



# APAARI

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### EDITORIAL

The changing scenario on agricultural research and development necessitates that NARS should have sound policies with increased national and international involvements. Considerable concern on the issues related to conservation, safeguarding and use of agrobiodiversity vis-a-vis national commitments, in developing and implementing national policies, has been raised by NARS with priority towards sustainable food security. Productivity, stability and equity constitute the key components of food security and have received focus in the International fora-at CBD, ITC, the World Food Summit (WFS), the Commission on Genetic Resources for Food and Agriculture and the International Undertaking on Plant Genetic Resources. Among several issues involved, access and benefit sharing assumes importance. In the Convention, benefit sharing is to be accomplished through facilitation of access to genetic resources, access to transfer of technology, the exchange of information and the promotion of international technical and scientific cooperation. CBD deals with access on mutually agreed terms subject to Prior Informed Consent (PIC). Also, the Material Transfer Agreement (MTA) needs emphasis in countries wishing to regulate access to their genetic resources and ensure equity in benefit sharing.

To APAARI and NARS in the Asia-Pacific region, such emerging issues have great relevance and developing/implementing mechanisms to resolve these needs priority. Greater linkages between public and private sector and participatory role of the farming communities in conservation of national bio-resources are envisaged. Promoting network activities such as those between APAARI and IPGRI to strengthen regional needs would be desirable. Further, stability and diversity in traditional agricultural systems are closely linked, and thus research and development efforts have to be in conformity to the ecosystems approach. Also, public awareness at grassroot level and among policy makers would go a long way to promote such efforts. Overall, an equity linked approach would demand accelerated use of underutilized diversity, value additions and enhancement, and sustainable use of such resource. Methods need to be worked out to develop internationally agreed procedures for recognizing and rewarding community contributions to genetic resource conservation. International guidelines need to be developed for according support from a Global Biodiversity Fund, GEF or the like. APAARI regional activities are getting tuned to debate/facilitate such strategic issues for the overall benefit of national programmes, thereby developing stronger NARS.

Editors

## AGRICULTURAL PERSPECTIVE ON PATENTS

The agricultural scenario of the Asia-Pacific countries has overemphasized the major thrust of high productivity towards meeting food security. It is only recently that there has been an increasing awareness towards conservation and sustainable use of natural resources, especially plant genetic resources, in the wake of the new intellectual property regime. The Asia-Pacific region is endowed with rich biodiversity. The region has mega-diversity regions viz. Hindustani region, Indo-chinese-Indonesian and Chinese-Japanese region, which collectively contain numerous crop plants.

### GLOBAL SYSTEM FOR THE CONSERVATION AND UTILIZATION OF PLANT GENETIC RESOURCES

Establishing a Global System for the Conservation and Utilization of Plant Genetic Resources (PGR) for food and agriculture was an important step to address PGR issues at global level. The main institutional components of the Global System are the Commission on Plant Genetic Resources for Food and Agriculture and the International Undertaking on Plant Genetic Resources (IUPGR). The Convention on Biological Diversity (CBD) came into force in December 1993, providing an international legally binding framework for the conservation and sustainable use of biodiversity worldwide. The system aims at: (i) conservation of plant genetic resources, (ii) sustainable use of its components, and (iii) fair and equitable sharing of the benefits arising from the utilization of genetic sources.

### WTO AND TRIPS

Under Article 27.3(b) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), it is obligatory for the signatory/member country to "provide for the protection of plant varieties either by patent or by an effective *sui generis* system or by any combination thereof". A few countries of the region have a system in place while most of them are in the process of developing it. Meanwhile, the developed countries, where a mechanism of patent or PVP is well established, are capitalizing by having an innuendo of patents and protections.

### TRADITIONAL RIGHTS AND NATIONAL SOVEREIGNTY VIS-A-VIS PATENTS

Several cases of patents like those pertaining to turmeric, neem etc., tantamount to almost a direct violation of the principles of national sovereignty, traditional knowledge and rights, several of which constitute the "prior art".

The patent given to W R Grace Company to use a pesticide extract from the 'neem' tree was challenged in Washington in 1995 by more than 200 organizations from 35 countries. They argue that the Company has wrongfully usurped an age-old biological process used by millions of farmers in India and other countries for generations.

In Brussels, another legal petition was filed in June 1995 at the European Patent Office against a patent it had granted to W R Grace for a method that extracts the neem oil for use in controlling fungi on plants. The three opponents, European Member of Parliament Magda Alvoet, Vandana Shiva of the RFSTNRP, and IFOAM President Herve la Prairie, argue that the patent was wrongly given as the claims for the technique lacked novelty, inventiveness and clarity. The petition argues that the invention is not new as the patented method for extracting neem oil is a standard method used for many decades, whilst the anti-fungal effects of neem oil have been known in India for centuries.

The US Patent Office revoked the turmeric patent on the basis of a challenge filed by the Council of Scientific and Industrial Research (CSIR) of India. The patent had been granted in March 1995 to two non-resident Indians associated with the University of Mississippi Medical Centre, Jackson, USA. As turmeric has been used for thousands of years for healing wounds and rashes, CSIR challenged the patent on the ground that it lacked novelty. The US Patent Office upheld the objection and cancelled the patent.

Several other Indian plant genetic resources have been patented by other countries in the past. As many as 22 medicinal plants have already been patented by a number of American and Japanese firms.

A herbal drug "Picroliv" was developed by Central Drug Research Institute (CDRI), Lucknow, India from the roots of *Picrorhiza kurroa*, a perennial herb found only in the higher reaches of the north-western Himalayas. CSIR applied and got a patent in 1993 but a US company is already producing and marketing it. Another patent on piperine was taken by a US company depriving the country of origin of the benefit of export of the commodity.

### THE CHICKPEA CASE – APPROPRIATION OF THE DESIGNATED GERMLASM HELD IN TRUST

Most of the Consultative Group on International Agricultural Research (CGIAR) collections are duplicates of the National samples of the respective country of

origin. By an agreement between the CGIAR and the FAO, as signed in October 1994, such germplasm is held in trust by CG centers on behalf of the FAO. Accordingly this material *per se* cannot be protected/patented. However, several patents/attempts of patenting of the designated germplasm have occurred. This is well illustrated by the chickpea case.

Recently, an Australian Company attempted to patent two chickpea lines. These were obtained from the designated germplasm supplied by the ICRISAT. One of these was a land race from Karnataka which is listed as "King Kong" in the ICRISAT inventory. Owing to the active role of RAFI (Canada), ICRISAT and the Indian NARS, the patent could be got abandoned.

### **THE BASMATI CASE - AN INFRINGEMENT ON GEOGRAPHICAL AFFILIATION AND TRADITIONAL KNOWLEDGE**

Under article 22 of Section 3 of TRIPS, there is a provision of protection of geographical indications which identify a good as originating in a specific territory, or a region or locality in that territory, where a given quality, reputation and other characteristic of the good is essentially attributable to its geographical origin. The evident examples of geographic appellation are Champagne from Champagne district in France, Colombian coffee, Havana cigars from Cuba and Scotch whisky exclusively from Scotland. Several of the Asia-Pacific countries including India have not yet enacted the legislation on geographic indication. As a result, national interest is to be safeguarded by other resources like filing suits in several countries for Trade Mark etc. as done in the case of goods like 'Basmati' rice of India. The same is applicable to other goods like 'Darjeeling' tea. This issue has once again been brought into focus by the latest case of granting a patent to Ricetec. Inc. to a (Basmati) variety bred at the US. The Ricetec claim may mislead the consumers by undermining real Basmati of the Indian subcontinent.

The Indian subcontinent, with its diverse eco-geographic conditions, is the primary center of origin of cultivated rice (*Oryza sativa*) and conserves high diversity of rice germplasm including quality scented rices, which hold the highest premium in the world market. Basmati is nature's gift exclusive to the Indian subcontinent where it is being grown since its origin (millions of years). Several aromatic rices are grown and consumed as Basmati rices. Yet a few like Basmati-37 (Punjab Basmati, Type 3 (Dehradun Basmati), Karnal local (Travadi Basmati) and Pakistan Basmati fulfil the quality norms required for export. Characterized by extra long superfirm slender grains, Basmati rices

possess a pleasant and exquisite aroma, sweet taste, soft texture, delicate curvature, and extra elongation with a least breadthwise swelling on cooking. From a total area of 700,000 hectares under Basmati rice in India nearly 650,000 tons of milled rice is produced annually. Out of this, India had exported 523,000 tons of Basmati rice to the gulf countries, Europe and US during 1996-97 (April-March).

