The Asia-Pacific Region, though agriculturally most vibrant, faces enormous challenges of food security and poverty alleviation, with alarming rise of its population. The region is also faced with rapid depletion of water, soil and forest resources/biodiversity. Besides, it also encounters recurrent droughts, floods and cyclones. To meet these challenges, future ARD projections of NARS and other organizations in this region need to be based on ecologically sound, equitable and sustainable management of natural resources, following a scientific land use approach.

Natural Resource Management (NRM) strategies should also fit into the broader goals of Rural Development to conserve and regenerate the deteriorated resource base of small farmers. Agricultural research and management of research needs to be developed based on use of local and indigenous resources and knowledge with emphasis to improve the existing farming systems/agro-ecosystems. Technology generation and adoption for meeting such growth has to be farmer friendly, risk reducing, cost effective, socio-economically feasible and locally acceptable. However, integrating high tech knowledge through new sciences will also be essential in certain areas particularly to address the emerging problems of soil salinity, drought, diseases and pests etc., and to address the nutritional deficiencies through value additions using available bio-resources.

For an overall agricultural growth, effective NRM programmes would need participation of diverse stakeholders. The research agenda of NARS thus must have such participatory initiatives developed, functioning at the grass root levels. This would necessitate empowerment of local communities and the NGOs, supportive policies with focus on poverty reduction, food security, sustainability and self-reliance, and overall improved ecological management of existing production systems. It would be equally necessary to strengthen local institutional capabilities to cope with the emerging NRM research and development agenda.

The CGIAR-NGO Committee during 1998 had deliberated on this topic for defining a proper NRM strategy. In a recently held international conference during February 2000 in India on Natural Resource Management (NRM) for Agricultural Development, future strategy for implementation by NARS was evolved. Also in the Global Forum 2000 held in Dresden, importance of NRM for sustainable agriculture was emphasised. It was also realized that apart from NARS and the participatory role of farmers and the NGOs., more proactive role of regional fora such as APAARI, and organizations such as Advanced Research Institutes (ARIs), IBSRAM, and the CGIAR centres located in the region would help in strengthening national programmes on Natural Resource Management, which have direct relevance to protecting the environment, generating resources, accelerating agricultural growth and development, and improving overall human welfare. Hence, time is ripe to accelerate the pace of NRM strategy through partnership among all stakeholders, where organizations, such as APAARI could play a facilitators' role.
TARO GENETIC RESOURCES CONSERVATION AND UTILIZATION: ACTIVITIES OF TAROGEN PROJECT

TaroGen, a three-year project funded by AusAID is being implemented by the Secretariat of the Pacific Community (SPC) in collaboration with IPGRI, the University of the South Pacific (USP) and Hort-research (New Zealand). It works with national programmes in the Pacific Islands to develop a regional strategy for the conservation of taro genetic resources and crop improvement. A unit has been established within SPC to provide the expertise required in tissue culture, plant breeding, germplasm conservation and project management. The Project is designed to assist Pacific Island Countries in collection and conservation of taro germplasm and its use in plant improvement programmes. The project, estimated to cost over AUD 3 million and approved by Heads of Agriculture from the region, started operating in July 1998.

The project team is composed of: Mr. Simon Field (Project Director); Dr Param Sivan (Project Team Leader); Dr Mary Taylor (Tissue Culture Specialist); Dr Davinder Singh (Plant Breeder in Papua New Guinea); Dr Grahame Jackson (Technical Director – part-time); and Dr Danny Hunter (Plant Breeder/Pathologist in Samoa – part-time).

OBJECTIVES

The objectives of the project are as follows:

- assist the Pacific Island Countries (PICs) to collect taro genetic resources world-wide, rationalise collections, and carry out international exchange;
- develop and implement complementary strategies for the conservation of taro genetic resources within PICs and regional institutions;
- provide growers with improved taro varieties to overcome limiting factors on production;
- provide efficient and effective management and monitoring of the project.

Further, a complementary project funded by ACIAR with two sub-components, one on DNA fingerprinting to facilitate accurate comparison of accessions between countries, and the other on virus indexing procedures to overcome quarantine concerns in the international exchange of taro germplasm, is also underway. Techniques will be developed at the Queensland University of Technology (virus indexing) and the University of Queensland (DNA fingerprinting) and initially transferred to Papua New Guinea (National Agricultural Research Institute and the Papua New Guinea University of Technology). The cost of the ACIAR-funded project is estimated to exceed AUD 1 million over 3 years. In addition, the Ministry of Foreign Affairs and Trade, New Zealand has agreed to support inputs of plant pathology to assist the breeding programmes.

PROJECT ACTIVITIES

The project work to achieve the set objectives, is being carried out under the following four components.

Component 1: Germplasm Collection

Initially, the diversity extant in taro collections within Pacific Island countries was assessed and priority areas for re-collection were determined. Efforts to describe the existing collections assembled so far using a set of agreed morphological descriptors and DNA fingerprinting are in progress. Methods are being developed to test accessions for tolerance to taro leaf blight at an institute outside the region, and later it will be applied in countries where the disease occurs. Information on germplasm collected as well as that generated from various project activities are being recorded in computer databases. The information will help countries to be able to rationalise their taro collections, and determine the duplicates which exist between countries. These efforts are also expected to help in developing a regional conservation strategy. If difficulties arise in making comparisons between Pacific Island countries, consideration will be given to the establishment of a temporary collection of all accessions in one location. The information gathered by the project so far is already being used in identifying germplasm for international transfer to support plant improvement programmes. The project will also endeavour to access germplasm of Asian countries by offering reciprocal exchanges. The movement of germplasm between countries, and into and out of regional genebanks set up under the project, will also be assisted by policies developed by a Working Group on Intellectual Property Rights. Research carried out in a complementary project will ensure the safe movement of germplasm.

The Project provides for short-term specialists in collecting and database management, and plant pathology; funds for training curators in collecting and gathering descriptor data (including molecular analysis), provision of computers; databases; internal
and international travel and air freight of samples, and workshops on germplasm collecting and characterization, the development of a regional taro conservation strategy, and intellectual property rights. Some fund will also be provided for labour where ex situ collections are large and where these may be needed to be maintained for long periods before descriptors are recorded and accessions are conserved by other means.

**Component 2: Germplasm Conservation and Maintenance**

The aim of the component is to overcome the difficulties that all Pacific Island countries have in maintaining field collections of taro which are not only costly but also subject to loss due to natural disasters, pest attack and neglect due to fluctuating financial support. In vitro collections will replace those maintained ex situ, utilising efforts in several countries to develop tissue culture capabilities.

- **Regional Germplasm Centre and Complementary Conservation Strategies:** To backstop national efforts, a Regional Germplasm Centre (RGC) has been established in SPC, Suva. The RGC has instituted a pilot in vitro active taro genebank to give countries a better understanding of the costs of maintenance, and the effects on germplasm kept as plantlets in culture. Assistance will be given to countries to establish in vitro collections with the provision of training. Those countries which do not have the resources to maintain collections either in vitro or as field genebanks will be encouraged to cooperate with others where similar accessions exist. A subset, or core collection, is being developed by regional consent which is representative of the variation found in taro within the region and will be maintained at the RGC. Such a representative subset will benefit all countries in the region. The RGC is also conducting research on cryopreservation (testing methodologies developed in Japan) and seed storage. Work on in situ conservation will be carried out as a pilot project in Vanuatu using the services of a non-government organization (NGO). These efforts will help to develop a complementary conservation strategy for taro in the region.

