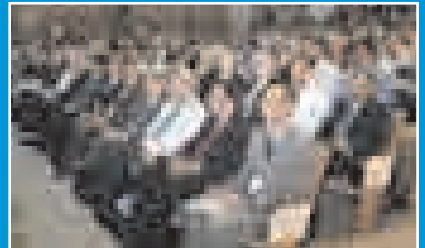
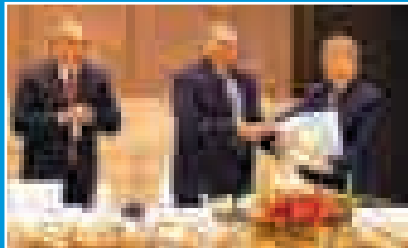




# *Twenty Two Years of APAARI*

- A Retrospective



# *Twenty Two Years of APAARI*

- A Retrospective

**Raj Paroda  
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# Foreword

Asia-Pacific Association of Agricultural Research Institutions (APAARI) was established in 1990 at the initiative of Food and Agriculture Organization of the United Nations (FAO) and most of the National Agricultural Research Systems (NARS) of the Asia-Pacific region. Its mission is to promote the development of NARS in Asia-Pacific region through facilitation of inter-regional, inter-institutional and international partnerships. APAARI's vision is: "To promote Agricultural Research for Development (AR4D) in the Asia-Pacific region, facilitated through novel partnerships among NARS and other organisations, so that it contributes towards sustainable development through increased productivity of agricultural systems and improvements in quality of our natural resource base to ensure food security and economic development of our people in the Asia-Pacific region".

APAARI is, therefore, fostering the development of agricultural research in the Asia-Pacific region through: exchange of scientific and technical information; collaborative research; human resource development; organisational and management reforms; policy advocacy; and effective networking among diverse stakeholders.

During the past two decades, APAARI has emerged as a dynamic regional forum through its AR4D activities directed well by its members and the Perspective Plan and Vision 2025. It has organised a number of conferences/workshops, expert consultations/policy dialogues, training programs on emerging issues of great relevance to NARS, such as: AR4D priority setting at national, sub-regional and regional level; need to strengthen regional research networks and consortia, strengthening of Asia-Pacific Agricultural Research Information System (APARIS) and Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), both operating as umbrella programs. Greater emphasis has been laid on promoting areas such as genetic resource management, biotechnology, post-harvest technology, natural resource management, conservation agriculture, adaptation to climate change, role of women and youth in agriculture, trans-boundary diseases, biosafety and bio-security, farmer-led innovations and linking farmers to markets.

APAARI has been very active in bringing out several useful publications – newsletters, proceedings of conferences/workshops/expert consultations, and success stories on research innovations that have made good impact. Earlier in 2001, APAARI had brought out a brief account of its achievements through "A Decade of Progress". This was followed by a more comprehensive account of APAARI achievements in a publication entitled "Fifteen Years of APAARI".

Recognising the importance of emerging challenges in agriculture, the role of APAARI in fostering agricultural research for development got enormously widened commensurate with the needs of developed and developing NARS. This is quite evident from its diverse activities and accomplishments. Thus, for the benefit of stakeholders, it has been considered appropriate to bring out a comprehensive account of activities and achievements of APAARI during the past 22 years. This publication with enormous efforts of Dr. Raj Paroda, the dynamic Executive Secretary of APAARI, supported well by Dr Bhag Mal, Senior Consultant, APAARI and Dr J.L. Karihaloo, Coordinator, APCoAB is indeed very timely. It gives details of various efforts put forth by APAARI in providing regional thrusts, tracing its growth and development and its impact on collaborative research activities over the last 22 years in a well synthesised manner. It will serve as a reference document for NARS and other partners/stakeholders and policy makers interested in AR4D in the region. The achievements of APAARI have been in line with the Millennium Development Goals (MDGs), new strategy of CGIAR, and the GFAR Road Map. It is encouraging to see APAARI's efforts, as reflected herein, towards addressing the immediate challenges of alleviating poverty, ensuring household food and nutrition security, agricultural sustainability, and above all our environmental sustainability.

I am sure that wider dissemination of this publication will be of immense benefit not only to the NARS of the Asia-Pacific region but equally to other regions, especially for strengthening AR4D to ensure inclusive growth and development.



**Dr. Simon Hearn**  
Chairman, APAARI

# Acknowledgments

This publication is based on the information synthesized from various APAARI publications brought out since its establishment in 1990 such as: newsletters, success stories, proceedings of expert consultations/workshops/conferences, other thematic publications, and status reports, etc. This is an updated version of earlier publication entitled "Fifteen Years of APAARI - A Retrospective" brought out in 2006 by Drs. R.S. Paroda and R.K.Arora.

We take this opportunity to express our sincere thanks to all APAARI members and collaborators for their strong support throughout without which APAARI programs and various activities would have not been so successful. In fact, this comprehensive publication is embracing mainly the significant achievements of APAARI during the past 22 years.

The APAARI's achievements, in retrospect, are the result of partnership among its diverse members/partners/stakeholders, which include national agricultural research systems (NARS) and several regional and international organizations. We are indeed grateful to a number of CG Centers, Food and Agriculture Organization of the United Nations (FAO), especially its Regional Office for Asia-Pacific (FAO RAP), Global Forum on Agricultural Research (GFAR), Australian Center for International Agricultural Research (ACIAR), Council of Agriculture (COA), Chinese Taipei, Japan International Research Center for Agricultural Research (JIRCAS), The World Vegetable Center (formerly, Asian Vegetable Research and Development Center (AVRDC), and other International Agricultural Research Centers and Advanced Agricultural Research Institutions including a number of Agricultural Universities. The support in particular to APARIS Program from FAO RAP, ACIAR and GFAR and to APCoAB Program from FAO, the Rockefeller Foundation, ACIAR, COA, GFAR, MONSANTO, MAHYCO, SYNGENTA Foundation, etc. is duly acknowledged. Also, the support of Asian Development Bank (ADB) for the assessment of research priority needs in three sub-regions and for entire Asia-Pacific region is duly acknowledged.

We express our sincere thanks to Ms. Chanerin Maneechansook, Program Assistant, for her technical inputs relating to APARIS Program. We also acknowledge the official/secretarial support rendered by Ms. Urait Rujirek, Administrative Associate, APAARI from Bangkok office and both Mr. Ram Niwas Yadav and Ms. Simmi Dogra from



Delhi Office. At the end, we would like to place our sincere thanks to Late Dr. R.K. Arora for his tremendous efforts in compiling the earlier version entitled "Fifteen Years of APAARI". This publication is the further revised and updated version of earlier compilation.

**Authors**

# Acronyms and Abbreviations

AAACU	Association of Asian Agricultural Colleges and Universities
AARINENA	Association of Agricultural Research Institutions in the Near East & North Africa
ACIAR	Australian Center for International Agricultural Research
ACUC	Asian Center for Underutilized Crops
ADB	Asian Development Bank
AFA	Asian Farmers Association
AFGRN	Asia Fruits Genetic Resources Network
AFITA	Asian Federation for Information Technology in Agriculture
AgGDP	Agriculture Gross Domestic Product
AGRIS	Agricultural Resources Information System
AGROVOC	Agriculture and Vocabulary
AIT	Asian Institute of Technology
AMBIONET	Asian Maize Biotechnology Network
ANGOC	Asian NGO Coalition for Agrarian Reform and Rural Development
ANMAP	Asian Network on Medicinal and Aromatic Plants
ANSWER	Asian Network on Sweet Potato Research
APAARI	Asia-Pacific Association of Agricultural Research Institutions
APAFRI	Asia-Pacific Association of Forestry Research Institutions
APAN	Asia-Pacific Advanced Network
APARIS	Asia-Pacific Agricultural Research Information System
APCoAB	Asia-Pacific Consortium on Agricultural Biotechnology
APEDA	Agricultural and Processed Food Products Export Development Authority
APFORGEN	Asia-Pacific Forest Genetic Resources Program
APHCA	Animal Production and Health Commission for Asia and the Pacific
APO	Asia, the Pacific and Oceania
APMC	Agricultural Produce Marketing Committee
APSA	Asia and Pacific Seed Association
AR4D	Agricultural Research for Development
ARD	Agricultural Research for Development
AREO	Agricultural Research and Education Organization (Iran)