US exporters were dominating the international market with a WTO regulation which states that the higher the price of a commodity, the lower the duty. The US followed the strategy to sell rice at \$ 530 a ton in the European market primarily to fight the Vietnamese who were selling rice at \$ 450 in the highest price market. New Delhi pegged Indian Basmati at \$ 780 a ton, which was \$ 250 higher than the referring price in the European Union and as a result of lobbying, Indian exporters managed to wrest a 250 ECU (European Currency Unit at that time equivalent to \$ 1.32) duty derogation. Islamabad followed suit and was allowed a similar concession for export up to 10,000 tons and 50 ECU. The trouble started when WTO got a complaint from the US and later from Canada and Thailand that the concession violated the most favoured nation requirement because similar aromatic rice had not been given the same concession. A week later the US changed the complaint to say that Basmati rice from US was being discriminated against. The Texas based Ricetec Inc., who was previously selling rice under the brand name Kasmati and Texmati, couldn't compete and has patented a variety as Basmati in 1997.

### **CONCLUSIONS**

The glaring examples cited above represent only a fraction of the appropriation of the genetic wealth of the Asia-Pacific Region. There is an imperative need to ensure the provisions of CBD. Regulatory mechanisms, legislations and their implementation are expeditiously needed in most of the countries of the region. Plant Variety Protection, Biodiversity Legislation, Patent, Geographic Indication and Trade Marks are either to be enacted upon or to be revamped as per the changing global needs.

Countries of the Asia-Pacific region have specific needs to launch a collective forum which may vigorously safeguard the interests of the region. Issues like Basmati patenting have vividly demonstrated this by posing a common concern across the involved countries. There is also a need to harmonize the regulatory mechanism not only in the respective countries but also between the countries. A common germplasm initiative is needed to crystallize our stand before we go to any international agency.



In case of the designated germplasm, the existing FAO-CGIAR agreement, ending in October 1998, should not be allowed to be rolled over. Instead, a revision thereof should be undertaken through a special body having enough representation of resource rich Asia-Pacific region. There is also a need to have a new look into the MTAs of the CG Centers. It would be desirable if the respective sovereignty of the respective countries is ensured through formal agreements which might be a better substitute to the "voluntary moratorium" on patenting of designated germplasm as called for by the CGIAR Chairman, Dr Ismail Serageldin.

There is a wealth of both coded and uncoded traditional knowledge which is being patented advertently for purely commercial reasons by the developed countries.

Rights of holders of traditional knowledge and practitioners thereof including farmers should be ensured. Appropriate compensation should be arranged for the original donors/innovators of the genetic material in cases where the patented seeds, utilizing the genes of the Asia-Pacific origin as "raw materials", are fetching profits for transnational seed corporations. This would ensure that the limited resources of these countries are utilized for conservation of biodiversity and its effective utilization for the benefit of humankind rather than in legal battles in International Courts.

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## PATENTS AND FARMERS' RIGHTS

The Basmati Patent claimed by RiceTec illustrates the problems inherent to patents on living resources. They are based on a false claim to invention. Claiming invention for plant varieties is based on a double denial of the creativity of nature on the one hand and farmers on the other. On the one hand the patent is for rice derived from Indian Basmati which has the essential characteristics of Indian Basmati and is hence a variety 'essentially derived' from a farmers variety. It cannot therefore be treated as novel. On the other hand, the patent claims the 'invention' of a 'novel line'. RiceTec's Basmati 867 cannot be 'same as traditional Basmati' and 'novel' at the same time. The characteristics for which RiceTec has claimed a patent are derived from traditional Basmati. However, the patent claim basically denies the prior breeding by farmers and, by denying the role of farmers and breeders, falsely claims a derivation as an invention. If the false claim to invention is maintained, the RiceTec, and the U.S. Patent Office deny the innovation and creativity of Indian farmers embodied in the Basmati from which Basmati 867 is derived. In the future, such false claims, which are an infringement of the collective rights and collective innovation of Indian farmers, can actually be used to treat the farmers as infringing on the RiceTec Patent. If patents like RiceTec were recognized in India, the patent claim could force Indian farmers growing Basmati to pay royalty since the claim covers functionally equivalent varieties.

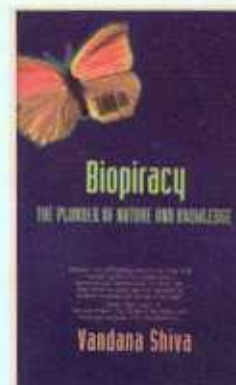
The most effective mechanism for preventing biopiracy and protecting farmers is by creating a legal framework for 'farmers' rights'. Farmers' rights recognise the collective, cumulative innovation of farmer embodied in distinctive varieties like Basmati. The Basmati patent denies farmers' rights, and instead of recognising that the RiceTec Basmati is derived from farmers varieties,

it falsely claims 'instant invention'. The most effective means for challenging the RiceTec Patent is through the recognition and legal protection of farmers' rights. Since these rights exist, in reality, and are not given by national governments or international agencies, the absence of a farmers' rights legislation in India does not imply that the RiceTec patent cannot be challenged in the U.S. on the basis of prior innovation and breeding by Indian farmers.

Geographical Indications (GIs) are a form of Intellectual Property Rights, which would allow 'Basmati' only to be used for rices originating in India and Pakistan. A false claim to a patent treats the aromatic characteristics of Basmati as an innovation by RiceTec rather than the result of nature's gift combined with the farmers' collective innovation and breeding over centuries. Hence, the prevention of biopiracy requires a combination of GIs for preventing unfair marketing and strong farmers' rights legislation which prevents unfair claims to breeders rights or patent claims. Farmers' rights are the declaration of national wealth and traditional innovation. Without the farmers' rights the country's biological wealth and intellectual heritage will continue to be pirated and drained.

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For more information  
on Biopiracy:  
'Biopiracy,  
The Plunder of Nature  
and Knowledge'  
ISBN: 1-896357-11-3





## STATEMENT ON THE GENERAL SITUATION OF FOOD AND AGRICULTURE IN ASIA AND THE PACIFIC REGION

*by FAO Director-General, Mr. Jacques Diouf*  
on the occasion of the 24th FAO Regional Conference for  
Asia and the Pacific, Yangon, Myanmar, 20-24 April 1998

Quote:

"During the last two decades the Asia and Pacific region has led the world in economic growth. Most countries saw rapid and sustained growth for a considerable period. While agriculture GDP changed gradually from 30 percent in the mid-1980s to about 20 percent in recent past, the sector remains a driving economic force. More than 65 percent of the region's inhabitants live in rural areas, and agriculture employs more than half of the economically active population.

Unfortunately, the "El Nino" phenomenon has once again seriously affected a number of countries and underscored the existence of pockets of vulnerability to food insecurity in the region. Floods, and other natural hazards such as earthquake, landslide, volcanic eruption, and forest fires have also plagued large areas. They have been a major cause of food insecurity among the vulnerable segment of the population, with large and devastating impact in terms of price upswings and instability of food access, coupled with damaged production and market infrastructures.

In a similar manner, the contagion of monetary and financial instability puts in jeopardy the region's progress towards sustainable food security and poverty alleviation. This instability poses a number of challenges to agriculture, fisheries and forestry. More than ever, the sector is called upon to absorb displaced labour, produce more export crops for foreign exchange, increase domestic food supply to mitigate upward pressures in wages, prices, and inflation rate, and to generate domestic sources of investment. In this context, the Organization, in consultation with the World Bank, is preparing programmes to develop peri-urban agriculture in those countries which are most affected by the current crisis as it is felt that these programmes could greatly contribute to lessen the problem of unemployment and urban poverty which have been exacerbated by

the financial situation and adjustment programmes. Under the new economic paradigm, a declining public sector role together with high costs, will diminish the influence of domestic procurement vis-a-vis international stocks in stabilizing domestic food prices and supply. On top of this, world food prices vary widely. The inherent risks and uncertainties associated with trade-oriented supply stabilization are a serious food security issue.