**Component 3: Crop Improvement**

The project is assisting breeding programmes in Papua New Guinea and Samoa to develop taro varieties with improved tolerance to taro leaf blight. Seeds from these breeding programmes are being made available for screening in Solomon Islands.

At the start of the project, based on the available information, strategies were developed to breed cultivars with durable horizontal resistance. The breeding lines being developed will be tested against different strains of the taro leaf blight. Trials will be conducted to determine genotype x environment interactions before new taro lines are released to farmers. Methods for screening taro for leaf blight tolerance are also being refined. Two national plant breeders (Papua New Guinea and Solomon Islands) are being further trained (studying for higher degrees). A Graduate Research Assistant is assisting with breeding work in Western Samoa while studying for a higher degree. In these three countries, national Taro Improvement Coordinating Committees (TICC) are providing the direction to the programme. TICCs are composed of farmers, NGOs, representatives from government departments, universities and regional agricultural programmes.

**Component 4: Project Management and Monitoring**

The project is operating within the Agriculture Programme of the SPC, with offices and laboratories in Suva, Fiji and the team leader manages the project, working closely with the SPC. An Australia-based Project Director has overall responsibility for the Australian (AusAID) contribution to the project. A part-time consultant provides technical guidance. Annual work plans are discussed at tripartite review meetings (countries, donors and implementing agencies) and finalized. Project monitoring includes preparation of monthly progress reports; six-monthly reviews of project activities by a Taro Genetic Resources Committee comprising of Heads of Agriculture from the region and triennially with PHALPS (Permanent Heads of Agriculture and Livestock Production Services). An in-depth project evaluation will take place towards the end of the third year.

[Contributed by: Dr Param Sivan, Project Team Leader, TaroGen, SPC, Suva, Fiji and V. Ramanatha Rao, Senior Scientist (Genetic Diversity/Conservation), IPGRI-APO, Serdang, Malaysia]
Achievements in Agricultural Research Technology and Development: Council of Agriculture, Taiwan

An Institute Profile

The Council of Agriculture (COA), Taiwan lays particular emphasis on high-tech research, with the aim of achieving a sustainable balance between agricultural development and environmental protection. The Council has established an Agricultural Technology Review Committee, comprising of 125 members. This group of specialists includes researchers, agricultural scientists, and government officials. The committee's objective is to examine projects selected from the five fields of farming, namely agriculture, forestry, fisheries, animal husbandry, and biotechnology. A summary of some of the recent significant achievements of the Council is given.

Advances in Crop Technology

The COA has successfully cultivated new crop varieties and enhanced traditional ones. The use of five newly developed rice varieties has lead to significant improvements in production over the traditional varieties. One of these “Tai-Stalk No. 8” has been planted over more than 80,000 hectares. The success of this strain is expected to generate some NT$ 1.6 billion in revenue for farmers annually. New cultivation methods have successfully produced ten new improved varieties of maize, potato, peanut, and soybean, all currently available for planting. Improved bean varieties are expected to help increase current farm revenue by NT$ 100 million. Improved greenhouse horticulture techniques have produced improvements in green onion, pear, tomato, and eggplant. Farm revenues are expected to increase by NT$ 2.1 billion with these improvements. New cultivation methods have also been applied to various fruit varieties, including grapes, wax apple, pear, sugar apple (Annona squamosa L.), guava, mango, star fruit and Indian date palm. These new methods are being applied in an effort to adjust each fruit variety's ripening season. This enables a measure of control to be added to the timing of the cultivation process, increasing the market price of each fruit variety, translating into some NT$ 5.6 billion profit each year.

Establishment of an Agrobiological Genepool

The COA has a well established national genetic resource centre, housing over 43,000 biological samples from all over the island, covering the complete biodiversity of Taiwan. This collection also contains samples of wood, native animals, insects and invertebrates, farm animals, and microbiological life forms found on the island. These specimens are all well preserved and catalogued. The resource centre is open to the general public for research purposes and its databases are accessible over the Internet.
The development of biotechnology is expected to help farmers increase their profits by more than NT$ 500 million each year. With new advances in genetic manipulation, in papaya, varieties resistant to Papaya Ring Spot Virus (PRSV) have been developed. The COA has successfully applied genetic manipulation techniques to cabbage, broccoli, cauliflower, and papaya. Tissue culture technology is helping in the cultivation of fruits and flowers, and is expected to raise NT$ 1.2 billion in profits for farmers annually. A new six-in-one animal vaccine has been developed and has proved effective in preventing many common livestock diseases. To improve the quality of meat products, an analytical method has been developed to detect trace amounts of chemicals remaining in the meat of farm animals that had previously been given sulfa-based medications.

**ANIMAL AND PLANT INSPECTION**

Every year approximately 2,000 mt of lichee, star fruit, and mango are exported to the United States and Japan, generating revenue of NT$ 1.6 billion. In case of livestock, polymerase chain reaction (PCR) testing methods have been used to determine with great accuracy whether livestock have contracted diseases such as swine fever, bovine ephemeral fever, or toxoplasmosis. The COA has also established a holding centre containing vital supplies of antibodies and vaccines to be used in case of an outbreak of an industry-debilitating contractable livestock disease.
PROTECTION OF FORESTRY AND THE ENVIRONMENT

The COA has developed shoot propagation techniques for use in forestry applications. Additionally, it has been undertaking research into landslide prevention and hillside maintenance. This research has produced, among other innovations, the development of a landslide early warning system.

DEVELOPMENTS IN FISHERIES

In the fishing industry, an all-female culture technique for mullet had already been successfully developed. Now, after a period of three years, mullet ovaries can be made into mullet roe. Each hectare can produce about NT$ 3 million worth of mullet roe and the industry boasts of high-value cultivation. At the same time, an indoor small abalone multi-layer culture technique has also been applied. Each hectare can now raise its production from five million tonnes to over twenty million tonnes, with three harvest seasons in two years. Annual increases in the revenue for fishery operators are expected to total NT$ 1.6 billion.

NEW TECHNOLOGY APPLIED TO ANIMAL HUSBANDRY

The Council has introduced two new varieties of napier grass at the Jui-sui dairy-farming zone in Hualien County as experimental new forage for cows. Their milk, marketed under the “Jui-sui Ranch” brand, has been well received. The Taiwan Livestock Research Institute has begun the development of a new black pig breed, being a mix between the Taoyuan pig and the Duroc pig. This new breed is expected to have strong prolificacy traits, and the Institute is predicting that the meat from this animal will become well established in the Taiwan market. A new technique has been developed to determine the sex of bovine embryos, showing good results when compared to traditional methods.

DEVELOPMENTS IN THE FOOD PROCESSING INDUSTRY

The COA assisted 160 factories in obtaining national food industry certification in a total of 1,754 foods, representing annual revenue of over NT$ 32 billion. The Council has been helping food processing factories provide a variety of safe and sanitary food products for consumers, and has been involved in the development of fast food and preserved food products. An example of such work has been the successful development of the 7-11 convenience chain store's "Royal Rice Ball," and similar store snacks. The annual profit of such products has grown to NT$ 1.5 billion.

