for Sri Lanka Forest Department.
Meetings

Indonesia’s National Workshop on Dissemination of PROSEA Information

The workshop was held at the Research and Development Centre for Biology, Bogor on 18 July 1995. The following subjects were discussed: i) Material for dissemination of information from PROSEA database; ii) Material needed for forestry extension; iii) Evaluation of PROSEA brochures used for university student’s extension activities; iv) Dissemination of information on plant resources to transmigrant communities; v) Extension material on plant resources using electronic media. The workshop was attended by about 60 persons representing institutions related to the PROSEA programme in Indonesia. [PROSEA Newsletter No.15, October 1995].

The Seoul Declaration

The Seoul Declaration was the main outcome of the Asia/Pacific regional conference on ‘Food, Culture, Trade and the Environment’, held at Saemaul Undong, Korea from July 19-22, 1995. It was attended by 100 participants from 21 countries, coming from social movements of consumers, farmers and scientists, and from women, environment and development organizations. The declaration calls for the adoption of measures leading to a world of harmony between nature and humanity. It favours, among other initiatives, the restoration, conservation and utilization of traditional varieties of food and forest products, the creation and strengthening of community-based and supported marketing systems; the protection of farmers’ rights not to be bestowed, but implemented, and that by Mr. J.C. Gautam, Executive Director, NARC stressed on the conservation of biodiversity - its wealth, threats, and management. Well prepared and informative presentations were given by persons coming from different organizations and these covered: 'Food, Culture, Trade and the Environment', held at Saemaul Undong, Korea from July 19-22, 1995. It was attended by about 40 participants from private, governmental and non governmental organizations both from India and abroad. Dr. Ken Riley represented IPGRI. The purpose of the meeting was to make suggestions on the way forward in implementing farmers’ rights. Discussions focussed on both the Indian and international issues.

SAARC Meeting of Experts on MAP

The South Asian Association for Regional Cooperation (SAARC) Meeting of Experts on ‘Cultivation and Utilization of Medicinal and Aromatic Plants’ was held 18-19 October 1995 in Colombo, Sri Lanka. Experts from India, Pakistan, Nepal, Bangladesh, and Sri Lanka attended.

The main objective of the consultation was to promote co-operation among scientists and industrialists of the SAARC region to improve the economic utilization of regional MAP resources. Some of the recommendations that emerged from this meeting were: 1) to short-list the high demand MAP commonly used in the region for industrial purposes, 2) to conduct concerted multidisciplinary research among the SAARC member countries in several identified priority areas, 3) to strengthen the R&D facilities within the institutions concerned among the member countries, 4) to boost raw material production through cultivation on small holdings, 5) to develop a national policy on MAP, leading to the formulation of a SAARC Regional Policy, and 6) to establish a system for the better exchange of information among member countries. [Druk Forestry News, Issue No.9, January 1996].

Agrobiodiversity and Farmers’ Rights

A technical consultation meeting at M.S. Swaminathan Research Foundation (MSSRF), Madras from January 16-18, 1996 was attended by about 60 participants from private, governmental and non governmental organizations both from India and abroad. Dr. T. Partap, ICIMOD in his keynote address reported on the situation of mountain agrobiodiversity - its wealth, threats, and management. Well prepared and informative presentations were given by persons coming from different organizations and these covered: 

Objectives for Farmers’ Rights

1. For farming communities to be entitled to receive a fair and equitable share of the benefits arising from the use of agrobiodiversity.
2. For farming communities to achieve recognition for their past, present and future contributions to conservation and agriculture.
3. To promote the conservation and sustainable use of plant and animal agrobiodiversity by farming communities.