Household food insecurity as a result of poverty continues to be a major challenge in the region where the bulk (74 percent) of the poor in the developing world is located. Poverty is mainly a rural phenomenon; it accounts for about three-fourths of the total. As the large majority of the rural poor depend on agriculture for employment and income, agricultural growth offers a potentially enormous source of poverty reduction, particularly when the growth is broadly based.

Given rising population, shrinking agricultural land, increasing demands on limited water resources from the expanding urban and industrial sectors, intensified cropping, and widespread land degradation, sustainable agricultural resource management is crucial for food security. The challenge is one of how to increase output from the sector while sustaining and enhancing the productive potential of the available resources."

Unquote

NARS  
ARE REQUESTED TO CONTRIBUTE  
ON THEIR MAJOR RESEARCH AND  
DEVELOPMENT ACTIVITIES ON  
A REGULAR BASIS TO  
THE APAARI SECRETARIAT

# THE NETWORK OF ASIAN SWEETPOTATO AND POTATO R AND D PROGRAM (ASPRAD)

## INTRODUCTION

The Asian Sweetpotato and Potato R and D Program (ASPRAD), formerly the Southeast Asian Program for Potato Research and Development (SAPPRAD), was initiated through the MoA, signed on October 18, 1980 in Jakarta, Indonesia, by representatives of five countries: Indonesia, Papua New Guinea, Philippines, Sri Lanka and Thailand; as well as the Director General of the International Potato Center (CIP). The MoA committed the participants to a collaborative Research & Development on potato, covering research, training and technology transfer. Subsequently, CIP developed a proposal for funding, which was accepted by the Australian government through a Memorandum of Understanding (MoU), signed by representatives of the coordinating committee (CC) of SAPPRAD, CIP, and the Australian government on March 8, 1982. The proposal identified the following objectives: 1) To promote the use of potato in member countries of Southeast Asia by planning the integrated R&D program for the crop, building competence in potato R&D in individual scientists and institutions within the region and exchanging technology within the region and with other similar regions; and 2) To work toward self-sufficiency in potato R&D, both as a region and within member countries.

Since then, SAPPRAD underwent three phases (1982-1986, 1987-1991 and 1992-1996). Sweetpotato was added as a mandate (1987). Malaysia became the sixth participating country (1988) with Vietnam and China as the seventh and eighth member respectively. Australia sustained her financial support for the network even as responsibility for monitoring shifted from the Australian International Development Assistance Bureau (AIDAB) to the Australian Centre for International Agricultural Research (ACIAR) in 1992. On the other hand, CIP stopped financial support for the network, while continuing with technical and administrative support. The participating National Agricultural Research Systems (NARS) were urged to provide modest support to sustain its networking activities. The committee also decided to change the name of SAPPRAD to the Asian Sweetpotato and Potato Research and Development (ASPRAD) network to reflect the new membership as well as the crop mandates.

## THE OBJECTIVES

- To promote the development and utilization of potato and sweetpotato in the region through collaborative R&D.

- Research thrust on problem areas to be undertaken by a lead country.
- To strengthen national research capability and technology transfer to utilize the results of research for development purposes.
- To enhance networking to discover, develop and disseminate technologies to strengthen the contribution of potato and sweetpotato to the socio-economic development of participating countries.

## THE ASPRAD SET UP

The ASPRAD is governed by a Coordinating Committee (CC) that acts as the policy making body. This committee consists of one representative each of the member countries, one of CIP and one of ACIAR. The committee's chairmanship is rotated annually, with the chairman's country hosting the annual meeting.

The CC is assisted by a technical Committee consisting of the ASPRAD Coordinator (Chairperson) and one project leader from each member country. The two committees' annual meetings are usually held jointly. The host country also co-sponsors the holding of the annual meetings in terms of logistic support and technical backstopping.

CIP serves as the program's implementing agency and appoints the coordinator in consultation with the CC.

The ASPRAD coordinating office (CO) is based in the Philippines. The Philippine Government through the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD) serves as host providing logistic support and office space. The CO is headed by the coordinating scientist (CS). It consists of 2 technical staff, 1 secretary, 1 support staff. The CS serves as the principal adviser to the implementation of the ASPRAD program which is funded by the member countries with additional financial and technical support from ACIAR and CIP.

## COLLABORATING MECHANISMS

The regional activities are mainly carried out by the ASPRAD member countries through the National Agricultural Research Systems (NARS) with technical assistance from CIP and technical manpower from the implementing institutions of the network. Among the agencies and organizations that ASPRAD has had



collaborative work are the Horticultural Crop Research and Development Institute (HORDI) in Sri Lanka, AARD-Central Research Institute for Food Crops (AARD-CRIFC) in Bogor, Malaysian Agricultural Research and Development Institute (MARDI), Department of Agriculture and Livestock (DAL) in Papua New Guinea, Horticultural Research Institute of Department of Agriculture (DA) in Bangkok, CIP-Bogor, Rootcrop Research Center of Vietnam Agricultural Science Institute (RCRC-VASI), Chinese Academy of Agricultural Sciences (CAAS) in Beijing, Indian Council of Agricultural Research (ICAR), PCARRD and ACIAR.

## THRUSTS AND ACCOMPLISHMENTS

ASPRAD underwent three phases in 15 years of implementation. During Phase I (1982-1986), the program was research-oriented and consisted of five initial projects, each representing a problem area and assigned to a lead country; namely: 1) breeding for lowland potato (Philippines); 2) tropical agronomy (Indonesia); 3) true potato seed (Sri Lanka); 4) storage and utilization (Thailand); and 5) practical seed production (Papua New Guinea). The Philippines through its breeding program provided the genetic materials for the establishment of a successful potato breeding and selection program for the lowland tropics, while Thailand generated technologies of storing potato using diffused light stores (DLS). On the other hand, Papua New Guinea and Sri Lanka established the seed scheme for the local farmers and developed/bred hybrid TPS families respectively. The agronomic methodologies such as modifying soil temperature, use of fertilizer and intercropping potato with other crops, were developed by Indonesia.

Phase II (1987-1991), on the other hand, was focused more on the transfer of technologies developed by the collaborating countries. The technology transfer was initiated by the CO, hence the research in Phase II was assigned to the NARS, apart from the breeding program in the Philippines. Malaysia which joined the program in 1988 was assigned to develop appropriate machinery for small farm potato production.

Phase III thrusts on potatoes were on 1) low cost high quality seed; 2) sustainability of tropical highland potato production; 3) appropriate production and marketing systems for the lowlands and mid-elevation; 4) variety development and testing; and 5) regional projects which involved training in several areas,

publications, meetings, workshops and study tours. In the case of sweetpotato, the objectives were: 1) development of sustainable cropping systems with rice under rainfed conditions; 2) development of cropping system with upland crops under rainfed conditions with one of the principal successes as the development and distribution of new germplasm to the cooperating countries made available to farmers, and 3) development of a strong regional program and interactive framework. The accomplishments in this area were the development of rigorous variety evaluation procedures, a critical step in the ultimate goal of establishing a sustainable regional sweetpotato variety development and establishment of an evaluation network. This coordination has now expanded in the form of a separate regional network on Sweetpotato named ANSWER (Asian Network on Sweetpotato Research) based in Indonesia.



*Sweetpotato farmers—field visit in the Philippines*

## ASPRAD TRANSITION PHASE/NETWORK SUSTAINABILITY

In the span of 15 years, the network has shown dynamism and successfully fastened close linkages among R&D workers in eight Asian countries and achieved breakthroughs that substantially contributed to the development of the potato and sweetpotato crop industries in the region. To sustain the network activities, the Asia Pacific Association of Agricultural Research Institutions (APAARI) Board approved ASPRAD's proposal to support ASPRAD activities at a minimal level while a more permanent network structure under the APAARI framework is being developed in a consultation process between the CC of ASPRAD and



*Potato harvester adopted in Thailand*

leadership of APAARI and project funds are being secured. The transition phase activities are focused on information and scientific exchange, continued communication with cooperating workers and national program leaders, preparation of potato and sweetpotato abstract-bibliography, proceedings of the ASPRAD Transition Phase Coordinating Committee Meeting, and preparation of a Catalogue of Potato germplasm.