AGRICULTURAL APPLICATION OF REMOTE SENSING TECHNIQUES

Remote sensing technology can determine the current state of land use and agricultural utilization. The collection of data in this way can analyze land use patterns, and can also help prevent over-developments. Remote sensing has already been used in the investigation undertaken after the hillside devastation caused by typhoon. These techniques have also helped to establish data banks of geographical information on preserved and protected land areas. Moreover, with satellite remote sensing probes, critical data about sea currents and water temperature surrounding the island can be provided to the fisheries industry to point out the best potential fishing spots.

ADVANCES IN AGRICULTURAL AUTOMATION TECHNOLOGY

The Council has developed new agricultural automation techniques, some of which have already been put to use in rice processing, vegetable growing, etc., partially attributed to new automation in the industry. New automation technology has also been applied to agricultural pesticide application and fisheries industry. With automation, circulating water systems have helped eel farmers breed eels 25 times faster than traditional outdoor breeding methods. The poultry industry has also been the beneficiary of automation in the areas of water supply and feeding, egg collecting, grading, and wrapping. The establishment of automation equipment has increased revenue by approximately NT$ 120 million each year. A mobile computerized auction system has also been developed for use at fish, vegetable, and fruit markets, and has contributed to fairer and more efficient trading practices.

[Contributed by: Dr Te-yeh Ku, Director General, International Cooperation Department, Council of Agriculture, Executive Yuan, 37 Nanhai Road, Taipei, Taiwan]
AUSTRALIAN CENTRE FOR INTERNATIONAL AGRICULTURAL RESEARCH

- AN INSTITUTIONAL UPDATE

OVERALL PERSPECTIVE

ACIAR is an Australian government-funded agency that receives around $A42 (US$26) million each year. Its task is to assist and encourage Australia's agricultural scientists to use their skills for the benefit of developing countries while they also work to resolve Australia's own agricultural problems. Australia is in an excellent position to do this, with its strong capacity in agricultural research and development.

ACIAR's principal goals are to reduce poverty, improve food security and conserve and rehabilitate the natural resource base for agriculture through international agricultural research partnerships for the benefit of developing countries and Australia. To achieve these goals, ACIAR facilitates and supports bilateral research and development activities in around 30 countries, in areas including crop production, animal production, fisheries, forestry, land and water resources management, postharvest technology, and economic studies of agricultural and natural resource utilization. ACIAR also supports a multilateral programme to fund research and development through the international agricultural research centres (IARCs).

ACIAR has fostered its role as a partner and facilitator of international agricultural development assistance through a comprehensive network of international contacts—importantly through membership of APAARI, APAFRI and IUFRO, and also as an observer with NACA and other Pacific regional organizations.

In early 1999, ACIAR's Board of Management issued a policy statement that defined the challenges that face ACIAR as it strives to provide cost-effective solutions through collaborative research and development, and mapped future strategies for ACIAR. The statement laid new emphasis on ensuring that ACIAR's partner countries capture the benefits of the research results. ACIAR has indicated its readiness to commit resources to help these results cross the research-extension threshold where appropriate. To this end the Centre has developed its relationship with Australia's major international development agency AusAID, as well as other initiatives to work more closely with Australian and international non-government organizations.

Through a Record of Understanding agreed in 1998, AusAID committed $A 8.5 (US$ 5.3) million over 5 years to fund a series of ACIAR project activities in Papua New Guinea (PNG) linked to the AusAID programme in natural resources. Progress has been made in identifying and developing 13 project initiatives, and their implementation is well under way.

One of the new ACIAR-AusAID initiatives in Papua New Guinea is building upon earlier AusAID support to develop and test small-scale cocoa bean fermenters and dryers that allow smallholders to reliably produce high quality cocoa. The researchers are using computer models to determine the desired characteristics for dryers in different cocoa-growing climates, enabling modifications that will match the dryers to each environment.

BILATERAL PROGRAMME

The past year has once again seen the development of many new research activities. The bilateral programme has 23 new major and 10 small projects. Of note is the ongoing research to improve integrated pest management of brassica vegetable crops in China and Australia. China reports that there has been a sizeable reduction in problems of pesticide poisoning in the Zhejiang Valley where findings from the initial project have become known and progressively implemented.

- In India, ACIAR has invested in research for well over a decade to improve the quality of feed available for dairy cattle and buffalo. Now new research has developed a way to protect the protein of oilseed meal from breakdown early in the digestive process, reserving large amounts of high quality protein for absorption later on. The successful implementation of this technology across just 25% of India's dairy industry could boost milk production by up to 18 million tonnes per year.

- In Indonesia, disease outbreaks were causing catastrophic losses among farmed shrimp. In 1998 there was little optimism that an ACIAR project to control diseases in farmed prawns would make any difference. However, early results have been quite extraordinary, with returns from the pilot
ponds of over one tonne per hectare of healthy, firm prawns compared with virtually no harvest from the control ponds. A harvest of this dimension had not been possible in the region for over three years.

- In Thailand, 4 years of research has led to development of feed that is making a significant contribution to the hybrid walking catfish industry. The fish is an important local food species, and its production has increased by as much as 20,000 tonnes during the life of the project. Culture has expanded quickly to new areas north and east of Bangkok and this expansion relied to a certain extent on the availability of better diets. The progress in Thailand was paralleled by similar success in Australia, with the development and commercial uptake of least-cost diet formulations for silver perch that has reduced dependency on imported fish meal and slashed feed costs to farmers.

- In the Philippines, ACIAR research programmes are directed to help marginal farmers in the hinterlands. Deforestation, soil erosion and increasing population in the uplands have contributed to rapid degradation of large areas. Agricultural and social scientists are working with the farmers to find ways to make the land more productive and reduce soil erosion, and to ensure that new techniques developed through the research are accepted and adopted by the farmers.

- In Vietnam, 80% of the meat eaten is pork. In the course of an ACIAR project, Australia has contributed top lines of pigs to Vietnam along with knowhow in the search for more productive animals. The imports have the desirable qualities of lean meat and good adaptation to high temperatures. These qualities are appearing in the progeny of these animals crossed with local varieties, and the economic benefit is already evident in the higher prices paid for the superior offspring in provincial markets.

**MULTILATERAL PROGRAMME**

ACIAR's allocation to the multilateral programme for the 1999-2000 financial year was $A9.4 (US$5.8) million, representing a slight increase on the previous year. Recognising the importance of unrestricted or core funding to the Centres, ACIAR has increased the proportion of this type of funding within the total allocation. Remaining funds go to restricted grants that allow ACIAR to target within the Centres’ ‘Agreed Research Agenda’ activities of special relevance to its own research and development objectives. A major aim is to strengthen the capacity of partner-country agricultural research institutions through linkages with Australian research institutions and the IARCs.

Subject areas range from crops to livestock, forestry and natural resource management to fisheries and agricultural policy, with all but two or three of the 24 centres being funded in any one year. Some of the more recent grants funded include: CIMMYT on increasing the yield potential in wheat, ILRI on evaluating the nutritional value of thornless acacias, IFPRI on public investments in agriculture in China, and ICLARM on developing methods for rearing sea cucumbers in the Pacific.