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ARI	Advanced Research Institute
AROW	Agricultural Research Organizations on the Web
ASEAN	Association of South-East Asian Nations
ASNAPP	Agribusiness in Sustainable Natural African Plant Products
ASTI	Agricultural Science and Technology Indicator
ATMA	Agriculture Technology Management Agency
Aus-AID	Australian Agency for International Development
AVRDC	Asian Vegetable Research and Development Center
BAIF	Bhartiya Agro-industries Foundation
BAPNET	Banana and Plantain Network
BAR	Bureau of Agricultural Research (Philippines)
BARC	Bangladesh Agricultural Research Council
BCP	Biotechnology Coalition of the Philippines
BIOTEC	Biotechnology
BIOTECH	National Center for Genetic Engineering and Biotechnology
BMGF	Bill and Melinda Gates Foundation
BMZ	German Ministry of Economic Development
BRAC	Bangladesh Rural Advancement Committee
BSF	Benefit-Sharing Fund
CA	Conservation Agriculture
CAAS	Chinese Academy of Agricultural Sciences
CABI	Center for Agricultural Bioscience International
CAC	Central Asia and Caucasus
CACAARI	Central Asia and the Caucasus Association of Agricultural Research Institutions
CaFAN	Caribbean Farmers Network
CAPSA	Development in Asia and the Pacific
CAR4D	Conservation Agricultural Research for Development
CARP	Sri Lanka Council for Agricultural Research Policy
CBD	Convention on Biological Diversity
CD-ROM	Compact Disk- Read only Memory
CEBAR	Center for Research in Biotechnology for Agriculture
CFF	Crops For the Future
CFTRI	Central Food Technology Research Institute
CG	Consultative Group
CGIAR	Consultative Group on International Agricultural Research
CIARD	Coherence in Information for Agricultural Research for Development
CIAT	International Center for Tropical Agriculture

CIMBAA	Collaboration for Insect Management in Brassica in Asia and Africa
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo
CIP	Centro Internacional de la Papa (International Potato Center, Peru)
CIRAD	Center de Coopération Internationale en Recherche Agronomique pour le Développement
CLAN	Cereals and Legumes Asia Network
CLT	Cooperative League of Thailand
COA	Council of Agriculture (Chinese Taipei)
COGENT	Coconut Genetic Resources Network
CORRA	Council for Partnerships on Rice Research in Asia
CoRRB	Council for RNR Research of Bhutan
CP	Challenge Program
CRP	CGIAR Research Program
CSO	Civil Society Organization
DBT	Department of Biotechnology
DFID	Department for International Development
DOA	Department of Agriculture (Thailand)
DOCNet	Development Opportunity Crops Network
DST	Department of Science and Technology
EA-PGR	East Asia Plant Genetic Resources Network
EFARD	European Forum for Agricultural Research and Development
EGFAR	Electronic Global Forum on Agricultural Research (Homepage of GFAR)
FAO RAP	FAO Regional Office for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
FFF	Federation of Free Farmers
FORAGRO	Forum for the Americas on Agricultural Research and Technology Development
FO	Farmer Organization
GAP	Good Agricultural Practices
GBN	Global Biosaline Network
GCARD2	Second Global Conference on Agriculture Research for Development
GCDT	Global Crop Diversity Trust
GCHERA	Global Consortium for Higher Education and Research in Agriculture
GCP	Good Collection Practices
GEF	Global Environment Facility
GFAR	Global Forum on Agricultural Research
GFU	Global Facilitation Unit

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GIS	Geographic Information System
GLOBAL-RAIS	Global Regional Agricultural Information System
GLP	Good Laboratory Practices
GM	Genetically Modified
GMO	Genetically Modified Organism
GMP	Good Manufacturing Practices
GoFAR	Group on Fisheries and Aquaculture Research
GO	Governmental Organization
GPA	Global Plan of Action
GPHI	Global Post-Harvest Initiative
GPP	Global Partnership Program
GTF	Global Task Force
GTZ	German Agency for Technical Cooperation
HRD	Human Resource Development
IAC	Independent Advisory Committee
IAC	Institut Agronomique Neo-Caledonien
IARC	International Agricultural Research Center
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas
ICBA	International Center for Biosaline Agriculture
ICGEB	International Center for Genetic Engineering and Biotechnology
ICIMOD	International Center for Integrated Mountain Development
ICLARM	International Center for Living Aquatic Resources Management
ICM	Information Communication Management
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
ICUC	International Center for Underutilized Crops
IDRC	International Development Research Center
IFAD	International Fund for Agricultural Development
IFAP	International Federation of Agricultural Producers
IFPRI	International Food Policy Research Institute
IIT	Indian Institute of Technology
ILCA	International Livestock Center for Africa
ILRI	International Livestock Research Institute
IMARK	Information Management Resources Kit
IMOD	Inclusive Market Oriented Development
INBA	International Islamic Network on Biosaline Agriculture

INBAR	International Network on Bamboo and Rattan
INCANA	Inter-regional Network on Cotton in Asia and North Africa
INGA	International Network on Genetic Resources of Aquaculture
INGER	International Network for Genetic Evaluation of Rice
INIBAP	International Network for the Improvement of Banana and Plantain
Inwent	Capacity Building International, Germany
IPCC	Intergovernmental Panel on Climate Change
IPGRI	International Plant Genetic Resources Institute
IPG	International Public Good
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
IRRI	International Rice Research Institute
ISAAA	International Service for the Acquisition of Agribiotech Application
ISAP	Indian Society of Agribusiness Professional
ISAS	Indian Society of Agricultural Statistics
ISNAR	International Service for National Agricultural Research
IT	Information Technology
ITDG	International Technology Development Group
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IWMI	International Water Management Institute
JIRCAS	Japan International Research Center for Agricultural Sciences
KVK	Krishi Vigyan Kendra
LFM	Linking Farmers to Market
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
M&E	Monitoring and Evaluation
MAFF	Ministry of Agriculture, Forestry and Fisheries, Fiji
MAFFM	Ministry of Agriculture, Forests, Fisheries and Meteorology
MAP	Medicinal and Aromatic Plants
MARD	Ministry of Agriculture and Rural Development, Vietnam
MARDI	Malaysian Agricultural Research and Development Institute
MCFF	Ministry of Commerce, Forests and Fisheries, Western Samoa
MDGs	Millennium Development Goals
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIS	Management Information System
MLS	Multi-lateral System
MoU	Memorandum of Understanding
MSSRF	M.S. Swaminathan Research Foundation

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NAARM	National Academy of Agricultural Research Management
NAAS	National Academy of Agricultural Sciences
NACA	Network of Aquaculture Centers in Asia-Pacific
NAIB	National Institute of Agricultural Biotechnology, Republic of Korea
NAIS	National Agricultural Information System
NARC	Nepal Agricultural Research Council
NARDF	National Agriculture Research and Development Fund Nepal
NARI	National Agricultural Research Institute
NARO	National Agricultural Research Organization
NARS	National Agricultural Research Systems
NASC	National Agricultural Science Center
NCD	Natural Cellular Defense
NFSM	National Food Security Mission
NGO	Non-Governmental Organization
NINP	National Information Nodal Point
NRAA	National Rainfed Area Authority
NRM	Natural Resource Management
NSTDA	National Science and Technology Development Agency, Bangkok, Thailand
OECD	Organization for Economic Cooperation and Development
PAPGREN	Pacific Agricultural Genetic Resources Network
PARC	Pakistan Agricultural Research Council
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PFU	Program Facilitation Unit
PGFRA	Plant Genetic Resources for Food and Agriculture
PGR	Plant Genetic Resources
PHM	Post Harvest Management
PHM	Prognostic Health Management
PHT	Post-Harvest Technology
PNG	Papua New Guinea
PPP	Public-Private Partnership
PPVFRA	Protection of Plant Varieties and Farmers Rights Authority
PRAP	Pacific Regional Agricultural Program
PROLINNOVA	Promoting Local Innovation (NGO)
PROTA	Plant Resources of Tropical Africa
PSU	Public Sector Undertaking
R&D	Research and Development