In 1997, the ASPRAD transition phase is being operationalized under the APAARI framework, while PCARRD through the office of the Executive Director together with CIP – Los Baños, coordinates with the CC to pursue the interim activities. The NARS, on the other hand, continue the implementation of breeding activities and some aspects of research components as part of their national programs.

## Free Internet Link for NARS

National agricultural research institutions that have access to e-mail facilities can now be represented, at no cost to them, by a home page on the World Wide Web. This innovative service was announced by the International Service for National Agricultural Research (ISNAR). The service will facilitate inter-institutional communications and enable the national systems to disseminate research information.

ISNAR will work with the developing country agricultural research institutions to develop the home pages and then link them with ISNAR's own Web site. An associated electronic connection via e-mail will enable interested parties to get in touch with the respective institutes. As such, the service will provide the research institutes with greater visibility globally, as well as greater accessibility electronically via e-mail.

ISNAR decided to develop the Web site because of a growing number of requests for information and services from developing countries. ISNAR will also use the Web site to allow many of its latest publications available worldwide to be read, downloaded, and printed.

Another aim is to establish and moderate e-mail discussion fora on topics related to agricultural research. Management of biotechnology research and agricultural research priority setting are the first two active forum topics. National agricultural research institutions throughout the world can apply to take part in the ISNAR Web page project or discussion forums by contacting [ISNAR@CGNET.COM](mailto:ISNAR@CGNET.COM). ISNAR's publications catalogue and other institutional information can be accessed at <http://www.cgiar.org/isnar>. (ISNAR)(CGIAR News Sept. 1997)

## ANNOUNCEMENT

### International Workshops and Conferences

- International Workshop on 'Assessing the Impact of Agricultural Research on Poverty Alleviation' 14-16 September 1999, CIAT, Cali Colombia. e-mail: [g.scobie@cgnet.com](mailto:g.scobie@cgnet.com)

The information and insights that emerge from this workshop will be used to better enable international centers and their national research partners to target projects to specific groups, such as low-income farmers and women, and to gauge the impact of this work.

- Third International Crop Science Congress 2000, August 2000, Hamburg, Germany. e-mail: [cropscience@cch.de](mailto:cropscience@cch.de)

This congress is a follow up to the first congress held in 1992 in Iowa and the second held in New Delhi in 1996. The congress will present current findings across a variety of systems, scales and interactions. At the same time, the participants will strive to identify the targets and research opportunities which will be needed to address the problems of the 21st century and to determine how these changing needs can be best met through crop science.





*Dr R.S. Paroda, Director-General, Indian Council of Agricultural Research receiving the prestigious Padma Bhushan Award from the Hon'ble President of India Shri K.R. Narayanan, April 12, 1998 in New Delhi*

The President of India has recently conferred the prestigious national award 'Padma Bhushan' on Dr R.S. Paroda, a renowned agricultural scientist and research administrator of international repute. Presently Dr R.S. Paroda is serving as Director-General, Indian Council of Agricultural Research (ICAR) and Secretary, Department of Agricultural Research & Education (DARE), Government of India. Dr Paroda is also recipient of ICAR's prestigious Rafi Ahmed Kidwai Memorial prize, ICAR team research award, FICCI Award, Om Prakash Bhasin Award, Sir Chotu Ram National Award, Asia Pacific Seed Association Special Award, World Food Day Award and Raj Krishto Dutt Memorial Award.

He has edited eleven books and is an author or co-author of more than 200 research papers, articles and bulletins. A large number of Indian Scientific Societies have elected him to their Presidencies. These are : Genetics and Plant Breeding, Plant Genetic Resources, Oilseed Research, Forage Research, Plant Physiology, Biochemistry and Biotechnology, Microbiology, Allelopathy, Desert Technology and Agricultural Statistics. The prestigious National Academy of Agricultural Sciences (NAAS) has also elected him as its President. Dr Paroda has recently been elected as the Fellow of the Third World Academy of Sciences (TWAS), Italy.

Dr Paroda is also presently the Executive Secretary of the Asia-Pacific Association of Agricultural Research Institutions (APAARI). Dr Paroda was the Chairman of the Governing Board of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

and presently is continuing as Vice-Chairman. He is also serving as a member on the Policy Advisory Council of the Australian Centre for International Agricultural Research (ACIAR) and the Finance Committee of the Consultative Group on International Agricultural Research (CGIAR). He is also a member of the International Scientific Advisory Committee for the Eco-regional fund established at ISNAR. Recently, he has been appointed as a member of the CAB International Governing Body. He also served on the Board of Trustees of the International Rice Research Institute (IRRI) for the period 1990-93 and was on the Boards of Management of organizations such as Indian Agricultural Research Institute (IARI), Haryana Agricultural University, Rajasthan Agricultural University, National Seeds Corporation (NSC), State Farms Corporation of India (SFCI), etc.

Currently as Director-General, ICAR & Secretary DARE, Dr Paroda is paying his utmost attention towards renewal of one of the largest National Agricultural Research Systems (NARS) in the World. Perspective Plan formulation for 2000, human resource development, technology assessment, refinement and transfer, decentralisation with effective integration with a well laid out system of freedom, flexibility and accountability, modernisation, information management, efficiency, monitoring, creation of incentive & reward system are his current priorities. Under his leadership, a visionary National Agricultural Technology Project (NATP) has been finally negotiated with the World Bank for US\$ 240 million, which is the largest such project for research ever funded by the bank for a developing country.

# INDIA-CIMMYT DAY

## APRIL 12-14, 1998 NEW DELHI

**I**ndia-CIMMYT Day was organized by the Indian Council of Agricultural Research (ICAR) and the International Maize and Wheat Improvement Centre (CIMMYT) Mexico. About 250 delegates from India, CIMMYT and other international organizations took part in the deliberations. These included Nobel Laureate Dr Norman E. Borlaug, Shri C. Subramaniam, Dr R.S. Paroda, Prof T.G. Reeves, DG CIMMYT, Dr M.S. Swaminathan and many other eminent

partnership in wheat and maize research has paid rich dividends primarily through the flow of germplasm, new knowledge and approaches. The main thrust areas identified were : expanding genetic base through use of gene pools of allied species; breeding varieties for rice-wheat cropping system and for new tillage options; optimising the use of inputs, emphasis on durable resistance and breaking yield barriers through hybrid breeding, new plant type in wheat, and the development of cultivars suitable for different agro-climates including single crosses; combining high yield with resistance/tolerance to biotic and abiotic stresses; development of genepools and vigorous inbred lines; seed production technology; and diversification of genetic base of different types in maize. Dr Borlaug expressed his view that the next green revolution will be in maize.

The application of biotechnology, characterization of genetic diversity, interactions with socio-economists, research priority setting, improving product targeting, enhancing spillover effects, and human resource development were also identified as key issues for collaboration.



*A view of the Plenary Session chaired by Dr S.R. Hashim, Member Secretary, Planning Commission*

scientists. The function was inaugurated by the Honourable Minister of State for Agriculture, Shri Som Pal. Dr S.R. Hashim, member-secretary, Planning Commission was the Chief Guest at the Valedictory Function.

The Honourable Minister gave the guidelines for future research and development activities. Dr. Paroda, Chairman of the Inaugural Session, emphasized the need to break yield barriers through hybrid breeding, restructuring plant type, development of cultivars with specific adaptation to agro-climatic regions and cropping systems and application of new technologies, such as biotechnology, GIS technology, information technology, etc..

In addition to three special lectures, active and intensive deliberations took place in various sessions on reminiscences of Indian-CIMMYT collaboration and several technical issues. From these it emerged that



*Dr Norman Borlaug honoured by Shri Sompal, the honourable Minister of State for Agriculture*

A press conference was held on 12th afternoon as a curtain raiser event. At this function, Drs Paroda and Reeves also signed the ICAR-CIMMYT joint workplan for 1998 to 2000.

The Fourth Steering Committee Meeting of the Network for Underutilized Tropical Fruits of Asia (UTFANET) was held at the Horticultural Research Institute, Department of Agriculture, Bangkok, Thailand on 23-24 April, 1998. Countries represented were: Philippines, India, Indonesia, Sri Lanka, Nepal, Thailand, Vietnam and the new member Pakistan. Unfortunately the Bangladesh representative could not attend the meeting. Dr Peter de Groot of the Commonwealth Science Council (CSC), Dr N. Haq, Coordinator and also representative of ICUC and Dr Ken Riley from IPGRI were also present. The meeting was chaired by Dr William Dar, Chairman of the Committee. The welcome address was given by the Director of the Institute.