**COMMUNICATION/INFORMATION DISSEMINATION**

ACIAR's Communications Programme has the task of ensuring that the results of ACIAR projects are recorded and their benefits captured, and of helping to build and maintain external relationships. The Programme has an impressive scientific publishing unit that has now produced well over 300 titles comprising proceedings, technical reports and monographs. The public information unit produces the twice-yearly ACIAR Newsletter, the annual magazine Partners in Research for Development and the ACIAR annual report. Newsletters emanating from the research programmes include the Forestry Newsletter, Postharvest Newsletter, Australian Mycotoxin Newsletter and the Food Legume Newsletter.

Information on all ACIAR projects and publications can be obtained through our website, www.aciar.gov.au

[Contributed by: Janet Lawrence, ACIAR Science Communicator, ACIAR, Canberra, Australia].

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

APAARI Newsletter, June 2000
GFAR CONFERENCE ON AGRICULTURAL RESEARCH FOR DEVELOPMENT
DRESDEN 2000

The Global Forum for Agricultural Research (GFAR) recently held its first conference in Dresden, Germany from 21-23 May, 2000. The GFAR is a dynamic new initiative of key players in agricultural research being the representatives of developing-country national agricultural research systems (NARS), advanced research institutions (ARIs), regional and sub-regional organizations like APAARI, universities, non-governmental organizations (NGOs), farmers' organizations, the private sector, international agricultural research centres (IARCs) and the donor community. More than four hundred participants from all over the world came together to formulate a Global Shared Vision (GSV) for agricultural research for development.

The Chairman of the GFAR, Dr R.S. Paroda, pointed out in his opening address that the role of biotechnology and access to genetic resources are priority issues to be addressed by the GFAR. Among other concerns, he mentioned the funding of programmes stressing the increased competitiveness of research. There must be a balance between co-operation and competition. Competition for funds should be fair and should not exclude the weakest, particularly the NARS of the developing countries.

A set of papers and posters on the theme of partnership, which included very interesting cases of existing and innovative partnerships, were presented around four sub-themes:
- Genetic Resource Management and Biotechnology
- Natural Resource Management and Agro-ecology
- International Co-operation on Commodity Chains
- Policy Management and Institutional Development.

In the sub-plenaries, the different case-studies on the sub-themes were presented and discussed. A GFAR guiding principle is that the NARS of the developing countries along with their regional and sub-regional fora are the corner stones of the global agricultural research system that GFAR aims to create. Therefore, the ARD situation in the five regional fora were also reviewed in a special session.

DRESDEN DECLARATION
“Towards a Global System for Agricultural Research for Development”

Preamble
At the dawn of the 21st century, we, the stakeholders of the Global Forum on Agricultural Research (GFAR), wish to remind the international community of the increasing importance and relevance of the three challenges that have guided agricultural research over the past decades:

- increasing food production, food access and quality to keep pace with or exceed the rate of population growth;
- economic development in the rural areas to alleviate the poverty and improve the quality of life that leads to exclusion of an important part of the world population, especially small farmers in marginal areas;
- development of sustainable agricultural production systems that are compatible with sustainable management and conservation of natural resources.

These challenges have to be addressed in a rapidly changing socio-economic context. The following trends provide uncommon opportunities but may also create some threats to agricultural research for development.

- Decrease of public research funding in the agricultural sector and emergence of privatized agricultural research, which imply a major change in the division of labour, necessitate the building of new partnerships and raised the issue of private versus public intellectual property rights.
Globalization and trade liberalization may improve food security through increased access to food at a global level, yet all people may not benefit equally.

Scientific advances in areas such as agro-ecology, the use of advanced information and communication technologies (ICT) and modern biotechnology are offering opportunities for improving agricultural production and productivity as well as nutritional value, while ensuring sustainable agriculture. There is, however, a critical need to assess the potential impact of these new technologies on human health and the environment.

To address these challenges, the GFAR stakeholders gathered in Dresden, Germany, from 21 to 23 May 2000, have adopted the following Global Vision for Agricultural Research for Development which builds on the diversity and complementarity of the different GFAR stakeholders.

**Global Vision for Agricultural Research for Development**

Advances in agricultural research and development, including major breakthroughs in the new areas of science, have significantly contributed to meeting the challenge of food and nutrition security, agricultural sustainability, production and productivity. However, the world still faces an increasingly complex challenge of feeding its growing population and of eradicating poverty, while assuring an equitable and sustainable use of its natural resources.

We, the GFAR stakeholders, believe that:

- food security, nutritional quality and safety, poverty alleviation and sustainable natural resources management are not only of concern to developing countries but are critical global issues with major impact on the well-being of the society;
- addressing these issues is a prerequisite for assuring peaceful coexistence, the attainment of human rights and basic human development in the new century;
- tackling these challenges is a matter of urgency, considering the rapid process of environmental deterioration and increasing inequalities, with long-term, pervasive impacts taking place in many parts of the world;
- agriculture, rural development and the management of natural resources are not only economic activities, but strategic dimensions of contemporary societies that have important economic, social and environmental functions. It also includes the access to resources by farmers such as land, water and genetic resources.

We share a vision for the future encompassing: (a) the appreciation of the role knowledge plays in the development of agriculture; (b) the conviction that knowledge generation and utilization is increasingly based on global research systems and networks and on farmers-led experiments and innovations; and (c) the belief that new developments in areas of natural resource management, information and communication technologies (ICT) and modern biotechnology generate new opportunities. These new developments represent an enormous potential but, at the same time, could lead to serious negative effects, widening of technology gaps and social exclusion processes. As a consequence, their socio-economic, human health and environmental impacts have to be monitored, risks and benefits evaluated and then regulated as appropriate.

The GFAR stakeholders envision the development of an agriculture including crops, livestock, fisheries and forestry, which is:

- sustainable, equitable, profitable and competitive, fulfilling its functions in the context of community-centered rural development, fully recognizing the role of women in agriculture;
- diversified and flexible in its structure to cope with heterogeneous and rapidly changing agro-ecological and socio-economic environments with an important role for the farm family;
- responsive to multiple sources of knowledge and innovation, both modern and traditional.

This vision implies a progressive shift of paradigm in Agricultural Research for Development (ARD) towards a holistic "Knowledge Intensive Agriculture" accessible to small and poor farmers.

In implementing this vision, the GFAR stakeholders agree to adhere to the following principles:

- Programmes should clearly be subsidiary and complementary to the on-going work and provide a clearly identifiable added value.
- Agricultural research should be demand-driven and implemented through equal partnerships among GFAR stakeholders.
- Priorities for the research agenda are set with a focus on farmers’ perspectives, taking into account...
the multi-functionality and regional heterogeneity of farming systems.

Research design and dissemination should involve the intended users and beneficiaries, particularly farmers.

The GFAR stakeholders commit themselves to establishing the following three building blocks of the Global System for Agricultural Research for Development as initial steps to implement the Global Vision:

1. The formulation of a global strategic research agenda, which capitalizes on the comparative advantages and the strengths of the different GFAR stakeholders;
2. The promotion of innovative, participatory, cost-effective and sustainable research partnerships and strategic alliances;
3. The ICT networking among stakeholders and the establishment of specialized agricultural knowledge and information systems.