RAC	Research Advisory Committee
RAEL	Regional Agricultural Expert Locator
RAGA	Research Association for Gender in Agriculture
RAIS	Regional Agricultural Information System
RDA	Rural Development Administration, Republic of Korea
RECSEA-PGR	Regional Cooperation in South East Asia-Plant Genetic Resources
RF	Regional Fora
RIS	Research and Information System for Developing Countries
RKVY	Rashtriya Krishi Vikas Yojana
RRN	Regional Research Network
RTF	Regional Task Force
RWC	Rice-Wheat Consortium
RWG	Regional Ad Hoc Working Group
SC	Steering Committee
S&T	Science and Technology
SAARC	South Asian Association for Regional Cooperation
SAIC	SAARC Agricultural Information Center
SANPGR	South Asia Plant Genetic Resources Network
SARC	South Asian Research Center
SAU	State Agricultural University
SAVERNET	South Asia Vegetable Research Network
SDC	Swiss Development Corporation
SDLEARN	Sustainable Development Learning Network
SEA	Southeast Asia
SEARCA	SEAMEO Regional Center for Graduate Study and Research in Agriculture
SGRP	System-wide Genetic Resources Program
SHG	Self Help Group
SMTA	Standard Material Transfer Agreement
SOP	Standard Operating Procedure
SPC	South Pacific Commission/Secretariat of the Pacific Community
SPF	Strategic Prevention Framework (US federal)
SPFDP	South Pacific Forestry Development Program
SPS	Standard Procurement System
SRC	Scientific Research Council
SSEEA	South, South East and East Asia
SWOT	Strengths-Weaknesses-Opportunities-Threats
TAAS	Trust for Advancement of Agricultural Sciences



## Twenty Two Years of APAARI — A Retrospective

TAMNET	Tropical Asia Maize Network
TAP	Tropical Agriculture Platform
TARI	Taiwan Agricultural Research Institute
TBD	Trans-boundary Disease
TFNet	Tropical Fruits Network
ToR	Terms of Reference
TPS	True Potato Seed
UKAiD	United Kingdom Agency for International Development
UNCC	United Nations Conference Center
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCAP	The United Nations Economic and Social Commission for Asia and the Pacific
UPM	University Putra Malaysia
URL	Uniform Resource Locator
USAID	United States Agency for International Development
USP	University of South Pacific
UTFANET	Underutilized Tropical Fruits Asia Network
WAICENT	World Agricultural Information Center
WB	World Bank
WFC	World Fish Center
WHO	World Health Organization
WISARD	Web-based Information Services for Agricultural Research for Development
WTO	World Trade Organization
XML	Extensible Markup Language
YPARD	Young Professionals for Agricultural Development

# 1 Introduction

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## Background Information

The Asia-Pacific region extends over a vast area representing West Asia, South Asia, South-East Asia, East Asia and the Pacific. The region exhibits a wide range of variation in climate, physiography and ecology. Its diverse climate supports equally diverse ecosystems encompassing plains and mountainous tracts with tropical semi-arid, sub-humid, humid tropical; coastal/oceanic; sub-tropical to temperate high altitude, cold arid habitats/environments. The region has a rich agricultural heritage reflecting diverse ethnic and cultural antiquity. Also, it is a region of domestication and diversification of several of our staple/food and other important crops (Box 1), livestock, fish and other agrobiodiversity as well as rich and unique wild flora and fauna exhibiting wide range of natural biodiversity. In fact, this region holds all kinds of agroclimatic/biological niches representing world's diverse biomes.

The Asia-Pacific is an agriculturally vibrant region. With 38 per cent of total agricultural land, it houses 80 per cent small holder farmers supporting 74 per cent of world's agricultural population. With 3.5 billion people, the region accounts for about 58 per cent of the world's population. Agriculture (crops, livestock, fishery, forestry, and the associated natural resource endowments) is the main source of livelihood for nearly 2 billion people. The region is the largest supplier of the world's food and agricultural products. The region has witnessed several innovations in agricultural development. Majority of the farmers are small holders, production is low and highly unstable, while there is intense demand for more food and other products because of population pressure. Further, there exists enormous variation in total land, land use, total population and agricultural population in the Asia-Pacific countries for different sub-regions. The geographical jurisdiction of Asia-Pacific Association of Agricultural Research Institutions (APAARI) region is given in Fig. 1.

The region is engulfed by poverty, food insecurity and malnutrition. According to FAO, the number of undernourished people in the world has increased during the last decade and the number of hungry for the first time crossed 1.0 billion in 2012. Almost two third of world's hungry (642 million) and 67 per cent of world's poor have their homes in this region. Besides poverty, the region is currently the home of 70 per cent of the world's undernourished children and women. The gains made in 1980s and early 1990s in reducing chronic hunger have been lost and the hunger

### Box 1: Asia-Pacific region is rich in agrobiodiversity

- The Asia-Pacific region is a cradle of domestication and primary center of diversity for many of the world's crop plants and forest resources. Crops, such as white jute, tree cotton, eggplant, pigeonpea, mango, jackfruit and cucumber originated from the Indian Gene Center; soybean, buckwheat, tea, citrus, litchi, peach, proso millet and foxtail millet from the Chinese Center; oriental rice, yam, taro, banana, mango and rambutan from South-East Asia, and yams, taro, coconut and breadfruit from the Pacific islands. A wide range of native diversity occurs in grain legumes, oilseeds, leafy vegetables, spices and condiments, medicinal plants, forages and forest species.
- This region is also a secondary center of diversity for introduced crops, such as maize, wheat, sorghum, groundnut, finger millet, chillies, pumpkin, okra, tomato, potato, sweet potato, papaya, guava, pineapple and several other tropical American fruits.
- Of the twelve regions of diversity of cultivated plants in the world, four are located in this region, namely, the Chinese-Japanese region, Indonesian region, Australian region and the Indian region.

reduction target to 50 per cent by 2015 under the Millennium Development Goals (MDG) remains unattainable.

Though the above constraints are of alarming nature and continue to persist, agricultural research for development, in the wake of rapid globalization and interdependence, has been addressing these issues on priority, making full use of national and regional assets and the great opportunities that the Asia-Pacific region offers for agricultural growth and productivity. This has been significantly achieved through the impact of Green, White, Blue and many other Agricultural Revolutions over the past few decades in the region.

In this context, recognizing the challenges before agriculture in the region, the role of APAARI in fostering agricultural development in the Asia-Pacific region has also got enormously widened since its establishment, commensurate with the needs of both developed and developing National Agricultural Research Systems (NARS). This regional forum has been actively debating on several emerging issues, addressing effectively the Millennium Development Goals (MDGs) involving Food and Agriculture Organization of the United Nations (FAO), Global Forum on Agricultural Research (GFAR), Consultative Group on International Agriculture Research (CGIAR)/ International Agricultural Research Centers (IARCs) and other organizations especially NARS, for strengthening agricultural research for development. Earlier in 2001, APAARI had brought out a brief account of its achievements in 'Decade



*Fig. 1. Geographical jurisdiction of Asia-Pacific region*

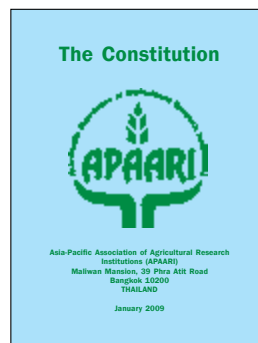
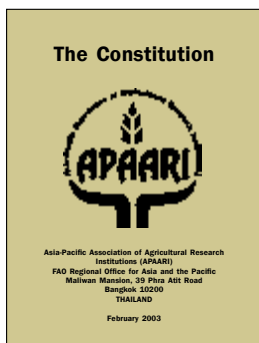
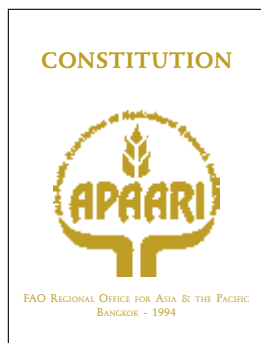
of Progress’ and later ‘Fifteen Years of APAARI’ published in 2006. However, the present publication gives greater details and is intended to highlight/address the efforts put forth by APAARI in defining regional priorities, tracing its growth and development, and the impact of its activities undertaken over the past 22 years. It provides a comprehensive account of its achievements for the information and possible use by its stakeholders and policy makers in the region. The document also conveys a message that agricultural research for development, capitalizing on advances made in science and technology, must play an important role in meeting the challenges of alleviating poverty, ensuring food and nutrition security as well as agricultural sustainability.