The coordinator in his report thanked CSC, APAARI and ICUC for their support during 1997 and highlighted the activities carried out during 1997: the publication of newsletters, bibliography and the proceedings of 1st Bangkok meeting; supporting a joint training course on conservation, management and utilization of tropical fruit resources and development of a project document in consultation with the national coordinators for submission to IFAD. Dr Riley then outlined IPGRI's activities on tropical fruits in the region and summarized past collaboration with ICUC and UTFANET. He felt that partnership between IPGRI and UTFANET would facilitate the conservation and use of genetic resources of UTFANET's priority species and will avoid overlaps. IPGRI could collaborate with UTFANET under the arrangements drawn up in the Memorandum of Agreement (MoA) for the support group.

UTFANET has now 8 signed up members and Pakistan will sign the MoA soon. Myanmar and China had indicated that they might become members at a later stage. Cambodia had been present at the 2nd UTFANET meeting as an observer. Malaysia has not signed the MoA yet but it has considerable expertise as well as genetic resources and would be a valuable member of UTFANET. Efforts should be made through various channels to encourage Malaysia to join. It was felt that 9-10 countries would form a good core group with which to begin sound projects. Once up and working, other countries would be encouraged to join.

The newsletter will have a specific theme from now on. The next issue will have genetic resources (collection, characterization and evaluation),

conservation, management and utilization followed by the second issue on production, postharvest technologies and marketing aspects. The issue on genetic resources will be produced in September and the deadline for contributions is 14 July 1998. UTFANET will produce the country technical reports.

It was felt that an information leaflet on UTFANET was needed to promote and highlight the philosophy and work of UTFANET. This leaflet will be produced soon.

It was agreed that efforts should be made to organize two training courses as soon as possible and these are on (1) field genebank management and (2) post-harvest technology.

IPGRI can play a role in the development and publication of Descriptors of UTFANET priority species. IPGRI would look into the authentication and joint publication of draft Jackfruit Descriptors developed by Bangladesh. IPGRI could help UTFANET with the collection and dissemination of germplasm and also dissemination of genetic resources information. UTFANET and IPGRI can organize joint training courses.

The concept of ICUC, APAARI and IPGRI (and other organizations) as "parents" for UTFANET was agreed in principle. Each organization would contribute according to its mandate in three broad areas in order to further the goals and activities of UTFANET, namely genetic resources, production and post production.

IFAD had signalled its willingness, in principle, to support an UTFANET proposal and the meeting discussed and developed a project proposal on "Regional partnership research and development of selected underutilized tropical fruits in Asia" and this will be submitted to IFAD with the endorsement of APAARI. The proposal includes exchange, characterization, testing, and increased use of elite varieties, development of new propagation methods including micropropagation, socio-economic and market studies, human resource development and capacity building.

It was felt that the Secretariat will remain in UK until a suitable location in Asia is found or until ICUC HQ moves to Asia.





## **NATIONAL AGRICULTURAL RESEARCH INSTITUTE (NARI)** **PAPUA NEW GUINEA**

NARI is a public funded statutory research organization developed under the Ministry of Agriculture and Livestock by the Government of Papua New Guinea for:

- conducting applied, adaptive and development oriented research on food crops, livestock, alternative food and cash crops and resource management issues; and
- providing technical, analytical and diagnostic services and information to the entire agriculture sector in PNG.

NARI was established by an Act of the National Parliament on the 31st July 1996 and was officially launched on the 5th May 1997. The formation of NARI was one of the major development initiatives of the PNG Government to bring about sustainable development in the agricultural sector and for realization of the national goals and directive principles.

### **THE MISSION**

The mission of NARI is to contribute, through operational research and technical programmes, to the development of the agriculture sector and realization of the national goals and directive principles by generating, identifying, adapting and transferring agricultural technologies and information.

As a research institute, the mission statement embraces in particular the following main objectives.

- (a) NARI vigorously pursues appropriate inquiry in agricultural sciences and professional fields and disciplines. This involves the conduct of appropriate and applied research activities to enhance the productivity, efficiency, stability and sustainability of the smallholder agriculture.
- (b) NARI aspires to foster the general improvement of the welfare of Papua New Guineans, especially of rural families and communities who depend on agriculture for their livelihood.

In pursuit of its mission, NARI deals specifically with food crops, livestock, alternative crops and resource management issues. The work is done by taking a farming systems perspective, so that all aspects of the farm-household system and its environment are considered, including questions of resource productivity and sustainability.

### **THE OBJECTIVES**

The main objectives of the Institute are:

- to generate, adapt and promote the use of appropriate and improved agricultural technologies;
- to provide essential technical and analytical services for development of the agricultural sector;
- to develop and promote ways of improving quality, post-harvest handling, processing, and marketing of crop and livestock produce;
- to maintain, conserve and utilize the diversity of genetic resources for agricultural development;
- to update and maintain national inventory on soil resources and recommend appropriate uses and management of these resources;
- to develop appropriate farming methods and practices for improvement of smallholder semi-subsistence agriculture;
- to provide agricultural information services, extension service support and other technical assistance to agricultural sector;
- to draw attention to constraints to the sustainable development of smallholder agriculture; and
- to formulate national agricultural research policies, define sectoral research priorities and recommend allocation of funds for agricultural research.

### **THE FOCUS**

The focus of the Institute's research is on the smallholder semi-subsistence farming sector in the rural areas of the country. This arises out of well-perceived and real concern that:

- the need to transform smallholder agriculture through increased on-farm productivity is important and that requires a significant, well targeted and effective agricultural research programme;
- the smallholder semi-subsistence farmers are going to be the main source of agricultural growth, gainful employment, foreign exchange, improved income distribution, overall rural development and broad-based socio-economic development;
- the integration of subsistence and semi-subsistence smallholder sub-sector into market cash economy is crucial to ensure fair competition and efficient use of resources; and
- the need is to help these smallholders to work towards food security, commercialization, market integration, resource management, stability and overall sustainability.

## RESEARCH PROGRAMME STRUCTURE

Based in Lae, NARI has two regional research programmes—highlands and lowlands—which are further categorized into five sub-regional research programmes viz., highlands, high-altitude highlands, wet-lowlands mainlands, wet-lowlands islands and dry-lowlands. Various technical, analytical and diagnostic services have been provided from laboratories located at Kila Kila in the National Capital District.

### Agro-Ecological Approach

Research programmes of NARI are regionally based in order to consider area specific constraints, needs, resources, opportunities and potentials and to develop and adapt appropriate technologies for different agro-ecological regions of the country. There are two main regions and five sub-regions.

- A. Highlands programme has two sub-regional programmes: the main highlands programme coordinated from Aiyura; and the high-altitude highlands programme coordinated from Tambul.
- B. Lowlands programme has three sub-regional programmes: the wet-lowlands (mainlands) programme coordinated from Erap; the wet-lowlands (islands) programme coordinated from Keravat; and the dry-lowlands programme coordinated from Laloki.

### Adaptive Research with Systems Perspective

In order to address the complexity and diversity of smallholder farming environment, work of the Institute is carried out from a multidisciplinary systems perspective. Most of the work is applied, adaptive, problem solving and demand driven.

## Research and Development Integration

NARI has the ability and flexibility to establish linkages and integrate the research programmes with development by having:

- a strong component of information, communication and research-development integration (ICRDI);
- a mechanism of effective on-farm adaptive research, information and liaison, farmer-extension training; and
- a process of testing production and marketing systems and of enterprise development.