Dresden Declaration on Plant Genetic Resources for Food and Agriculture

The GFAR participants also came out with the declaration on Plant Genetic Resources for Food and Agriculture which reads as follows:

- Urge Governments to complete the revision of the International Undertaking on Plant Genetic Resources for Food and Agriculture, thereby allowing for the effective implementation of a multilateral system for facilitated access and benefit sharing of plant genetic resources for food and agriculture, recognizing Farmers’ Rights in plant genetic resources’ matters and promoting implementation of the Global Plan of Action.

Recommend that countries enacting national access legislation complying with the CBD do so in a way that takes into account and allows for their participation in and the effective operation of multilateral arrangements for access and benefit sharing.

Encourage countries that are considering or reviewing legislation on intellectual property, do so in such a way that they do not restrict the exchange, transfer and use of germplasm in crop improvement programmes and which contain, among others, strong research and farmers’ exemptions.

Urge effective implementation of the Global Plan of Action through the FAO Global System for the Conservation and Utilization of Plant Genetic Resources for Food and Agriculture, together with agreed and adequate financial provisions.

Encourage countries to implement the various components of Farmers’ Rights in conformity with the draft agreed text of the International Undertaking on Plant Genetic Resources for Food and Agriculture.

MEETING OF REGIONAL INFORMATION OFFICERS

Parallel to the GFAR meeting, another meeting was held with the key-players in Agricultural Information Management. The different regions presented their views and experiences with the development of a Regional Agricultural Information System. Besides, the Philippines presented their experience on developing a National Agricultural Information System (NAIS). Together they concluded that there are opportunities to integrate efforts in order to accelerate the development and consolidation of the RAIS. There are considerable coincidences on the needs, challenges and constraints faced by recently launched RAIS, opening the way to develop common strategies and tools to face them. Also the need for information systems to evolve into knowledge systems was expressed. The group recommended a two prong strategy to start the implementation of the collaboration and integration among RAIS:

- Continue the discussion on priority issues through the creation of an Electronic Discussion Group.
- Create the “Inter-Regional Agriculture Information Partnership among RAIS” to strengthen the development of the Regional Systems in addressing information and technology issues as well as information policy issues.

Potential collaboration is foreseen in capacity building, information standardization and exchange, software applications development and expert systems development. A project proposal is being drafted to undertake this initiative.
This conference was organized by the Indian Society of Soil Science in collaboration with Indian Society of Agronomy, Indian Society of Soil Survey and Land Use Planning, Indian Society of Plant Genetic Resources and several others. It was sponsored by the Indian Council of Agricultural Research, Ministry of Agriculture, Ministry of Environment and Forests, National Academy of Agricultural Sciences and some other co-sponsors.

The Conference was inaugurated by Dr M.S. Swaminathan, the world renowned Agricultural Scientist. It was attended by more than 1500 delegates from India and abroad.

**TECHNICAL PROGRAMME**

Four Plenary lectures and four Evening lectures were delivered during the conference by well known personalities like Dr K. Kasturirangan, Dr J.S. Kanwar, Dr Andrew Bennett, Dr M.A. Chitale, Dr Y.K. Alagh, Dr R.S. Paroda, Dr Peter Raven and Dr S.K. Sinha.


In addition to these, four Panel discussions were held on the themes of: Role of Agro-biodiversity for Enhancing Global Food Production, Energy Management for Sustainable Agricultural Production Systems, Global Climate Changes: Threats and Opportunities and Farming Systems Strategies to Enhance Soil Organic Matter. About 1000 posters were displayed by participants covering the themes of Soil Management, Water Management, Agro-biodiversity, Agro-forestry, Weather and Climate Management, Socio-economics, Integrated Resource Management for potential production, Energy Management, Microbiology and Cropping System.

**EMERGING CONCERNS/KEY ISSUES**

Some key issues that have emerged out of the conference are as follows:

1. The traditional agriculture system apparently sustainable at low productivity and at low
population pressure is breaking down under the onslaught of high human and animal population pressures. Thus a shift in paradigm of soil and water management research and development is an inevitable necessity. This is possible provided we make use of traditional knowledge and farmers perception and develop technology around it using science based and knowledge based system. We must move from the commodity based to farming system based approach for efficient management of natural resources. The land use planning should be agro-ecological, region/sub-region based and village oriented. The available information on soil resources with the National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) and National Remote Sensing Agencies should be made use of in planning.

2. Defending the gains already made by the research in the past by bridging the yield gaps between the actual farmers yield and the potential yields both in the so called green revolution areas as well as in the disadvantaged agro-ecological regions, but not one at the cost of natural resources quality.

3. Spreading the gains to additional areas of farming systems through intensification, diversification and value addition.

4. Making new gains through use of new frontiers of knowledge such as bio-technology, diversification of farming system and value addition processes for making agriculture more productive, efficient, profitable, sustainable and eco-friendly, thus making it a dynamic process responsive to market forces and innovative technologies.

5. Increasing the use efficiency of agricultural inputs such as plant nutrients (fertilizers, water seed and pesticides) by using integrated nutrient management, water management, integrated energy use and integrated pest management system and efficient use of biodiversity.

6. Soil degradation is the most serious problem affecting productivity and sustainability of agriculture. It is both a biophysical and socio-economic problem. At present about 187.8 mha of area in India is subjected to various forms of soil degradations (water and wind erosion, chemical and physical degradations). Scientific and technological interventions are therefore, required to check the degradation and to improve the productivity of the degraded soils through soil and water conservation, and location specific technologies. This can be achieved with bottom up approach and stakeholders’ full participation.

7. Agricultural production sustainability in different ecosystems (Rainfed, Arid, Hill & Mountain, Irrigated and Coastal Agro-systems) is threatened by an array of factors specific to each of these agro-systems. Therefore, development of ecosystem specific management strategies and science-based technologies should be taken up on priority basis in the years to come. It is hoped that the NATF projects of ICAR will sharply focus attention on this problem and endeavour to bring these ecosystems to high and sustainable productivity.

8. There is a need for ecologically sound agricultural systems and judicious use of biodiversity in our approach to sustainability. The twin necessities of enhancing agricultural productivity and building sustainable agro-ecosystems call for a “paradigm shift” towards an agriculture that is knowledge based, technology intensive and information rich enterprise. The imperative is to focus on total ecosystem quality management and clubbing economy with ecology and equity while ensuring food security.

9. Development of different technology transfer models, which are locally replicable and socially
Resources to maintain the type cultures, at the national level and recognized by the international community.

- The role of mushrooms in the food, nutritional and industrial chain, should be enhanced. In particular, greater efforts are to be made for their collection, evaluation, conservation and use.

- In situ conservation of fish genetic resources should be encouraged through economic incentives to restrict the loss of genetic diversity. Potential application of transgenics in increased production, resistance or quality should be studied only under contained conditions.

- Use of on-farm participatory approaches should be integrated for conservation and genetic enhancement of traditional cultivars that will help development of sustainable production systems, including promotion of formal and informal seed production, conservation and genetic enhancement.

- Inventorisation and preparation of national/regional check-lists of species to update the taxonomic information utilization of advanced techniques like Geographical Information System (GIS) should be undertaken.