## 2 Genesis of APAARI

### Establishment of APAARI

Aware of the problems and challenges and realizing the opportunities available, the heterogeneity among National Agricultural Research Systems (NARS) and the regional needs to coordinate agricultural research and development for the benefit of all stakeholders, the FAO of the United Nations had organized in mid 1980s two regional conferences/consultations (Islamabad, 1984; Bangkok, 1985) which recommended the creation of a regional association to strengthen NARS. This led to the establishment of the Asia-Pacific Association of Agricultural Research Institutions (APAARI) in 1990, primarily to strengthen the national agricultural research capabilities and to enable the sharing of experiences among national partners, to alleviate poverty, increase productivity and resource-use, protect/conserves the environment and attain agricultural sustainability. APAARI is an apolitical, neutral and non-profit forum of agricultural research in the Asia-Pacific region. Significant events relating to establishment of APAARI are given in Box 2.

In order to plan, prioritize and initiate its activities, APAARI constitution was developed and adopted in December, 1990 by the General Assembly in its



### Box 2. Establishment of APAARI : Significant Events

- 1984-85 • FAO regional conference and consultations recommended the creation of regional association to strengthen NARS
- 1988-01 • Founder Chairman, Global Forum on Agricultural Research (GFAR)
- 1990-91 • Asia-Pacific Association of Agricultural Research Institutions (APAARI) was established
  - APAARI Constitution developed and adopted by the General Assembly
  - First Executive Committee constituted
  - APAARI activities initiated
- 1992-93 • APAARI logo designed and adopted by the General Assembly
  - Regional Crop Networks established
- 1994 • APAARI Constitution was revised
- 2000 • Asia-Pacific Agricultural Research Information System (APARIS) established
- 2000 • APAARI Vision 2025 developed and published
- 2001 • Regional priority setting for ARD in Asia-Pacific Region undertaken
- 2003 • Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) established
  - APAARI Constitution got revised
- 2004 • Research need assessment and prioritization for ARD in South and West Asia
- 2006 • Regional synthesis of research needs undertaken in Asia-Pacific region
- 2008 • Tsukuba Declaration on Adapting Agriculture to Climate Change
- 2009 • Bangkok Declaration on AR4D adopted
  - APAARI Constitution was further revised
  - Chairman, Program Committee, Global Forum on Agricultural Research (GFAR)
- 2010 • APAARI communication strategy developed
  - Suwon Agrobiodiversity Framework adopted
- 2012 • Regional synthesis of research needs in South Asia done and presented in Second Global Conference on Agriculture Research for Development (GCARD2)

- Chairman, Organizing Committee for the 2nd Global Conference on Agricultural Research for Development (GCARD2)
  - Global Conference on Women in Agriculture Organized
- 2013
  - CSOs representation on APAARI Executive Committee (BRAC, Bangladesh; AFA, Philippines)
  - Member, CG Fund Council representing all Regional Fora
  - Member, Evaluation and Impact Assessment Committee of CG Fund Council
  - Chair, Independent Advisory Committee (IAC) on CRP (Grain Legumes)
- 2014
  - Member, Tropical Agriculture Platform (TAP) - Global Task Force (GTF) & Regional Task Force (RTF)



*APAARI meeting held in Yogyakarta, Indonesia in November, 1993 with Dr Mohd. Yusaf bin Hashim, the then DG MARDI as Chairman, APAARI Executive Committee*

meeting held at FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. The Constitution was published in December, 1991 and subsequently revised in September, 1994, followed by amendments in February 2003 and January 2009 as per NARS needs in particular and overall regional developments. It has 17 Articles and 32 clauses detailing its structure, management and governance, and system and procedures.



# 3 Objectives, Functions, Structure and Governance

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## Mission

The ‘Mission’ of APAARI is to promote further development of national agricultural research systems in the Asia-Pacific region through facilitation of intra-regional, inter-institutional, and international cooperation/partnership.

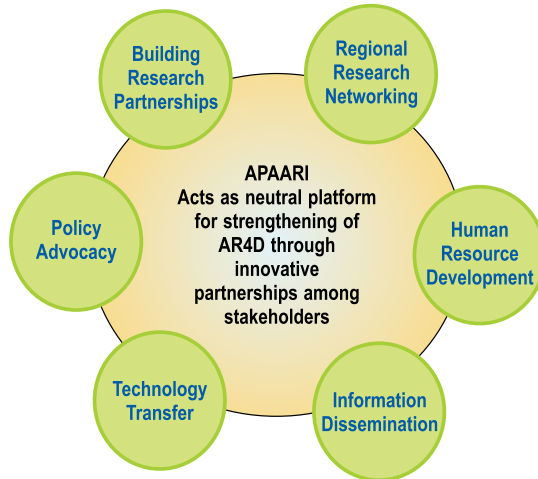
## Objectives

The overall objective of the Association is to foster agricultural research for development in the Asia-Pacific region so as to help address the concerns of hunger, poverty, environmental degradation and sustainability of agricultural production. More specifically, the objectives are as follows:

- To promote the exchange of scientific and technical know-how and information in agriculture
- To encourage the establishment of appropriate cooperative research and training programs in accordance with identified regional, bilateral or national needs and priorities
- To assist in prioritizing NARS/regional needs, strengthening of research organizational and management capabilities of member institutions including information and communication technology
- To strengthen cross-linkages among national, regional and international research centers and organizations including universities through involvement in jointly planned research and training programs
- To promote collaborative research among member institutions including need based support to regional research networks

## Strategic Thrusts

APAARI acts as a neutral platform for strengthening agricultural research for development through innovative partnerships among stakeholders. Its major strategic thrusts are given in Fig. 2.



*Fig. 2. APAARI's strategic thrusts*

## Functions

In pursuance of the above objectives, the Association may undertake one or more of the following activities:

- Convene General Assembly to discuss the Association's policies and priorities, work plan and administrative matters
- Organize working groups, meetings and seminars to discuss specific problems or sponsor technical studies, training courses and workshops
- Collect, collate and disseminate research information
- Maintain links with agencies, institutions, organizations and other entities undertaking similar activities within and outside the region including donor institutions
- Promote collaborative research among member institutions



*Dr. Jacques Diouf, Former DG FAO visits APAARI Office in FAO premises*

## Organizational Structure and Management

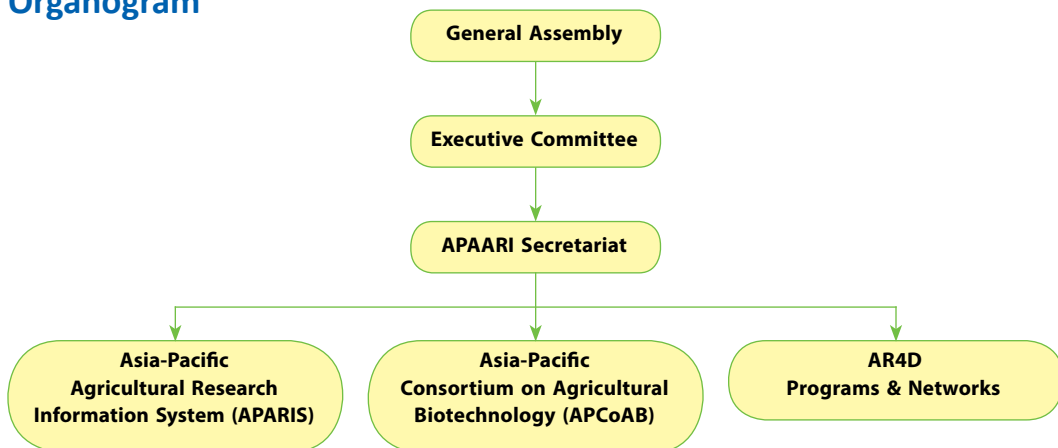
The activities of APAARI as per its Constitution are carried out by its Executive

Committee which is elected from among member NARS once every two years. It is composed of a Chairman, a Vice-Chairman, and Executive Secretary and eight other Executive Members. The Executive Secretary has the overall responsibility to execute the activities and manage the functioning of the Secretariat. The composition of the Executive Committee for 2013-2014 is given in Box 3. The composition of the Executive Committees from 1991-92 onwards to date. are given in Annexure I.