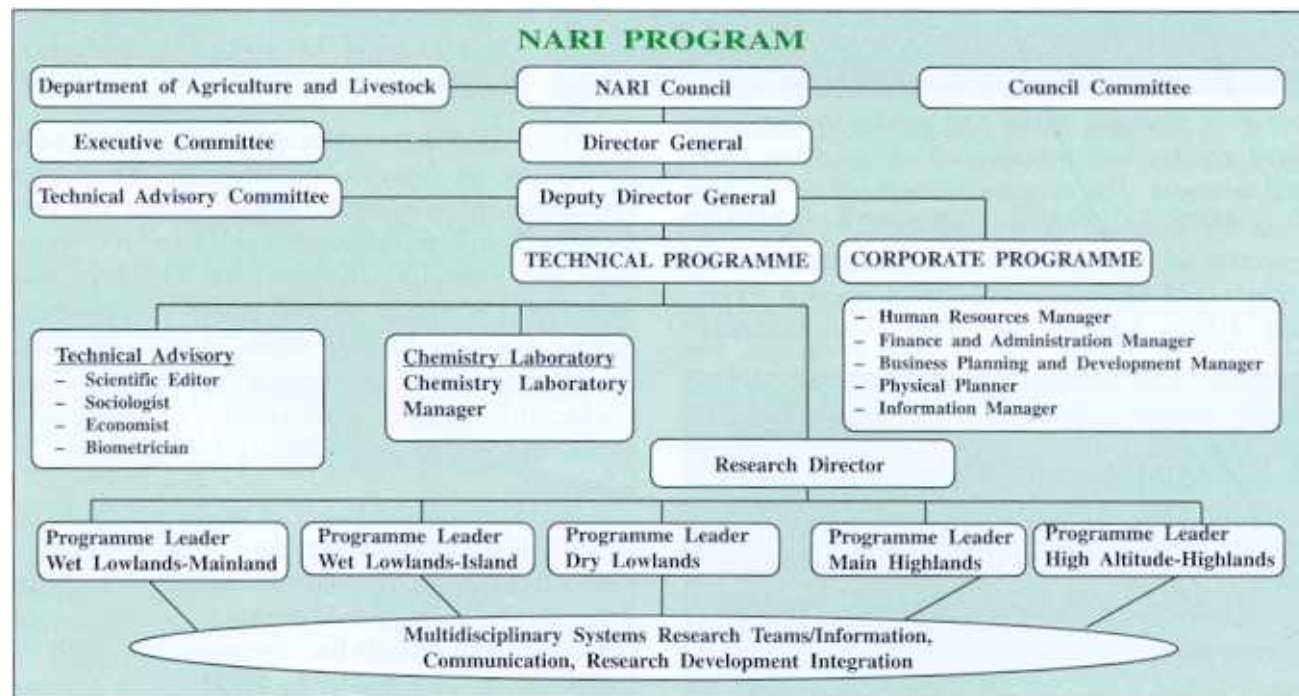
To facilitate effective development, NARI:

- acts as a catalytic agent in the development process at local, district and agro-ecological area levels;
- undertakes pilot extension projects in NARI generated technologies;
- has a mechanism for organizing contractual extension by private and non-governmental organizations;
- provides advisory and consultancy services in its areas of expertise; and
- selectively develops business enterprises by entering into partnerships with the private sector.

## PARTNERSHIP AND ALLIANCES

NARI facilitates close linkage and forges partnership alliances between scientific community and various developmental agencies such as extension, government departments, universities, NGOs, processors, credit institutions and marketing organizations.

Institute's programmes are expected to lead towards self reliance, food security, import replacement, export orientation, improved income distribution and broad-based domestic economic growth.



## AGRICULTURAL RESEARCH PAYS HIGH DIVIDENDS

**P**ast investments in agricultural research have been very rewarding, generating higher rates of returns than those in other competing investment opportunities. And there is a strong case to raise agricultural research investment to at least 1% of the agricultural gross domestic product from its current level of 0.42%. Are returns to further investments in agricultural research going to be equally impressive? To address this question, the National Centre for Agricultural Economics and Policy Research had undertaken an Ex-ante economic evaluation of research on hybrid rice and rice-wheat system. These two have been accorded high priority under the National Agricultural Technology Project (NATP). The projections are based on conservative but informed assumptions about potential yield gains, probability of research success, research costs, adoption lags and obsolescence.

Rice hybrids have demonstrated a yield advantage of about 1 tonne in the northern region and 1.5 tonnes or more in the southern regions. It is expected that these hybrids would occupy about 5 million hectares in the irrigated regions in the next decade. With these assumptions, it is estimated that further investment in hybrid rice research would generate an internal rate of 135% return. A large part of these benefits would be transferred to consumers in the form of lower rice price. Thus, hybrid rice research would strengthen national food security and benefit poor consumers, besides generating attractive rates of return.

Rice-wheat system is a priority area because of its contribution to national food security. This is constrained by new production stresses in the system, the yield potential, tillage and residue management, weed control and management of irrigation water and nutrients. The on-going research efforts in these areas are proposed to be augmented by additional resources under the NATP. This additional research effort would increase probability of research success and shorten research lag. With these reasonable

assumptions benefits to incremental research investment under the NATP have been estimated and are as given in the Table.

Internal rate of return (%) to incremental investment in rice-wheat system research		
Research area	High productivity region	Low productivity region
Development of rice variety	109	85
Development of wheat variety	65 79	70 *
Weed control	74	62
Water management	48	45
Nutrient management	68	56
* Tillage and residue management is not a priority area for low productivity region		

The rates of returns are higher for crop improvement research because of the expected higher level of adoption of new varieties. They are slightly lower in low productivity regions, comprising eastern Uttar Pradesh, Bihar and West Bengal; because of relatively higher project costs and lower adoption ceilings. If technology adoption is increased in these low productivity regions on areas, by strengthening transfer of technology system, research benefits would be accrued to consumers through lower prices.

These impressive rates of returns and wide distribution of benefits support case for higher investment in agricultural research. While the case for research on high-value crops could be even stronger, these two examples illustrate that foodgrains also offer highly attractive income growth opportunities. Besides monetary benefits, other benefits like food security, improved equity through development of low productivity regions, sustainability of production system and several other indirect benefits would be substantial.

Dr Suresh Pal, Senior Scientist  
National Centre for Agricultural Economics and Policy Research (NCAP), Pusa Campus  
New Delhi-110 012, India  
(ICAR News, January-March, 1998)

*The National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi, India is a key centre with the mandate to undertake above kind of studies highlighting national concerns.*



# INTERNATIONAL WORKSHOP ON WTO AGREEMENT ON AGRICULTURE

## April 30-May 2, 1998, New Delhi

Organized jointly by Research and Information System for the  
Non-Aligned and Other Developing Countries, India, ActionAid, India  
and Institute for Agriculture and Trade Policy, USA

**T**he agricultural sector, the world over, is on the threshold of major changes as the multilateral discipline underlined by the WTO is extended to this sector. Although the broad framework of the policy regime which the WTO seeks to introduce in this sector has been set out in the Agreement on Agriculture, some of the critical elements of policy in the WTO regime on agriculture form part of several key agreements formalised at the conclusion of the Uruguay Round negotiations. These issues need close consideration as countries carry out the commitments that have entered into the problems that they could encounter in meeting the commitments. This can be regarded as the first step towards preparing the ground for the review of the Agreement on Agriculture, as also the other key Agreements, that is due in the next couple of years and which could have a bearing on the future of this sector in developing countries, in particular.

The inclusion of the agricultural sector in the Uruguay Round negotiating mandate, marking a departure from the past when this sector was left outside the purview of the GATT's rule-making authority, was made with the explicit consideration that the distortions in policies pertaining to this sector need to be addressed. The conclusion of the Uruguay Round of GATT negotiations has, however, left many of the issues unanswered. One of the key issues that emerged in the late eighties, and which held centre-stage in the Uruguay Round negotiations pertaining to agriculture, was the large volumes of subsidies that developed countries were providing to their farm sector. These subsidies were quite high for several specific product categories. In such a situation it was felt that the Uruguay Round agreement would suggest effective mechanisms for reining in the high subsidies of the developed countries. But with the US and the EU eventually agreeing on a considerably small reduction in the overall levels of subsidies that they were providing before the commencement of the Uruguay Round, the subsidy discipline remains largely unfulfilled. Such high levels of subsidies would not augur well for developing countries on two counts. One, the potential exports of countries that have emerged as competitive players in the global market would be affected by the subsidised produce of the two of the largest exporters in the market. And,

two, countries which have to comply commitments such as removal of quantitative restrictions on imports might face the threat of their domestic production systems being priced-out while trying to compete with cheap imports.