- In light of the global interdependence for genetic resources, nations are obliged to develop their own effective sui-generis systems for IPR regime, safeguarding the national interests. The conference noted that less than 40 countries have their instruments in place or are working at final stages. Others should also come forward.

- International community should lay more emphasis on protection of “Indigenous Community Rights” over biodiversity and associated knowledge and fair and equitable benefit sharing on commercialization, in further negotiations.

- The advent of biotechnological tools has created single gene pool of the total bioresources on the globe, comprising of plants, livestock, fish and microbes. This requires an integrated approach for their management, conservation and sustainable use.

[Contributed by: Dr A.K. Singh, Project Director, Water Technology Centre, (ICAR), IARI, Pusa Campus, New Delhi 110 012 and Dr P.L. Gautam, National Director, National Agricultural Technology Project (NATP), IARI, Pusa Campus, New Delhi 110 012, India]
INTERNATIONAL COMPREHENSIVE RESEARCH PROJECTS AND SOCI-ECONOMIC STUDIES AT JIRCAS

Food and agriculture problems are becoming more global, complex and inter-linked these days. Many developing countries express concern about the socio-economic implications, sustainability, and environmental aspects of new technologies. It is widely recognized that these issues can be better addressed through close collaboration between biological and social scientists.

COMPREHENSIVE RESEARCH PROJECTS

Major Objectives

In comprehensive research projects, socio-economic studies play three major roles. The first is to identify issues to be addressed, the second is to ensure rapid feedback in the course of technology development, and the third is to evaluate the results of research activities at a later stage of the research project. In the early stage, socio-economists conduct surveys on socio-economic aspects including finances of farm households, market systems, and social customs. Based on these survey-results, those issues that need to be addressed to achieve effective and sustainable agricultural development are identified along with the types of technologies and systems to be developed. Such surveys thus provide the required direction for subsequent research/technology development programmes.

Once the most important needed technologies have been identified, biological scientists can initiate research activity. During the course of their work, interaction with socio-economists and farmers can help improve the relevance of technology, identify problems, and allow for rapid adjustment. In this way, technologies with higher potential for adoption can be developed more rapidly. In the later stage of the project, evaluation of newly developed technologies and systems need to be conducted. The technologies and systems developed must be adapted to farmers’ conditions and management. Otherwise, the outcome may not be successful, even granted that farmers invest large amounts of funds.

Projects Implemented

In 1999, eight comprehensive research projects have been implemented by the Japan International Research Centre for Agricultural Sciences (JIRCAS). These projects as given in Table 1, have been divided into three categories – “Site-Specific Comprehensive Projects”, “Country-Based Comprehensive Projects”, and “Multinational Comprehensive Projects”.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Project</th>
<th>Time Frame</th>
<th>Research Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Productivity and sustainable utilization of tropical and subtropical</td>
<td>1995-1999</td>
<td>Department of Fisheries, Forestry Research Institute, and Ministry of Agriculture,</td>
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<tr>
<td></td>
<td>brackish water ecosystems</td>
<td></td>
<td>University of Malaya, Malaysia</td>
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<tr>
<td>2</td>
<td>Development of sustainable agricultural technology in Northeast Thailand</td>
<td>1995-2001</td>
<td>Department of Agriculture, Bangkok, Thailand, Department of Livestock Development,</td>
</tr>
<tr>
<td>3</td>
<td>Evaluation and improvement of regional farming systems in Indonesia</td>
<td>1998-2002</td>
<td>Land Development Department, Agency for Agricultural Research and Development,</td>
</tr>
<tr>
<td>4</td>
<td>Development of new technologies and their practice for sustainable</td>
<td>1999-2003</td>
<td>Indonesia</td>
</tr>
<tr>
<td></td>
<td>farming systems in the Mekong Delta, Vietnam</td>
<td></td>
<td>Cau Long Delta Rice Research Institute, Cantho University and Southern Fruit</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Research Institute, Vietnam</td>
</tr>
<tr>
<td>5</td>
<td>Comprehensive studies on the development of a sustainable agro-pastoral</td>
<td>1996-2002</td>
<td>Brazilian Agricultural Research Corporation, Centre for Tropical Agriculture, and</td>
</tr>
<tr>
<td></td>
<td>system in the subtropical zone of Brazil</td>
<td></td>
<td>International Centre for Agricultural Technology, Association of Agricultural</td>
</tr>
<tr>
<td>6</td>
<td>Development of sustainable production and utilization of</td>
<td>1997-2003</td>
<td>Cooperation of Japanese Immigrants, Brazil</td>
</tr>
<tr>
<td></td>
<td>major food resources in China</td>
<td></td>
<td>Institute of Agricultural Economics, Institute of Natural Resources and Regional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Planning, Research Centre for Rural Economy, China Agricultural University,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Institute of Soils and China National Rice Research Institute, and the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shanghai Fisheries University, People’s Republic of China</td>
</tr>
<tr>
<td>7</td>
<td>Comprehensive soybean research project in South America</td>
<td>1997-2006</td>
<td>Agricultural Technology Centre in Paraguay, Paraguay; Brazilian Agricultural</td>
</tr>
<tr>
<td>8</td>
<td>Improving food security in West Africa through increased productivity</td>
<td>1998-2002</td>
<td>Research Corporation, Brazil; and the National Institute for Agricultural Technology,</td>
</tr>
<tr>
<td></td>
<td>in rainfed rice systems</td>
<td></td>
<td>Argentina</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>West Africa Rice Development Association, Cote d’Ivoire</td>
</tr>
</tbody>
</table>
Site-Specific Comprehensive Projects: These systematically analyze the agricultural, forestry, and fisheries issues of a specific region through an understanding of the relationships among various factors such as natural resources, environment, technology, and administration. Projects in Vietnam, Thailand, Malaysia, and Indonesia are examples of site-specific projects.

Country-Based Comprehensive Projects: These identify the most significant food supply and agricultural problems of the partner country and then select several representative research fields and themes in which JIRCAS can best contribute towards the resolution of these problems. In addition, these projects promote comprehensive joint research through collaboration with the administration of the partner country. Both the China and Brazil projects fall under this programme.

Multinational Comprehensive Projects: These involve researchers in many fields from a wide region covering several countries in a cooperative effort to resolve strategically important issues. Projects in South America and West Africa are multinational projects.

Multi-disciplinary/Participatory Approach

JIRCAS is convinced that project goals are better achieved if socio-economists work together with biological scientists before and during the projects. Socio-economists are often expected to play a bridging role in a multi-disciplinary project by considering individual technologies within a broader context of the socio-economy of the regional countries concerned. Now-a-days agro-economists and rural sociologists are expected to play an important role in JIRCAS comprehensive projects.

[Contributed by: Mr. Kazuyuki Tsurumi, Director of Research Information Division, Japan International Research Centre for Agricultural Sciences, Ministry of Agriculture, Forestry and Fisheries, Tsukuba, Japan].