<b>Box 3. APAARI Executive Committee (2013-2014)</b>		
Chairman	Dr. Simon Hearn	ACIAR, Australia
Vice-Chairman	Dr. Masa Iwanaga	JIRCAS, Japan
Members	Dr. S. Ayyappan	ICAR, India
	Dr. Iftikhar Ahmad	PARC, Pakistan
	Dr. Cho Myoung-rae	RDA, Republic of Korea
	Mr. Misa Konelio	MAFFM, Samoa
	Dr. Mark Holderness	GFAR, Italy
	Dr. Thomas Lumpkin	CIMMYT, Mexico
	Dr. Mahaboob Hossain	BRAC, Bangladesh
	Ms. Esther Penunia	AFA, Philippines
Executive Secretary	Dr. Raj. Paroda	APAARI

Currently, APAARI operates through the organizational arrangement as given in the organogram below:

### Organogram

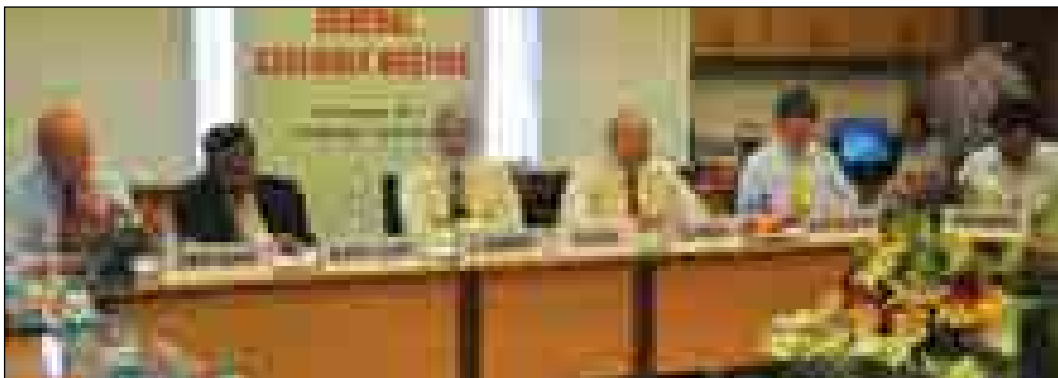




*APAARI Executive Committee Meeting at Islamabad*

In line with the above organizational structure, the General Assembly develops policies, priorities and programs every two years. The Executive Committee is responsible for managing the affairs of APAARI in accordance with policies and directives adopted by the General Assembly. The Secretariat of APAARI is headed by the Executive Secretary who is responsible for carrying out the overall program, allocation of budget, convening of Executive Committee and General Assembly meetings. Currently, the Secretariat, located at Annex Building of FAO Regional Office, Bangkok, is manned by the Administrative Associate. APAARI has also initiated two major programs, namely, Asia-Pacific Agricultural Research Information System (APARIS) operating from APAARI Secretariat, Bangkok and headed by a Coordinator and supported by Program Assistant and Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) located at ICRISAT office, NASC, Pusa Campus, New Delhi, India headed by a Coordinator and supported by Office Secretary. Need based consultants are also contracted for short-term for needed technical support.

An Editorial Committee is designated to prepare and review APAARI publications including a biennial APAARI Newsletter, which is widely distributed to about 500 persons currently on APAARI mailing list.



*APAARI General Assembly Meeting, New Delhi*

## Membership

APAARI is a self-sustaining organization mainly based on its membership subscriptions since its establishment. Membership is open to national agricultural research institutions/councils/organizations/universities from countries of the Region/ARD Fora in other regions, etc. In countries where agricultural research is handled directly by a government department, the relevant unit/bureau will be eligible to become member of the Association.

Presently, it has 56 members. As per APAARI Constitution, these members (Annexure II) are categorized as follows:

- Regular Members-NARS (20): These are national agricultural research institutions/councils/organizations/universities in the region from South-West Asia, South Asia, South-East Asia, East Asia, and the Pacific Island countries and Oceania.
- Associate Members (16): These include CGIAR Centers, International Agriculture Research Centres (IARCs), Agricultural Research Institutions (ARIs) and Regional Centers
- Affiliate Members (10): These include regional fora, agricultural universities in the Asia-Pacific region
- Reciprocal Members (10): These are some regional/global ARD Fora and Civil Society Organizations (NGOs, FOs) that have recognized APAARI as their Member with conditions of mutual waiver of any membership fee.



*APAARI members represent NARS, regional and international organizations*



*Diverse partnership constitutes APAARI's strength*

APAARI has gained momentum over the past 22 years of its establishment as an important scientific regional forum. It has built up diverse partnerships, utilizing national, regional and international expertise and collective wisdom to attain its mission and objectives as reflected in Chapter 3 “Objectives, Functions, Structure and Governance”.

## 4 Perspective Plan and Vision 2025

In pursuance of its goals, APAARI effectively planned its activities for agricultural research for development broadly in two phases: i) developing a perspective mid-term plan for five years (1995-2000) during 1994-95, and ii) its vision 2025 – for long-term plan to be pursued from 2000 onwards, keeping in view the overall sub-regional/regional needs and global R&D scenario, and flexibility to discuss reprioritization of activities/programs.

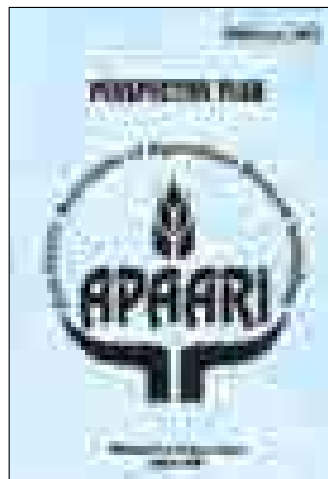


*Perspective Plan Meeting held at Bangkok, 1994*

### Perspective Plan (mid-term 1995-2000)

To streamline its objectives and functions, APAARI developed in 1994-95 its Perspective Plan which provided a blue print for its development in the medium-term. This was presented at the Third General Assembly meeting in November, 1994, and got approved. The Perspective Plan reinforced collaborative relationships among institutions and advocated networking of activities to support and complement national efforts in improving agricultural research for development in the region, and to address relevant issues. APAARI, thus, worked out strategies to ensure that it is able to address and provide directions to achieve its goals by implementing the following tasks:

- Regional collaboration/networking/partnership
- Human resource development/capacity building
- Policy advocacy
- Information dissemination/knowledge sharing
- Resource generation



## Vision 2025: Long-term Plan

The mid-term perspective plan provided the desired direction and accordingly, diverse activities were undertaken by APAARI, as per strategies defined. However, it was realized that over this period (1995-2000), several developments took place within NARS vis-à-vis global/regional agricultural scenario. There had been some significant paradigm shifts requiring timely interventions to broaden APAARI's vision, considering the challenges of the region, status of the NARS and NARS-NARS and inter-institutional collaboration/cooperation among partners, and to develop programs addressing the emerging role of new science:



*Expert consultation to develop APAARI Vision 2025*

information communication technology (ICT), biotechnology, post-harvest technology (PHT), etc. and needed shift towards policy advocacy. Further, APAARI's focus remained on AR4D to address poverty alleviation and food security, while aiming at agricultural sustainability. To achieve these goals along with the objectives laid out in the perspective plan, the strategies were revised looking at APAARI's long-term perspective in regional context. Thus, APAARI during August 1999 had organized at New Delhi, a brainstorming meeting to discuss its Vision 2025. Subsequently, this was further discussed and formally adopted during the Executive Committee meeting of APAARI held at FAO RAP, Bangkok on 29 November – 1 December 1999. Same was later published and widely circulated among all APAARI members. The gist of APAARI Vision 2025 is given in Box 4.