The pressure from the WTO discipline raises the above mentioned challenges for developing countries many of which have been beset with the problems caused by the process of globalization. The impact of globalization on the agricultural sector in developing countries can be seen at various levels. In the first instance, developing countries are being encouraged to produce those commercial crops which go as inputs to the food processing industry. As a consequence, in India, as in many other developing countries, there has been a perceptible decline in the acreage under staple crops in recent years. This would fundamentally affect the orientation of some of the large developing countries, including India, which had made realisation of food security as the prime objective of policy. The consequence of the above mentioned phenomenon needs consideration. The move away from production of staple crops would lead to a greater dependence on imports, resulting in the equalisation of the domestic and international prices of the agricultural commodities. It is being feared that the international prices which have remained so volatile would adversely affect the food security in the developing countries by reducing the scope of the state to take any manoeuvre for controlling the instability of prices. This is likely to become more problematic when, under the structural adjustment programme, states are being advised to replace the buffer stock policy by the one in which reliance is put on trade. Moreover, the erratic behaviour of the international commodity market has proved their producer to be at a loss in many ways.

The tendencies mentioned above could be reinforced in some of the more advanced among the developing countries, such as India, who have supported their agricultural sector with a strong indigenous R&D base built largely around the public sector. With increasing privatisation of research and the consequent involvement of the large transnational corporations in the seed industry in these countries, structural changes are afoot in this area. This process has been accentuated by the

introduction of biotechnology, regarded by many as the technology of the future. The implications of the above mentioned process would be worth looking at. Particularly important in this regard would be the examination of the two contentious issues. One, the technology that the corporations bring would intensify the polarisation between the large and the small farmers. And two, the regime would strengthen the control of the conglomerates, among others through the proposed regime of intellectual property rights, which could in its turn impede the design and innovation capability of the public sector (in house) R&D units, the prime movers in technology generation in most developing countries.

The above issues found reflection in the Workshop through a number of case studies that were presented.

The countries covered in the case studies included those from three continents, Latin America, Africa and

Asia. The studies revealed that several countries were faced with difficult processes of adjustment in the agricultural sector in the policy regime defined by the WTO. A major outcome of the Workshop was that concerns of the countries stemming from the difficulties they have been encountering would be taken up in a sustained manner in the process of negotiations in the WTO that leads up to the review of the agreements that impinge on the future of agriculture in developing countries.

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### MESSAGE FROM INDIAN NARS TO IFAD ON ITS 20TH ANNIVERSARY

The International Fund for Agricultural Development (IFAD) has played a crucial role in the development of sustainable rice farming systems for the rainfed regions of India. With the financial assistance from IFAD and the technical support from the International Rice Research Institute, the Indian Council of Agricultural Research, State Agricultural Universities (SAUs) and selected NGOs in eastern India – Assam, Bihar, Orissa, West Bengal, eastern part of Uttar Pradesh and Madhya Pradesh – were able to launch a collaborative research program to cater to the technological needs of rainfed rice farming communities.

This program through IFAD support provided the forum for the international and national agricultural research systems, local NGOs and farmers to jointly take the responsibility of handling the problems and to design the need-based technologies. It enabled the research and development partners in eastern India to fully operationalize the multidisciplinary, participatory on-farm research approach for addressing

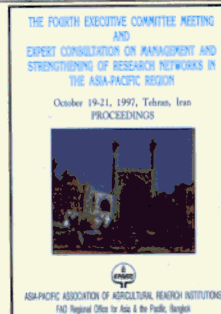
the problems of poverty-stricken marginal and small farmers in diverse rainfed ecologies.

The IFAD support over a period of seven years provided opportunities for skills enhancement of more than 500 scientists in various disciplines and for upgrading the farming skills of scores of farmers in the region.

Over these years, the program has been able to effectively characterize the rice growing environments and prioritise the research issues. It has developed improved technologies for the respective environments in each of the major rice ecosystems and has delineated the application domains of the technologies in the six states of eastern India which cover a rice area of more than 28 million ha and on which 480 million people totally depend for their livelihood. The eastern India program which was launched through the IFAD support only seven years ago has now become a concept and a methodology for doing multidisciplinary participatory research for the disadvantaged areas.



NEW  
APAARI PUBLICATIONS





## 7TH ASIAN REGIONAL MAIZE WORKSHOP

### LOS BAÑOS, PHILIPPINES, FEBRUARY 23-27, 1998



*Participants attending the 7th Asian Regional Maize Workshop*

The seventh Asian Regional Maize Workshop was held in Los Baños, Philippines during February 23-27, 1998. This workshop was jointly sponsored by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and CIMMYT Asian Regional Maize Programme. The Workshop was attended by more than 170 participants from as many as 17 countries including special invitees which included the Director Generals of International Maize and Wheat Improvement Centre (CIMMYT), PCARRD, International Rice Research Institute (IRRI) and Indian Council of Agricultural Research (ICAR). The theme of the workshop was "Strengthening Hybrid Maize Technology and Public - Private Partnership to Accelerate Maize Production in the Asian Region".

The workshop deliberations were conducted in eight sessions held in the workshop. These were: Inaugural Session, Strengthening the Public-Private Maize Research, Hybrid and New Bioscience Technologies, Breeding for Abiotic Stresses, Maize Agronomy Research, presentation of Country and Seed Industry Reports and Specialty Corn.

The maize programme leaders of the respective centres presented their reports in which they highlighted the progress made and the problems faced. During the course of deliberations, it was emphasized that there

is hardly any possibility of vertical expansion of the area under maize, the only possibility therefore left is to increase the per unit productivity to meet the growing demand of maize, not only for the food but for the industries, poultry and piggery as well. To overcome the problem of low productivity almost all speakers emphasized a strong need for sustainable corn production. To meet the ever increasing demand of corn in this region, the measures suggested were development of single cross hybrids of required maturity and the management of biotic and abiotic stresses which are responsible for lowering the maize yields appreciably in the region. The specific stresses were identified and debated to develop suitable strategies to contain them. In this direction, the CIMMYT has entered into various collaborative projects of regional importance in which India has to play a major role.

### HACCP IN AGRICULTURE

Today, the Hazardous Analysis and Critical Control Point (HACCP) based system is considered to be one of the most effective and efficient ways to enhance the safety of food. It has direct application to official food control, industry quality control and assurance, and for establishing food safety standards in the international food trade. Many importing countries have initiated measures which require the use of the HACCP based system or its equivalent as a mandatory system for food being offered for export to their countries. This system, when applied appropriately, can be utilized to reduce, eliminate or minimise hazards associated with foods and is expected to overcome those food safety problems that have been very prominent in news media accounts of food borne poisoning outbreaks all over the world in recent months.

Utilising the HACCP based system at all levels of the food chain is expected to provide the needed level of protection for consumers against most food safety hazards.

HACCP as it is defined is mainly used in food processing context. However, it has been suggested to use the HACCP concept to enhance and ensure food quality control right from the farm. In the next issue of the APAARI Newsletter we intend to discuss the appropriateness and feasibility of quality control at the farm level using HACCP or other accepted systems.

*We would appreciate your experiences and thoughts on this matter. Please send us your inputs.*



## **TRANSPLANTING MAIZE IN VIETNAM**

### **INTRODUCTION**

Maize in Vietnam is grown almost all over the country ranging from northern/northeastern mountainous tract to Mekong delta in the extreme south. However, the Red River delta, the central plateau and the Mekong delta offer a great potential both for yield increase and area expansion, as three crops of maize can very easily be grown here. Besides increasing the genetic productivity of the crop, efforts are directed on developing proper agronomic practices to enhance total production. With the development of transplanting technology for winter maize in wetlands, it has become now possible to raise a winter crop of maize in wetlands, after two crops of rice in the Red River delta.

### **ADVANTAGES OF RAISING NURSERY FOR TRANSPLANTING**

- Large field bands and canal bank surfaces are put to effective use to raise nurseries.
- Ten days time is saved for maize growing in main fields
- Selection of good seeds and raising of vigorous seedlings ensure a good plant density and better weed control in transplanted maize.
- Time is saved in land preparation

### **TRANSPLANTING TECHNOLOGY**

The following steps are critical for success of transplanting:

- Selected varieties should have a high yield potential and are adaptable to the agro-ecological conditions. The duration of maturity of varieties should be such that the pollination is completed before the onset of cool temperatures in November.
- Seed should be genetically pure and healthy.
- 15-20 kg of seed is required for transplanting of 1 ha to maintain a population of 55,000 to 60,000 plants per hectare.
- Seeds are soaked in water for 12 hours, the swollen seeds are then allowed to germinate, which takes about 36 hours. When the sprouts are 1 cm long, the germinated seeds are gently washed with clean water and sown in cake like squared mud patches.
- Planting time is crucial, in northern Vietnam the winter maize nursery must be established in September and should be transplanted before 10 October.
- The seedling nursery should be located near the field to minimise transportation cost of seedlings.