Seminar on Managing Agricultural Biodiversity

The seminar on Managing Agricultural Biodiversity for Sustainable Mountain Agriculture: Issues and Experiences, 15-16 March 1996 was organized by LI-BIRD at Pokhara, Nepal and jointly funded by ICIMOD and IPGRI. The purpose was to create awareness on agricultural biodiversity and to bring farmers, INDOS, NODS, NARS, and Donors together to share ideas and experiences and to explore ways to establish collaboration for future work. This was attended by 60 participants. IPGRI was represented by Drs. Monica Gessler, Urs Hodel and R.K. Azora. Twelve short presentations were given by persons coming from different organizations and these covered: 

Nepalese Biowealth and Realities of Genetic Erosion, Community Participation in on-Farm Genetic Conservation, and Agrobiodiversity and Agricultural Development. The address by Dr. F. Pelinick, Director General, ICIMOD and that by Mr. J.C. Gautan, Executive Director, NARC stressed on the conservation of the biodiversity in Nepal and the issues involved. Dr. T. Partap, ICIMOD in his keynote address reported on the situation of mountain agrobiodiversity - its wealth, threats, and management. Well prepared and informative short presentations were made on a wide...
range of research activities on conservation and biodiversity issues in Nepal. One of these covered gene, gender, and generation, and stressed on the importance of focusing on gender dimension in the promotion of conservation of biodiversity. The three farmers who participated spoke about their problems and this generated interesting discussion. Collaboration among different organizations to resolve issues and constraints in national context were discussed and recommendations accordingly proposed.

The Consultation / Workshop on Regional Information System for Musa and Plantain - Asia and Pacific (RISBAP)

This meeting was held from 1-3 April 1996 at the Philippines Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), Los Banos, Philippines. Representatives from Australia, China, Indonesia, India, Malaysia, Philippines, Thailand, Taiwan and the South Pacific Commission participated in the meeting. Participants gave presentations of current information systems in their country and how they could participate in the regional information system for Musa and Plantain in the Asia Pacific region. In the discussion it was agreed that RISBAP will be set up and be based in PCARRD where the INIBAP Regional Coordinator is located. The group proposed that a list of regional Musa research projects from national institutes would be compiled and made available during the year and the possibility of a regional newsletter was suggested. The proceedings will be published in due course.

IPGRI Organizes Training Courses on Rattan

IPGRI's has been involved, in close collaboration with INBAR, in genetic resources activities on bamboo and rattan. Human resource development is very important to promote species conservation and propagation. This has been long realised. Therefore, it is important to see the appropriate persons receive the training to improve their skills. IPGRI has organised this training course, jointly with INBAR, and in close cooperation with the Department of Forestry, Sarawak, Malaysia and Royal Botanic Gardens, Kew, UK during 14-28, April 96 in Kuching, Sarawak, Malaysia. Dr. John Dransfield, eminent palm botanist is directing the programme. The same trainees will continue the next week for a weeks training in Genetics and Improvement of Rattan at Luasong Forestry Centre, Taiwan. This part of the course is being organized by IPGRI/INBAR in collaboration with CIRAD-Foret and INNORISE, Sabha Foundation, who have also started research work in the last two years on conservation and genetic improvement of rattans, which the trainees will be able to see and learn from. Dr. Helen Joly and Bacilleri, of CIRAD-Foret and staff of INNORISE are closely associated with the training. This is an effort that underlines the cooperation from a number of national, regional, and international institutions, including semi-private sector to promote the dissemination of knowledge in these important fields of taxonomy, ecology, and genetics and improvement of rattans.

Forthcoming Meetings

Domestication, Production and Utilization of New Crops, 7-10 July 1996 at the University of Southampton, United Kingdom

A three day conference organized by the International Centre for Underutilized Crops (ICO) will be held at the University of Southampton, U.K from 7-10 July 1996. The objective of this 3rd international meeting is to highlight obstacles in the process of new crop development, and determine, from practical experience, how to overcome them. The aim will be to extract general principles, and thus provide a practical basis to aid future work. The conference programme will include sessions covering all the main technical, economic, sociological and regulatory factors affecting new crop development. [For details contact: Dr. N. Haq, Conference Secretariat, International Centre for Underutilized Crops, Building 62, University of Southampton, Southamptom S016 7PJ, UK].

Collaboration on Plant Genetic Resources in the Asia Pacific Oceania Region.