### Box 4. APAARI Vision 2025

“Agricultural Research for Development (AR4D) in the Asia-Pacific region is effectively promoted and facilitated through novel partnerships among NARS and other related organizations so that it contributes to sustainable improvements in the productivity of agricultural systems and to the quality of the natural resource base that underpins agriculture, thereby enhancing food and nutrition security, economic and social well being of communities and the integrity of the environment and services it provides.”

APAARI since then endeavoured to fulfil this vision by building NARS towards sustainable agricultural research for development (AR4D) through effective regional cooperation. It also functioned as a regional forum to provide a neutral platform for discussion on thematic research issues/policies. The journey forward for APAARI vis-à-vis Vision 2025 followed an integrated, well coordinated approach in pursuance of its goals and mechanisms (APAARI Vision 2025; published 2000).

There has been a paradigm shift from a supply driven to a demand driven approach in agriculture. This resulted in a change in focus from production levels to production efficiency, productivity and profitability. Besides that, equity, employment, environmental sustainability, nutrition, food quality, trade, etc. have become new areas of concern for agricultural research even as efforts to maintain food security continue. Obviously, these areas make R&D management arduous and challenging. This demands for effective introspection, re-prioritization and consolidation, besides overall accountability. These underscore a need for developing an appropriate strategy and action plans. It may be noted that the elements of the strategy need to be separately charted out for different countries or sub-regions (e.g., West Asia, South Asia, South-East Asia, East Asia, and the Pacific Island countries).

The following strategic thrusts on agricultural research for development (AR4D) embraced in APAARI Vision 2025 are considered important to be pursued in order to accomplish the desired goals:

- Strengthening regional cooperation and partnership through networking and encouraging the use of new information and communication technology
- Publication enhancement for information and technology transfer among NARS
- Human resource development
- Impact assessment and evaluation
- Advocacy for ARD at the policy level
- Setting strategic directions
- Ensuring sustainability

APAARI as a dynamic regional forum has done well in promoting sustainable agricultural development through communication among NARS and the regional cooperation through its support for network. Rapidly growing population coupled with the noble vision of ensuring comprehensive and sustained physical and economic access to food and a quality livelihood for all the people in the region, clearly point towards the urgency and unquestionable need for concerted action to ensure increased productivity and sustainable food security across the countries in the region. There is a compelling need to link NARS across agri-ecological, economical and political boundaries, and to enter regional and global associations and networks for sharing of knowledge and information.



### Box 5. Strategic Areas (Vision 2025)

- Enhancing production and productivity
- Genetic resource management and use
- Natural resource management
- Climate change adaptation and mitigation
- Linking farmers to market
- Biotechnology for yield enhancement
- Biosafety and biosecurity regulations
- Biofuels for energy
- Enhancing role of women and youth in agriculture
- Knowledge sharing

APAARI's Vision 2025 clearly outlines the pathway and the strategy to translate future goals into current activities. Today's action is the basis for tomorrow's progress, and strength is built through partnership with mutual benefit and combined action by all the key players responsible for ARD in the Asia-Pacific Region – a region that is dynamic and agriculturally vibrant. Hence, this vision provides a clear path and directions set for all the key players to ensure that this dream becomes a reality. APAARI Vision 2025 is decidedly a significant step in that direction with the aim to achieve regional welfare and prosperity.

The major strategic areas to be addressed for the effective implementation of APAARI Vision 2025 are given in Box 5.

## 5 Strategies and Priorities for AR4D

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APAARI provides a platform for regional priority setting based on the needs identified by different stakeholders in the Asia-Pacific region. During the last two decades, APAARI has done its best to bring together all stakeholders to collectively decide on regional research priorities, its strategic plan, the networks it is associated with, and some new initiatives such as on ICT/ICM and biotechnology.

The Sixth General Assembly of APAARI and the Expert Consultation on ‘Strategies for Implementing APAARI Vision 2025: Towards Agricultural Research for Development in the Asia-Pacific Region’ held from 8-10 November, 2000 at Chiang Rai, Thailand stressed on the importance of agricultural research and development (ARD) priority setting at the national, sub-regional and regional levels involving various stakeholders, such as NARS, ARIs, CGIAR Centers, FAO, IFAD, GFAR other international organizations and NGOs. Three sub-regional meetings were accordingly recommended and planned for South Asia (ICAR, New Delhi and ICRISAT); South-East and East Asia (PCAARRD, Los Baños, Philippines and IRRI) and South Pacific (NARI, Papua New Guinea and ACIAR). The following strategies were identified on priority basis: (i) strengthening regional cooperation and partnership through networking and encouraging the use of new information and communication technology, (ii) human resource development including improvement of research management, (iii) advocacy for ARD at the policy level, (iv) impact assessment and evaluation, (v) setting strategic directions, (vi) ensuring sustainability, and (vii) publication enhancement for information and technology transfer among NARS.

Subsequently, during 2001, APAARI organized three sub-regional meetings on ARD Priority Setting; for West and South Asia at ICRISAT, Patancheru, India; for South-East and East Asia at IRRI, Los Baños, Philippines; and for the Pacific region at Nadi, Fiji. The recommendations of these were further discussed at the Expert Consultation held in Bangkok on 12-14 November, 2001. This exercise, while analyzing the regional priorities, took note of the common priorities for the sub-regions and as to how best to integrate these with some of the CGIAR Challenge Programs (CPs). It also emphasized that the role of regional networks should also to be examined critically and efforts made to bridge the existing gaps.

Based on the above deliberations, seven common areas for research opportunities/ regional priorities could be identified, namely:

- Natural resource management
- Management of genetic resources



*Expert consultation on ARD priority setting by NARS*

- Commodity chain development (linking farmers to markets)
- Meeting protein needs of growing population – both animal and plant resources
- Tree and forest management
- Information and communication management
- Capacity building

The specific priority areas identified are given in Box 6. The details of the discussions were published in 2002. This publication serves as an important input in the process of ARD planning in the region presenting the sub-regional ARD needs.

For South and West Asia another meeting was held at ICRISAT in 2004, and also for other sub-regions in 2005, to assess regional research needs and ARD priorities, taking into consideration the new developments and challenges. One of the major challenges the Asia-Pacific region faced was the on-going shift from a focus on increased production to meet national food security targets, to increased farm productivity that factors in environmental concerns and profitability. Since majority of the producers in the region are small scale farmers, moving them beyond the subsistence level to market – oriented and environmentally sound production systems will not be easy. This, therefore, needed a major paradigm shift for ARD. Integrating all efforts, the broad workable structure of strategies for ARD and the corresponding action plan addressing many of the priorities were developed and are given in Box 7.

In South and West Asia, new research areas deserving additional emphasis include agroenterprise development (focus on legumes, post-harvest technology for value adding products), and policy and institutional reforms with special emphasis on strategies to encourage higher investments in infrastructure, and enabling



*ICRISAT-ICAR-APAARI expert consultation on agricultural research priorities for South and West Asia*

#### **Box 6. Regional Priorities for the Asia-Pacific Region**

- Natural Resource Management
  - ❖ Integrated NRM and integrated crop management (ICM)/IPM
  - ❖ Policy development and institutional issues related to NRM
  - ❖ Watershed management
  - ❖ Land management and soil fertility
  - ❖ Rehabilitation of degraded and marginal lands
- Genetic Resources Enhancement and Agrobiodiversity Conservation
  - ❖ PGR conservation and improvement
  - ❖ Livestock selection and improvement (including fisheries)
  - ❖ Microbial functional agrobiodiversity
  - ❖ Biosafety issues/policy/GMOs/IPRs
- Commodity Chain Development (Linking Farmers to Markets)
  - ❖ Commercialization, marketing and trade
  - ❖ Policy–International agreements
  - ❖ Input/supply and demand analysis (industry and macro level)
  - ❖ Production and marketing economic analysis (firm/farm and micro level)