- The size of nursery depends on the quality of seed to be sown. The nursery bed should be flat and free from weeds. The levelled nursery beds are covered with banana leaves or polyester sheets and equal amount of mud and well composted farm yard manure is spread uniformly over it, the depth of mud and manure mixture on the bed should be about 7 cm. As soon as the mixture is dried out on the surface, it is cut into square pieces like cake. The size of the cakes may vary from 5x7x7 cm to 5x5 x7 cm depending upon the duration of time for which seedlings are to be kept.
- Each mud cake is planted with one pre-germinated seed in the centre at the depth of 1 cm and is covered with pulverised soil.
- Soon after the harvest of second rice crop, the field is ploughed, raised flat beds of 1 to 1.2 cm in width, running across eight furrows, are then prepared using hoes and proper care is given to provide adequate drainage. Adequate pulverised mixed fertiliser, comprising well composted farmyard manure and super phosphate is applied for supplying proper nutrients to the younger seedlings.
- The optimum age of maize seedling for transplanting is 7 days.
- The recommended plant to plant spacing is 25 cm and row to row 70 cm, which is enough to raise about 55,000 plants per hectare.
- For an expected yield of 4 to 5 tonnes/ha, the recommended doses of fertiliser are 100 kg N, 60-80 kg  $P_2O_5$  and 20 kg  $K_2O$ , plus 5 to 10 tonnes of FYM.
- Proper weed, disease and pest control methods should be followed.

### **BENEFITS OF THE TECHNOLOGY**

- The average yield of the open pollinated varieties (OPVs) increased from 2.2 tonnes/ha to 3-5 tonnes/ha, while in case of hybrids the average yield ranged from 5 to 7 tonnes/ha the area under maize also increased considerably.
- It led to grow one more additional food crop per year which added 200,000 tonnes of maize grain annually to the national kitty.
- It created more employment for people in the rural areas.
- The varieties yielded more green fodder for cattle after winter, and provided 7-8 tonnes/ha more maize stalks for fuel consumption.
- The by-products such as husk could be used for making carpets and rugs.

## NEWS FROM OUTSIDE THE REGION

CIMMYT and its research partners help farmers to feed not only their families but also the world. Our mission is to increase the productivity, profitability and sustainability of maize and wheat farming systems in developing countries, while protecting the natural resources upon which agriculture is based.

The impact of our research partnerships has been beyond dispute, especially in Asia, where collaborative research made the wheat revolution a reality in farmer's fields, delivered downy-mildew-resistant maize to countless farmers, and countries making maize and wheat more affordable for poor consumers in many countries. Several new areas of research show promise to carry on this tradition of collaborative achievement and impact in future. Some of this research may initially focus on areas outside Asia, but eventually many of the technologies and methods described here will benefit APAARI member countries.

Research on raising wheat yields to new heights focuses on building a new plant architecture, unlocking hybrid vigour, and releasing the potential of genetic resources to enhance yields (for example, through crosses between wheat and wild relatives). This work is complemented by research on wheat management technologies for favoured and marginal environments. For example, special raised bed planting systems offer great potential for irrigated wheat environments such as north-western Mexico and South Asia, and reduced and zero tillage shows potential in marginal environments of Eastern Africa.

Improved tillage practices are also the focus of natural resources research in South Asia, under the auspices of the Rice-Wheat Consortium. Researchers are investigating how alternative tillage and crop establishment practices for wheat grown after rice may affect soil fertility and crop productivity over time. Through participatory experimentation, technical options are being tailored to farmers' circumstances. The GIS/Crop Modelling team is characterizing the rice-wheat tract and the study sites within it so that research results can be synthesised across sites in the region.

Following basic research on stress tolerance in maize, sponsored by UNDP, we are taking results to the field in Africa. With funding from SDC, researchers in the Southern Africa Development Community will develop locally adapted maize cultivars that tolerate drought and low nitrogen—two of the most intractable constraints on maize cultivars in the region. A project in eastern, western, and central Africa brings CIMMYT

and IITA together to combat insects and the parasitic weed *Striga* spp. in maize, as well as to enhance drought and low nitrogen tolerance in maize. This latter project is supported by UNDP, IFAD, and SIDA.

Progress in applying molecular markers to transfer stress resistance traits to elite maize lines and varieties is evident. Advances include genome mapping of regions associated with resistance traits, comparisons between marker-assisted and conventional selection, use of new methodologies to improve efficiency, and strategies for using marker-assisted selection in breeding programs.

A new project funded by the Asian Development Bank will establish a collaborative research and training network among national maize and biotechnology research programs in Asia. The network, which brings together CIMMYT and national research programs in India, Indonesia, China, the Philippines, and Thailand, will strengthen biotechnology capacity in the region and use it to improve maize for farmers.

A five-year project funded by DGIS aims to establish applied agricultural biotechnology programs in Kenya and Zimbabwe. Eventually, using DNA markers and other biotechnology tools and working closely with breeders, the project will generate locally adapted, stress resistant maize.

Both our Economics Program and our National Resources Group have been strengthened, to build our capabilities (especially in gender analysis, farmer participatory research, crop-soil modelling, and geographic information systems) and also to provide a "credible mass" for working with partners whose comparative advantages lie in these areas of work.

In Mesoamerica, we collaborate with national research programs, NGOs, and international organisations to develop productivity-enhancing, resource-conserving technologies that address problems affecting the natural resource base, especially land degradation. Current work focuses on using conservation tillage (with crop residues used as mulch) and green manures in maize-based systems to reduce erosion, enhance moisture retention, and improve soil fertility.

Innovative approaches are being developed for assessing the economics and impact of *in situ* and *ex situ* strategies for conserving genetic resources.

Studies are being completed on the impact of maize and wheat germplasm in all regions where CIMMYT works. Some results will be available by the end of 1998.



### LIST OF APAARI SUCCESS STORIES

- Baby Corn Production in Thailand (1994/1)  
by Dr Chamnan Chukaew and Dr R.S. Paroda
- Tilapia Farming in the Philippines (1994/2)  
by Dr Rafael D. Guerrero III
- Hybrid Rice in China (1994/3)  
by Mr Lou Xizhi and Dr C.X. Mao
- Dairying in India (1994/4)  
by Dr R.P. Aneja
- Hybrid Cotton in India (1995/1)  
by Dr A.K. Basu and Dr R.S. Paroda
- Palm Oil Industry in Malaysia (1995/2)  
by Dr Y.B. Basiron
- Transformation in Korean Farming (1996/1)  
by Dr Chae Yun Cho
- Cotton Production in Pakistan (1996/2)  
by Dr Badruddin Soomro and Dr Parvez Khaliq
- Orchids in Thailand (1997/1)  
by Dr Kanchit Thammasiri
- Wheat Production in Iran (1997/2)  
by Dr Abbas Keshavarz and Dr M.J. Mirhadi
- Agro-Tourism in Australia (1997/3)  
by Dr Tom Connors

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### FUTURE CONFERENCES

1. Title : 9th Asian Symposium on  
Medicinal Plants, Spices and other  
Natural Products  
Venue : Hanoi, Vietnam  
Period : 24-28 September 1998  
Contact : Secretariat of ASOMPS IX  
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2. Title : International Symposium on  
Lowland Technology, ISLT '98  
Venue : Saga, Japan  
Period : 4-6 November 1998  
Contact : Prof. Norihiko Miura  
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3. Title : 1st International Agronomy  
Congress: Agronomy Environment  
and Food Security for the  
21st Century  
Venue : New Delhi, India  
Period : 23-27 November, 1998  
Contact : Secretary  
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4. Title : International Conference on  
Conservation of Tropical Species  
Communities and Ecosystems  
Venue : Thiruvananthapuram  
Kerala, India  
Period : 3-6 December, 1998  
Contact : Dr K. Naryanan Nair  
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