The countries in the Asia Pacific Oceania region poses such of the world's diversity of genetic resources on which the very survival of mankind depends. Recent changes in the region including rapid industrialization, and urbanization may threaten these resources. There is also increased realization of the potential benefits sharing these resources, conserving them and in developing technologies and practices for their sustained utilization. As agreed under the Convention on Biological Diversity, countries have both the responsibility for conserving genetic resources as well as for sharing of the benefits from their use.

During the past year, there has been a growing interest in strengthening collaboration across the region. The preparation meeting for the FAO International Technical Conference on Plant Genetic Resources (ICTGR), held last October in Bangkok called for regional networking and collaboration for sharing information, implementing cost effective conservation, and technology development. A number of crop and forestry commodities particularly neglected crops were given specific recognition, for further collaboration.

During a consultation meeting in January 1996 in New Delhi, the Asia Pacific Association of Agricultural Research Institutions (APAARI) also endorsed a regional collaborative approach in developing stronger partnerships between National Agricultural Research Systems (NARS) and the International Agricultural Research Centres (IARC's) working in the region. Again, genetic resources were identified as an important topic on which such collaboration should be based. This collaboration should be based on nationally and subregionally identified priorities.

For the past 20 years, IPGRI (formerly IBPGR) has been working in the region to advance the conservation and use of plant genetic resources. Strengthening of collaboration among countries has been an important activity. A meeting between November 13-16, 1996 in New Delhi just prior to the 2nd International Crop Science Congress is planned to bring together national programmes, scientists and policy makers in countries from the Asia Pacific Oceania region, with scientists from IARC's, FAO and other regional and international organizations in order to advance the growing desire for collaboration across the region on plant genetic resources [Dr. Ken Riley, Regional Director, IPGRI-APO, Singapore].

Descriptors for Coconut (Cocos nucifera L.) is a complete revision of the descriptor list given in Appendix V of Coconut Genetic Resources, 1978 (AGPE/IBPGR/78/4), which was the second IBPGR consultation held by IBPGR on coconut genetic resources. It was prepared in the IBPGR standard format by the breeding section of the National Cocon Development Programme, Tanzania and reviewed by the participants of the International Workshop on Coconut Genetic Resources, held at Cipanas, Indonesia from 8-11 October 1991 and subsequently revised by scientists participating in the International Database on Coconut Genetic Resources, held at Montpellier, France, from 19-23 May 1992.


This volume deals with the proceedings of the 4th International Congress of Ethnobotany held at Lucknow in November 1994. It includes besides Dr. M.S. Swaminathan’s inaugural address, over 100 selected papers of authors from 20 countries. The papers cover diverse topics under several sections, namely, Food, Health Care, Conservation, Diversity, Regional Studies, Methodologies, Socio-economic aspects and general studies. The book provides state of the art information from several countries, and brings out gaps in our studies and concerns for future research. The new methodologies/approaches will help in recording more ethnobotanical information. The publication is a very valuable addition to the literature on ethnobotany for researchers in this field, to


This symposium was jointly sponsored by Agency for Agricultural Research and Development (AARD), Yayasan Keenakanragan, Indonesia (KEHATI) and IPGRI. The deliberations also included animal genetic resources, stressed on increased role of biotechnology, and laid importance on the conservation of biological diversity and the issues involved. The symposium invited participants to present papers introducing topics and issues for discussion and debating these. The main objectives were to review the progress on PGR in Southeast Asia, exchange ideas/information, regional views etc., on the conservation of genetic resources, and plan follow up action.


Descriptors for Beta (Beta spp.) in a revision of the original IBPGR Publication Descriptors for Beet (IBPGR, 1979). The initial list was used as a basis for the current list which was initiated after a meeting of a Beta workshop in 1987.

those interested in documenting native/indigenous knowledge, conserving rich diversity, and above all, in the application of such potential wealth for human welfare. For more information, contact: Dr.S.K. Jain, Honorary Director, Institute of Ethnobotany, National Botanical Research Institute, Lucknow, India.