- ❖ Value adding
- ❖ Competitiveness
- ❖ Product/quality improvement and standards
- ❖ Quarantine and biosecurity
- Meeting the Protein Demand of Growing Population (Animals)
  - ❖ Feed resources: fish, poultry, ruminants and non-ruminants (forage, pasture, fodder, grain, constituted feed stocks and crop residues)
  - ❖ Disease management (poultry, ruminants, non-ruminants, aquaculture)
  - ❖ Production systems (crop/livestock, aquaculture, mariculture)
  - ❖ Waste management by-product utilization
- Meeting the Protein Demand of Growing Population (Plants)
  - ❖ Grain legume productivity improvement
  - ❖ Legumes in farming systems
  - ❖ Quality and nutrition improvement (human)
  - ❖ Food safety: aflatoxins and anti-nutrition factors
- Tree and Forest Management for Landholders
  - ❖ Natural forest management
    - ◆ Harvesting regime and regeneration
    - ◆ Cutting cycle analysis
  - ❖ Forest plantation, productivity and health
  - ❖ Agro-forestry in production systems
- Cross-cutting Issue: Information Management for Agricultural Development
  - ❖ Packaging, access and use: research, methodologies and modalities
- Cross-cutting Issue: Capacity Building
  - ❖ Human resources development
  - ❖ Institutional development
    - ◆ Research management, stakeholder management
    - ◆ Technology transfer facilitation
  - ❖ Research policy development
    - ◆ Food insecurity and poverty mapping

### Box 7. Strategies for AR4D and Action Plan

- Regional Cooperation and Partnership (Collaboration/Networking in Priority Programs)
  - ❖ Prioritize/select and support specific programs; promote new initiatives
  - ❖ Identify centers of excellence
  - ❖ Establish regional databases; ensure information sharing through electronic connectivity
- Human Resource Development/Capacity Building
  - ❖ Sensitize NARS to strengthen HRD
  - ❖ Identify specific needs for trainings, workshops
  - ❖ Promote technology transfer
- Policy Advocacy
  - ❖ Hold dialogues on policy issues to sensitize NARS vis-à-vis other partners
  - ❖ Preparing/publishing policy papers and information dissemination
- Information Dissemination
  - ❖ Publication of newsletter, success stories, proceedings of meetings/ consultations, specific status reports for Asia-Pacific, sub-regional/regional emphasis
  - ❖ Promote public awareness
  - ❖ Disseminate information widely among members, NARS and other partners
- Resource Generation
  - ❖ Enhance APAARI membership
  - ❖ Facilitate NARS to prepare proposals for donors support
  - ❖ Diversify donors choice as per proposal/project needs

policies on marketing, credit and commodity pricing. In the Pacific, serious gaps were identified in important research areas such as value adding and post-harvest management, markets and marketing. In Southeast Asia (SEA), main priority areas identified were: i) food safety and security, specifically agriculture and fisheries product quality, value adding of products for competitiveness, productivity and profitability, export/import competitiveness, policy researches related to food safety, market changes, biotechnology and other emerging issues; and ii) farmers/ fisher folks capability enhancement including value chain analysis and improve market access, entrepreneurial development of farmers and fisher folks, provision of access to credit, and intra/inter-household production access.

There is growing recognition that research must transform subsistence farming into agro-entrepreneurship. With support from Global Forum on Agricultural Research (GFAR), a workshop on Regional Synthesis of Research Needs in Asia-Pacific was conducted on 18-19 August, 2006 in Bangkok. It brought together key stakeholders in the three sub-regions, namely, the NARS, CGIAR centers, non-governmental organizations (NGOs), farmers' and Private Sector organizations, donor representatives, regional and international organizations, and the youth sector. The workshop synthesized regional research needs and identified short and medium term regional priorities and suggested anticipatory researches, and the roles of APAARI and GFAR. To the extent possible, the workshop addressed concerns for inter-sector imbalance, harmonization with priorities of the CGIAR and GFAR, and building new partnership based on complementation and subsidiarity principles. It identified six regional research themes: i) natural resource management, ii) genetic resources and biotechnology, iii) enterprise improvement, iv) post-harvest and value addition, v) policy and institutions, and vi) capacity building. Anticipatory research in the areas of climate change, risk management and biofuels were recommended. A number of follow-up actions by different stakeholders were generated. APAARI and GFAR are expected to continue to play the role of honest brokers and facilitators in the areas of information and knowledge sharing, capacity building, partnership and networking, resource mobilization and policy advocacy. A new role in monitoring and evaluation of these collaborative activities was suggested. NARS leaders are expected to address the priorities and recommendations from this synthesis workshop and donors will hopefully be more supportive of ARD.

## Identification of Sub-Regional AR4D Priorities

The AR4D priorities in Asia-Pacific region were assessed in 2010 through the following four reiterative activities:

- (i) **E-Consultation:** over 300 responses from 50 countries, comprising voices of 93 scientists from NARS, 66 from NGOs, 47 from CGIAR, 35 from public sector and extension agents, 17 from CSOs and Farmers' Organizations, 15 from private sector and industry, and 27 unclassified
- (ii) **Sub-Regional and Regional Reviews and Studies:** Sub-regional and regional reports on AR4D in the Asia-Pacific were commissioned from South Asia, Southeast Asia, China and the Pacific and the Asia-Pacific Region as a whole'
- (iii) **Face-to-Face Consultation:** involving 75 stakeholders from 17 countries and representing APAARI members NARS, CGIAR, IARCs, GFAR, ARIs, universities, NGOs, farmers/farmer organizations, the private sector and donor organizations from the region
- (iv) **Recent reports/literature on the subject and wisdom of selected scientists/academics.** Participation from China, particularly in the E-Consultation, was negligible. Given the obvious importance of China in the global agrarian economy

and its agricultural transformation, voices from China must be heard as the GCARD process progresses. Participation of some of the major groups of stakeholders, such as private sector, was also rather thin, and this gap should be corrected in order to have a balanced picture.

## South Asia

Based on the sources of literature review, analysis of evidences, the e-consultation and the F2F Consultation, the following priority research needs were identified by the South Asian Group:

### Commodity-based priorities

- Rice
- Wheat
- Local staple cereals
- Pulses
- Livestock
- Horticulture (Fruits and Vegetables)
- Fisheries

### Overarching research areas

- Climate change management
- Natural resource management (NRM)
- Socioeconomics, policy and value chain management
- Germplasm conservation and improvement
- Post-harvest management, agro-processing and value addition
- Quality improvement and safety
- Rural non-farm employment and income generation.

The Group had also suggested complementary approaches and policies (reflected in the regional scenario) and specifically suggested three to four times increase in funding support to agricultural research, extension and education in South Asia from US\$1.6 billion in 2002 to US\$4.6 billion in 2020 (at current price) towards attaining food and nutritional security, poverty alleviation and social empowerment. It had observed that prioritization exercises need to explicitly target the poor otherwise their needs are underfunded.

## Southeast Asia

The Southeast Asian sub-regional study quantified expected and historical levels of benefits for the poor and the environment from different areas of research and



contrasted relative expected impact potential with current relative allocations across research areas. The analysis found the key gaps between current investments and expected impacts for productivity enhancing research on rice, vegetables, fruit and aquaculture, with the rice gap the most pronounced. The following were identified as priority research needs for Southeast Asia:

### **In terms of target agricultural products and productivity enhancement research**

- Rice
- Vegetables
- Fruits
- Aquaculture

### **In terms of research activities**

- Crop genetic enhancement and post-harvest processing, particularly for quality.
- As an additional issue raised in the consultations and review of changes in the context for agricultural research, integration among disciplines in research organization and conduct was identified as important to the effectiveness of future research efforts.

## **Pacific**

The Pacific sub-region had highlighted the following challenges: (i) small population and economies, (ii) inappropriate policies and weak institutional capacity in both public and private sector, (iii) remoteness from and low competitiveness in international markets – high costs of transportation and labour, (iv) susceptibility to natural disasters and climate change, (v) fragility of land and marine ecosystems, (vi) limited fresh water supply, (vii) high import dependency, (viii) non-adoption of technologies from research, (ix) vulnerability to exogenous shocks, and (x) special problems of atolls.