EGFAR Electronic Global Forum on Agricultural Research: NARS Master Website

The main objective of the Electronic Global Forum on Agricultural Research (EGFAR) is to establish a communication platform in Internet that facilitates the exchange of information and knowledge among the stakeholders of agricultural research for development (ARD). From an operational point of view, EGFAR is conceived as a system of webpages that fulfills three main functions:

a) The first is a gateway function, whose purpose is to provide an internet platform to facilitate the interaction among the members of GFAR, as well as a gateway to the information and knowledge resources of the various stakeholders of ARD;

b) The second function is an electronic forum discussion function on topics relevant to the GFAR stakeholders, at the regional and global levels. The first electronic fora are already being prepared.

c) Thirdly, the system of webpages that constitute EGFAR offers specialized information services to the stakeholders of ARD.

The service that is being developed is that of the “NARS Forum”, which is aimed at the development of an user-driven Knowledge Marketplaces on topics of specific interest to the management of NARS. The development of EGFAR is being done in close coordination with FAO/WAICENT, with the CGIAR and with the information services of the various stakeholders of GFAR, specially the Regional/Sub-Regional Fora and their databases and information systems.

The NARS Master Webpage (http://www.fao.org/nars), as one of the seven Stakeholder Master Webpages of EGFAR (http://www.egfar.org), has recently been formally launched. The objectives of the NARS Master Webpage are to facilitate the active involvement of NARS in the Global Forum, to promote the interaction among them and the sharing of relevant experiences, and to facilitate to all stakeholders and interested parties access to NARS and to their information and knowledge resources. Thus this webpage provides Information on NARS and on NARS-related issues, and it provides a gateway to the Regional/Sub-Regional Fora (RF/SRF) and to their Regional Agricultural Information Systems (RAIS). The NARS Master Webpage can be accessed either by going directly to the first address previously mentioned, or by clicking on the “NARS leaf” of the GFAR symbol in the EGFAR Home Page. The EGFAR Home Page is being totally re-designed, and the new Home Page will soon be available.

The NARS Master Webpage (http://www.fao.org/nars) is constituted by seven elements: (1) What are NARS and the role they play in GFAR; (2) General information services; (3) GFAR-in-Action; (4) Gateway to information resources of the stakeholders of ARD; (5) the NARS Forum; (6) Electronic fora on specific topics; and (7) GFAR-2000.

[For details contact: Dr Alain Derevier, Executive Secretary, GFAR-SC & Adviser Agricultural Research Group, The World Bank, 1818H Street, NW Washington DC 20433, USA].
The National Agricultural Technology Project (NATP) being jointly implemented by the ICAR and the Department of Agriculture and Cooperation (DAC), Government of India, with the World Bank support is aimed to:

i) improve the efficiency of Organization and Management System of ICAR;

ii) enhance the performance and effectiveness of research programmes responding to location specific needs of farmers; and

iii) pilot test innovations in technology dissemination with greater accountability and with participation of the farming community.

OBJECTIVES

The main objective of National Agricultural Technology Project is to address the National issues, viz i) national food security, ii) household food security, iii) poverty alleviation or equity, iii) environmental quality and conservation of biodiversity, iv) sustainability in the use of natural resources, v) product diversification to enhance rural income, vi) welfare of tribal people, women or other disadvantaged groups, vii) exploiting commercially viable technologies and viii) enhance export potential.

Specific objectives, however are: i) implementation of a new, more problem oriented and/or demand driven mode of operation in the NARS and to give greater prominence to multidisciplinary, location specific research, through enhanced linkages between research institutions and programmes, ii) sharpening focus of the research on problem of emerging national importance, iii) increasing the proportion of research output that responds directly to the needs of backward areas, small-scale farmers, women and disadvantaged groups, iv) increasing contribution for frontier sciences relevant to production system research and v) meeting crucial gaps in knowledge and skill needed to attain the technical objectives.

COMPONENTS

Research

This component supports research programmes in Agro-ecosystems under Team of Excellence (TOE), Mission Mode (MM), Production System Research (PSR), Technology Assessment and Refinement (TAR) and Competitive Grants Programme (CGP). The programmes of Agro Eco-systems Research revolve around 8 thematic areas: i) Integrated Pest Management (IPM), ii) Natural Resource Management (NRM), iii) Integrated Plant Nutrient Management (IPNM), iv) Post Harvest Technology and Value Addition (PHT&VA), v) Agro-Biodiversity (ABD), vi) Water Management (WM), vii) Socio-Economics and Policy Research (SE&PR) and viii) Biotechnology (BT). Scientists involved with the research programmes have been empowered to make them responsible and accountable and also to develop scientific leadership qualities to enable them to take hard and challenging decisions in tune with national interest and fast changing global perspectives. This paradigm shift in management of research will ensure need based delegation of powers with matching responsibility and accountability.

Technology Dissemination

Under the ICAR component of the Innovations in Technology Dissemination, 53 Zonal Research Stations (ZRS) are remandated to function as KVKs. These ZRSs are being strengthened to serve their newly assigned roles of developing and testing location specific technologies. Forty Agricultural Technology Information Centres (ATICs) have been established...
for providing single window support system for access to recent technologies developed at various units of ICAR institutions/SAUs. In addition, 29 Directorates of Extension Education in SAUs and 8 Zonal Coordinating Units are being strengthened.

The Department of Agricultural Cooperation (DAC) component is being implemented in six states viz, Andhra Pradesh, Bihar, Himachal Pradesh, Maharashtra, Orissa and Punjab. Districts in all the six states have been identified for establishment of Agricultural Technology Management Agencies (ATMAs). The State Agriculture Management and Extension Training Institutes (SAMETIs) are being strengthened to train the farmers and the extension workers. Strategic Research and Extension Plans (SREPS) for the selected districts have been finalized for planning interventions.

**Organization and Management (O&M) Systems**

Organization & Management (O&M) Systems cover activities related to: i) O&M reforms in ICAR, ii) Strengthening of ICAR Headquarters, National Agricultural Science Centre (NASC), Directorate of Information & Publication on Agriculture (DIPA) and PIU-NATP, iii) Institutionalization of Priority Setting Mechanism, Monitoring and Evaluation (PM&E) and iv) Information System Development (ISD) covering Agricultural Research Information Service (ARIS) and Library Information and Networking.

The comprehensive allocation of budget is as follows: i) Research component US $ 125.8 m; ii) Technology dissemination US $ 39.5 m; iii) O&M System US $ 53.7 m; iv) Physical/price contingency US $ 20.7 m; total US $ 239.7 m.

The NATP has made significant strides in its one and a half years of existence and is heading steadily towards full implementation of the diverse activities planned under the Project. It has catalyzed the scientific system and excellent partnerships have been built among the institutions and scientists. The Project is now progressing towards building up of partnership at the international level also. Most of the Research programmes have been reviewed, finalised and cleared and the present status of progress under this Component is as follows: i) Teams of Excellence-26; ii) Mission Mode-30; iii) Competitive Grant Projects-79; iv) Production Systems Research-197; v) Institute Village Linkage Programme (IVLP) through TAR-44.

The impact of this initiative is being felt in the different agro-ecosystems and it is hoped that it will catalyze the change in the NARS to address the emerging challenges in Indian Agriculture. Recently, the programme of Rainfed Agro-ecosystem was launched at Hyderabad. In his inaugural speech on this occasion Dr R.S. Paroda, Director General, ICAR stressed for “a symbiosis between institutes, scientists and farmers to help agricultural technology bloom”. Agricultural scientists must be able to make technology work in the fields. And for this they must be prepared to rub shoulders with farmers and institutions, he said. In June, a brainstorming meeting of the Project Monitoring Committee was held with the World Bank Mid-Term Review Team, wherein the overall programme was reviewed and discussed.