This publication is the outcome of the meeting of East Asia Coordinators on Plant Genetic Resources organized by IPGRI office for East Asia, Beijing, China on 23-25 September 1994. National Coordinators and specialists from China, Japan, Mongolia, Democratic People's Republic of Korea and Republic of Korea participated. IPGRI professional staff from APO region and Dr. Gary Fowler of Food and Agriculture Organization of the United Nations also attended the meeting, besides several PGR/Crop/Community experts from China. While session I deals with country reports, session II mainly covers special PGR topics including policy issues. The deliberations of the meeting resulted in several recommendations, and took into account the constraints and needs of national programmes, and their priorities and common interest in PGR related matters. The participants expressed further collaboration in the form of a Regional Network for conservation and utilization of plant genetic resources.


The aim of this workshop was to discuss 1) the major outputs of the projects, 2) important findings from field based studies, 3) the type of training material required and 4) to identify priority activities for future follow up. The proceedings include country reports of India, Pakistan, Nepal and China. Other interesting articles include: Understanding degradation processes, soil fertility issues under irrigated and rain-fed agriculture, effective method of slope utilization, design for low-cost soil erosion, use of native plant species and indigenous knowledge for rehabilitation of degraded mountain ecosystems, screening and techniques for afforestation etc.


This bibliography provides an overview of the range of research carried out on local crop development, in situ and community conservation and identifies the important gaps. The bibliography is organized in four thematic chapters, each listing key references. Each chapter starts with a brief introduction to highlight the major issues and gaps in present knowledge. Chapter 1 on 'Farmers knowledge and practices' has 90 references concerned with studies that describe intraspecific diversity in local farming systems, the criteria for varietal selections, and the technique used by farmers for local crop development. Chapter 2 on 'Genetic diversity and plant breeding includes 38 references relating to biological studies on the process of local crop development, characterization of genetic diversity and evolution of crop genetic diversity and plant breeding for marginal environments. Chapter 3 on 'Research methods and development activities' includes 63 references on research methods relevant to local crop development and field techniques for strengthening and supporting crop development efforts and community conservation and Chapter 4 includes 69 references relating to Policy that support or inhibit local crop development.


This publication is an outcome of the national workshop on strengthening of plant genetic resources programme held at Hanoi, Vietnam from 28-30 March 1995 with inputs of the editorial board formed jointly of the staff from Vietnamese Agricultural Science Institute (VASI) and International Plant Genetic Resources Institute (IPGRI). The articles in this publication are developed from the work of a project organized by IPGRI and funded by Canadian International Development Agency (CIDA) and the International Development Research Center (IDRC). Information relating to Vietnam national PGR programme, and strategies for PGR conservation and utilization in Vietnam have been nicely dealt with under various chapters. The conservation and use of forest and medicinal plants have been presented in more details. Diversity, Conservation and Enhancement of rice, maize, cotton and other crops, fruit crops, sugarcane, coffee, and cotton germplasm in Vietnam has also been presented.

Periodicals / Reports


This quarterly periodical deals with priority medicinal plants - richness, heritage, traditional medicine and primary health care, conservation aspects, both in situ and ex situ and establishing multidisciplinary databases to disseminate information on medicinal plants. It also highlights policy issues.


The purpose of this bulletin is to disseminate information on extension systems and practices, research on extension methods, efficient organization of technology transfer and current concerns in the area of agriculture, among policy makers, scientists and extension functionaries.


This report is based on studies carried out under a IPGRI funded project. Information on collection done in taro and yam, and ethnobotanical information from diverse communities has been recorded on the methods of growing, maintenance of material, conservation and use of taro and yam.


This issue presents information on characterization of isolates of Fusarium oxysporum f.sp. cubense from Asia, effective coordination of Musa germplasm, cooking qualities of black sigatoka resistant plaitain hybrids, influence of mycorrhizae and phosphide solubilizing bacteria on the growth and development of banana and other banana diseases, and variation of bunch types in mericlones of a multi-bunching banana. This issue also contains a list of publications from INIBAP.

In this issue, several research papers presented provide interesting information relating to wild Brassicaceae species utilizable as vegetables in the Mediterranean areas, plant genetic resources in Romania, short-term conservation of mango seed, characterization of vetch population collected in Turkey, safe movement of coconut germplasm and resistance sources for downy mildew in opium poppy.