[Contributed by: Dr K.P Agarwal, National Coordinator, NATP, Project Implementation Unit, and Dr P.L. Gautam, National Director, NATP, LBS Centre, IARI, Pusa Campus, New Delhi 110 012]
CARP PROMOTES AGRICULTURAL RESEARCH AND TRAINING ACTIVITIES IN SRI LANKA

More recent efforts (during the last six months) with emphasis on agricultural research and training/skill enhancement of staff are presented.

- A Workplan 2000/2001 for cooperation between the Indian Council of Agricultural Research (ICAR) and the Sri Lankan Council for Agricultural Research Policy (CARP), (on behalf of SL NARS), on Agricultural Research and Training was signed on February 5, 2000 in New Delhi and on the 30th March, 2000 logistical arrangements to execute this plan were worked out. This agreement covers (a) exchange of germplasm, (b) joint projects in Agricultural Research between India and Sri Lanka, (c) exchange of 15 scientists, (d) short-term training for Sri Lankans in India in various specialities, and (e) Postgraduate training for 30 Sri Lankans at Indian Agricultural Universities.
- CARP secretariat staff have been exposed to skills training in several fields of computer applications including GIS (Arc-view), Visual Basic & Programming in C++, and currently two members are with ISNAR upgrading their MIS skills to the state-of-art. Also, CARP has started to compile a quarterly newsletter and also got access on the web at http://www.slcarp.lk. It is now in the process of building its own capabilities of improving upon what it now has on-line. A 10-year Vision for agricultural Research in this country is also being developed.

[Contributed by: Dr D. Kiritsinghe, Executive Director, Sri Lankan Council for Agricultural Research Policy (CARP), Wijerama Mawatha, Colombo, Sri Lanka]

NARC ORGANIZES NATIONAL SUMMER CROPS RESEARCH WORKSHOP AT LUMLE, NEPAL

Nepal Agricultural Research Council (NARC) organized the 22nd National Summer Crops Research Workshop at Agricultural Research Station, Lumle, from 27-29 March, 2000. Such workshops are held every two years and are well coordinated, representing diverse partnerships. This three-day workshop was held with the objectives to review the research activities carried out on summer crops in the past few years and their outcomes, recommend technologies to release for farmers to adopt, discuss existing problems and make suggestions for improvement.

The workshop was participated by scientists/researchers from National Commodity Research Programmes, Regional Agricultural Research Stations. Disciplinary divisions of NARC; district agriculture offices of Department of Agriculture; Institute of Agriculture and Animal Science (IAAS), NGOs, Donor agencies and farmers. In the workshop, working papers about the researches on various summer crops i.e. rice, maize, millets, buckwheat, oilseed crops, grain legumes and jute were presented and discussions on different issues were held followed by the group presentations on recommendations of technologies for release, pipeline technologies, and some promising technologies under research and on some system and management issues.

The workshop after deliberate discussions recommended varieties for official release to be cultivated by farmers in different agro-climatic regions/zones of the country: 13 in rice, 4 in maize, 1 in cowpea, 2 in pigeonpea, 4 in soybean, 2 in groundnut, 1 in sesame, 1 in niger, 4 in fingermillet and 2 in buckwheat. They were recommended on the basis of many years results of various research trials of different levels in different areas. Similarly, 32 varieties in rice, 5 in maize, 2 in cowpea, 1 in pigeonpea, 2 in soybean, 4 in groundnut, 1 in sesame, 1 in sunflower, 3 in fingermillet and 4 in jute were recommended as pipeline varieties for further research/experiments to be undertaken at different research stations and outreach research sites in farmers’ field. The workshop also made recommendation on system perspectives and management issues for improvement.

[Contributed by: Dr Dhruv Joshi, Executive Director, Nepal Agricultural Research Council (NARC), Lalitpur, Khumaltar, Kathmandu, Nepal]
**APAARI PUBLICATIONS**

**SUCCESS STORIES**

- **Baby Corn Production in Thailand** (1994/1)
  - by Dr Chaman Chutkaew 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 – A Success Story of Effective Linkages** (1996/1)
  - by Chae Yun Cho
- **Cotton Production in Pakistan** (1996/2)
  - by Badaruddin 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 Basiron
- **Direct Seeded Rice in Malaysia** (1998/1)
  - by Dr Cheong Ah Wah
- **Groundnut in China** (1998/2)
  - by Dr Duan Shufen, Dr Hu Wenguang and Dr Sui Qingwei
- **Oilseeds in India** (1999/1)
  - by Dr Mangala Rai
- **Integrated Pest Management in Rice in Indonesia** (1999/2)
  - by Dr Soejitno

**OTHER PUBLICATIONS**

- Proceedings – Expert Consultation to Develop APAARI Vision 2025 & Fifth Executive Committee Meeting of APAARI
- APAARI – A Decade of Progress
- APAARI – Vision 2025

**FUTURE CONFERENCES**

- **Title**: XXI International Union of Forestry Research Organization (IUFRO) World Congress
  - **Venue**: Kuala Lumpur, Malaysia
  - **Period**: 7–12 August, 2000
  - **Contact**: Chairman, Congress Organizing Committee (COC) XXI World Congress, Forest Research Institute, Malaysia (FRIM) 52109, Kuala Lumpur, Malaysia
  - **Phone**: +603-630-2135/2564
  - **Fax**: +603-630-5687/7753
  - **E-mail**: iufroxxi@frim.gov.my
  - **http://frim.gov.my/intro.html**

- **Title**: 3rd International Crop Science Congress 2000
  - **Venue**: CCH Congress Centrum, Hamberg, Germany
  - **Period**: 17–22 August, 2000
  - **Contact**: CCH-Congress Organization P.O. Box 3024
  - **Phone**: 8-14 October, 2000
  - **Fax**: 0049-040-3569-2269

- **Title**: International Symposium on Scientific Basis for Participatory Improvement and Conservation of Crop Genetic Resources
  - **Venue**: Oaxtepac, Morelos, Mexico
  - **Period**: 8-14 October, 2000
  - **Contact**: Dr Adi Damania, Symposium Secretariat
  - **E-mail**: abdamania@ucdavis.edu

- **Title**: PLACROSYM-XIV International Conference on Plantation Crops
  - **Venue**: Hyderabad, India
  - **Period**: 12–25 December, 2000
  - **Contact**: Dr P. Rethinam, Director
  - **E-mail**: abdamania@ucdavis.edu

- **Title**: 6th ISRR Symposium Roots: The Dynamic Interface between Plant and the Earth
  - **Venue**: Nagoya, Japan
  - **Period**: 11–15 November, 2001
  - **Contact**: Dr Shigenori Moritta, Graduate School of Agricultural and Life Sciences
  - **E-mail**: moritta55@mailcity.com

**All queries relating to APAARI Newsletter be addressed to:**

APAARI Secretariat, FAO Office in India, 55, Max Mueller Marg, New Delhi-110 003
Phone: +91-11-4628877; Fax: +91-11-4620115; E-mail: FAO-IND@field.fao.org
APAARI Homepage: http://www.apaari.org