Comprehensive information regarding utilization of Iniadi, an early maturing and productive landrace of pearl millet from West Africa in the development of improved cultivars in Africa, India and USA has been provided in an article entitled: "Use of West African pearl millet landrace". A review on global values of biological diversity: the public interest in the conservation of plant genetic resources for agriculture has also been discussed in detail.


It is an interesting periodical intended to provide information on traditional knowledge, biodiversity, conservation, use of natural plant resources, indigenous uses, applied ethnobotany and community development related issues; International / National institutes / Societies involved, new journals published. Information is also provided on establishment of global biodiversity information networks.


Species is one of the newsletters of the Species Survival Commission (SSC) of IUCN - the World Conservation Union. Interesting information relating to PGR is about the kew millennium seedbank and wetland International - A new global force for wetland conservation.

Scientific Contributions

Collecting khirni [Manilkara hexandra (Roxb.) Dubard] germplasm from central and south-west India

Khirni [Manilkara hexandra (Roxb.) Dubard] is a neglected minor fruit of great economic potential. It occurs widely in dry evergreen forests of north Central India and the Deccan Plateau. It is a tall tree with spreading crown and straight massive bole. It is also used as commercial rootstock for sapota (Manilkara achras). In Gujarat and adjoining area flowering occurs in two seasons, during July-August and in October-November. However, October-November flowering sets fruits that mature in April-May. In North India, flowering occurs during February-March and fruits mature in June-July. Khirni germplasm, comprising 13 accessions...
collected during 1995 from different parts of Gujarat (Bahruch) and Maharashtra (Akola, Nagpur and Bhandara), were studied for their tree canopy development, productive traits and fruit morphological characteristics. Wide range of variability was observed in trunk girth (1.5 - 3.8m), tree height (10 - 25m) and spread - branching pattern, crown snap, and fruit morphological characteristics - length, circumference, average weight etc. (Table 1).

Khirni being heterozygous in nature, seed propagation has generated a high range of variability in its plantations in Gujarat and Maharashtra. It was observed that the canopy and tree trunk girth development of genotypes in Gujarat were highly vigorous, tall growing, with wide spread crown in comparison to plantations in Maharashtra. It may be due to feasible soil and climatic conditions. It was also observed that the rapid deforestation in the recent past has resulted in the erosion of khirni germplasm in different areas due to high demand for its quality timber. This concern has resulted in its large scale plantation by forest department in Pawani range, in Bhandara district of Maharashtra. Thus, promising genotypes for high yield and better fruit taste have been identified and recommended for direct use. (Mathura Rai1, H.P. Singh2 and P.N. Gupta1: 1. National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi 110 012, 2. Project Coordinator, Tropical Fruits, Indian Institute of Horticultural Research, Hessaraghata Lake, Bangalore 560 089, India)

### Table 1. Variability observed in tree and fruit morphological characters of khirni

<table>
<thead>
<tr>
<th>Traits</th>
<th>Descriptor states / range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree canopy development</strong></td>
<td></td>
</tr>
<tr>
<td>Tree habit</td>
<td>Upright tall, semi-spreading, spreading and drooping</td>
</tr>
<tr>
<td>Tree size</td>
<td>Medium large to tall</td>
</tr>
<tr>
<td>Branching pattern</td>
<td>Spreading and large, sparse to dense</td>
</tr>
<tr>
<td>Trunk girth (m)</td>
<td>1.5 - 3.84</td>
</tr>
<tr>
<td><strong>Leaf</strong></td>
<td></td>
</tr>
<tr>
<td>Shape</td>
<td>Oblong to elongated</td>
</tr>
<tr>
<td>Size</td>
<td>Small, narrow to large and elongated</td>
</tr>
<tr>
<td>Colour</td>
<td>Light green, yellowish green</td>
</tr>
<tr>
<td><strong>Flowering and Fruiting</strong></td>
<td></td>
</tr>
<tr>
<td>Flowering period / Fruit set</td>
<td>Gujarati and adjoining areas: July-August &amp; again in Oct-Nov. North India: February-March</td>
</tr>
<tr>
<td><strong>Maturity</strong></td>
<td></td>
</tr>
<tr>
<td>Gujarati and adjoining areas:</td>
<td>April-May</td>
</tr>
<tr>
<td>North India:</td>
<td>June-July</td>
</tr>
<tr>
<td><strong>Fruit characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Length (cm)</td>
<td>1.48 - 2.22</td>
</tr>
<tr>
<td>Circumference (cm)</td>
<td>2.80 - 5.26</td>
</tr>
<tr>
<td>Average weight (g)</td>
<td>5.20 - 11.0</td>
</tr>
<tr>
<td>Seed/fruit (number)</td>
<td>1.00 - 1.80</td>
</tr>
<tr>
<td>Seed weight/fruit (g)</td>
<td>0.60 - 0.92</td>
</tr>
<tr>
<td>Pulp weight/fruit (g)</td>
<td>4.50 - 10.75</td>
</tr>
<tr>
<td>Pulp seed ratio</td>
<td>6.43 - 14.43</td>
</tr>
<tr>
<td>TSS (brix) (1%)</td>
<td>21.0 - 26.80</td>
</tr>
<tr>
<td><strong>Seed characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Brown, black, brown or black with whitish margin</td>
</tr>
<tr>
<td>Shape</td>
<td>Small to medium</td>
</tr>
<tr>
<td></td>
<td>Oval, chlong and flattened</td>
</tr>
</tbody>
</table>

**Khirni** (*Manilkara hexandra*) - an underutilised fruit.

IPGRI would like to hear of your activities and ideas. Please send notes and news to any of the offices. (See page 1 for addresses)
Useful Names & Addresses/Contributors

ICIMOD
International Centre for Integrated Mountain Development
4/80 Jawalakhel
G.P.O. Box 3226, Kathmandu
Nepal

INIBAP/ASPNET
Dr. Ramon V. Valmayor
Regional Coordinator
Asia and the Pacific Network (ASPNET)
c/o PCARRD Headquarters
Paseo de Valmayor Los Banos
Laguna
Philippines

IPGRI
International Plant Genetic Resources Institute
Via delle Sette Chiese 142
00145 Rome
Italy

Dr. Kenneth W. Riley
Regional Director
IPGRI Regional Office for Asia, the Pacific and Oceania
8th Floor, RELC Building
30 Orange Grove Road
Singapore 258352

PROSEA
Network Office for South East Asia Development Centre for Biology-LIPI
Jalan Ir. H. Juanda 22
P.O Box 234, Bogor 16122
Indonesia

SAARC
Regional Information Centre (GARC)
New Airport Road, Farm Gate
Dhaka 1215
Bangladesh

Department of Agriculture
P.O Box 119
Thimphu
Bhutan

Dr. K.P.S. Chandel
Director
National Bureau of Plant Genetic Resources
Pusa Campus
New Delhi 110 012
India

Dr. Xiongming Du
Cotton Research Institute of CAAS
An Yang
Henan 455112
Peoples Republic of China

Dr. Pablo Eyzaguirre
Anthropology & Socio-economics, GD
International Plant Genetic Resources Institute
Via delle Sette Chiese 142
00145 Rome
Italy

Dr. J.C. Gautam
Executive Director
Nepal Agricultural Research Council
Mumaltar, Lalitpur
Nepal

Dr. A.H. M. Jayasuriya

Director
Plant Genetic Resources Centre
P.O. Box 11, Gannoruwa
Peradeniya
Sri Lanka

Prof. Fang Jiahe,
Institute of Crop Germplasm Resources of CAAS
30 Bai Shi Qiao Road,
Beijing 100081
China

Dr. R.S. Paroda
Director General ICAR &
Secretary DARE
Indian Council of Agricultural Research
Krishi Bhavan
New Delhi 110 001
India

Dr. M.S. Swaminathan
Chairman
M.S. Swaminathan Research Foundation (MSSRF)
Taramani Institutional Area
Madras 600 113
India

Dr. Schichino Tsuchiya
Director
Division of Fruit Breeding
Fruit Tree Research Station
MAFF, Tsukuba 305
Japan

Comments and/or suggestions