The following priorities were identified:

- Value-adding (inclusive) for niche markets (domestic and export) to be considered within a value chain approach, and alleviation of NCDs
- Crop improvement to support value-adding and climate change readiness and also for nutritional security – Climate change management through mitigation and adaptation
- Biosecurity and trade facilitation – market access and farmer-market linkage
- Sustaining livelihoods in atolls
- Supportive policy actions and approaches

## Thematic Research Priorities for Asia-Pacific

With the above backdrop and keeping in view the sub-regional priorities, the thematic research priorities for the Asia-Pacific region are listed below:

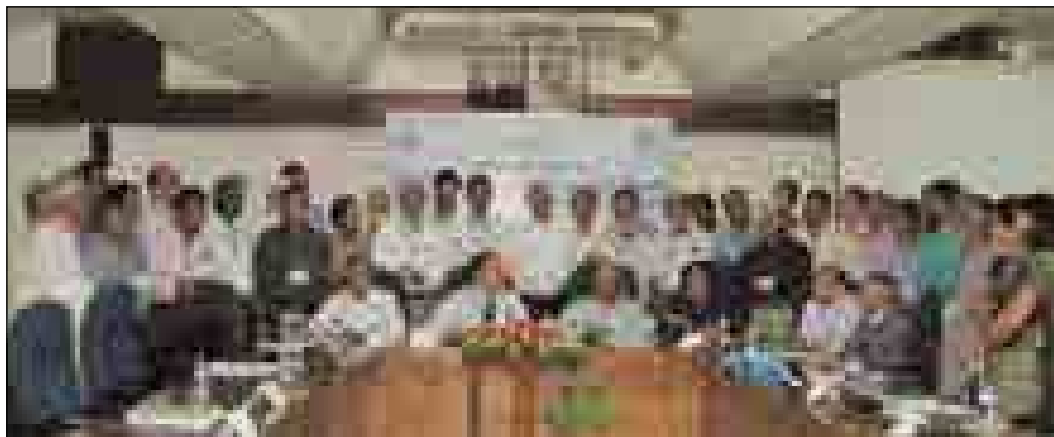
- Productivity enhancement particularly in food staples and those that will diversify incomes at the farm sector; and yield improvement through use of science and technology
- Improve value chain development and management: weakest links in the chain are infrastructure that link farmers to markets; and market outreach through building networks and partnerships
- Increase resilience in two major areas: climate change, and those resulting from economic shocks

The above AR4D agenda has spatial dimensions. The thematic research priorities identified for South Asia, Southeast Asia and the Pacific sub-regions are given in Box 8.

## National Dialogue on Prioritizing Demand-driven Agricultural Research in Bangladesh

A national dialogue on prioritizing demand-driven agricultural research for development in Bangladesh was jointly organized by APAARI, IFPRI and Bangladesh Agricultural Research Council (BARC) on 23 June, 2012 at Dhaka, Bangladesh. The dialogue was attended by 44 participants representing public sector, private sector, corporate sector, civil society organizations, representatives of the educational institutions and farmers' groups in Bangladesh.

The aim of the exercise was to focus on: i) reviewing structural concerns in AR4D priority-setting, ii) gathering and including views from the demand side (farmers'



*National policy dialogue at Dhaka*

<b>Box 8. Thematic Research Priorities for Asia-Pacific Region</b>			
	<b>South Asia</b>	<b>Southeast Asia</b>	<b>Pacific</b>
<b>Increased Productivity</b>			
Food staples	Rice, wheat, local staple cereals, pulses	Rice	Local crops: Taro, banana
Diversified crops/livestock	Horticulture, fisheries, livestock	Vegetable, fruit, aquaculture	That ensure inclusive value adding for niche markets: Vegetables, fruits
Science and technology	Germplasm conservation & improvement	Genetic improvement utilizing the potentials of genomics and bioinformatics	For nutritional security, value-adding; sustaining atoll livelihoods
<b>Improvement of Value Chain Development (weak links in the chain)</b>			
Infrastructure: farmer market links	Post-harvest, agro-processing, management, ICT, safety & quality	Post-harvest, particularly for quality	Post-harvest, transport, ICT, safety & quality
Markets & networks/partnerships	Public-private-partnerships (PPPs), South-south cooperation	–	Niche markets (domestic, foreign), trade facilitation
<b>Increased Resilience</b>			
Climate change management	Adaption & mitigation	Averted agricultural expansion through productivity improvement; germplasm adaption	Adaption & mitigation, need for incread capacity on modeling/ forecasting
Economic shocks	Rural & non-farm jobs, risk management	Food affordability/ agricultural productivity	Special concerns of atolls

groups, civil society, and private sector), iii) assessing the potential impact of selected agricultural technologies on yield improvement, production cost reduction, sustainable natural resource use, health and nutrition, food security, and trade, and iv) developing a strategic plan for enhancing AR4D including recommendations for critical AR4D priorities, expanded investment sources, and innovative delivery mechanisms. After the presentation of detailed report, further discussions were held in four Working Groups: i) priorities of AR4D, ii) structures and institutions, iii) funding and financial mechanisms, and iv) innovative delivering mechanism.

The recommendations regarding priorities identified by the groups included: i) genetic improvement of crop/livestock, fish/forestry, ii) research on unfavourable ecosystems, iii) input-use efficiency improvement, iv) unified service conditions for NARS scientists, v) BARC to be empowered to decide and approve matters relating to agricultural R&D of NARS, vi) strong monitoring and evaluation, vii) core funding of research to be enhanced with accountability, viii) multidisciplinary research through competitive grants program; ix) encourage private sector partnership in research funding with clear cut cost-sharing mechanism, x) ensure fair prices of all agricultural produce during storage to reduce seasonal loss, xi) strengthening research to mitigate the impact of climate change on fish breeding, xii) incorporation of private sector and progressive farmers in technology transfer, and xiii) direct coordinated research programs through the participation of farmers, extension and research personnel.

It was highlighted that the food safety issues, soil health aspects, agricultural mechanization, value chain and supply chain should also find place in AR4D agenda.

### **National Dialogue on Prioritizing Demand-driven Agricultural Research for Development in India**

A national dialogue on prioritizing demand-driven agricultural research for development was organized by APAARI in collaboration with IFPRI and ICAR, New Delhi on 2 July, 2012 at NASC Complex, New Delhi. The dialogue was attended by 32 participants from India, Nepal and Bangladesh which included various stakeholders including policy makers, researchers farmers, NGOs and private sector. As a result of in-depth discussions, the following priorities relating to research, structures and institutions, funding and technology delivery were identified:



*National policy dialogue at New Delhi*

### **Research priorities**

The priority commodities identified for research were rice, maize, wheat, milk, pulses, oilseeds. The commodity group priorities included cereals, horticulture, livestock including poultry, fishery, high value agriculture. The resource management and other priorities identified were: NRM including adaptation to climate change, resource conservation; water use efficiency; value chain and market integration, genetic resource management; biotechnology; farm mechanization; processing, value addition; rural energy use and management; trans-boundary diseases.

### **Structural and institutional priorities**

The structural and institutional priorities identified were: i) find the political will to adequately fund AR4D and support the NARS, ii) cast ICAR as mainly a policy making organization—a brain trust or think tank, iii) address women and youth issues and their involvement in research, iv) strengthen the consortium mode of conducting research, v) promote greater autonomy in the NARS, vi) balance investments in research, education, and extension; strengthen basic, strategic, and socioeconomic and policy research; fund research on harsh ecosystems; fund research on rural non-farm enterprises; strengthen public–private partnerships, vii) focus research; build centers of excellence; build more advanced research institutes, viii) ensure that the university system deals directly with farmers to bridge the knowledge gap, ix) redefine the ultimate beneficiary of research to include farmers, farmer organizations, GOs and NGOs, processors, traders, and the private sector, x) promote effective science communication and policy dialogue

### **Funding priorities**

The funding priorities identified were: i) provide timely funding, ii) maintain transparency in funding, iii) enhance funding, iv) provide funding for technology dissemination, v) provide funding for HRD, vi) create long-term plan for AR4D, vii) ensure that funding criteria are broad-based and balanced to cover all aspects of AR4D, viii) provide funding for advocacy of research results, ix) involve stakeholders in funding decisions, and x) extend equity in funding to all potential research providers

### **Technology delivery priorities**

The technology delivery priorities identified were: i) pursue technology breakthroughs for yield improvement, ii) promote technology commercialization, iii) recognize innovative farmers and promote innovations, iv) promote technology extension through partnerships, v) have a stable policy for adopting technology by dispelling myths about the benefits of new technologies and other policy and institutional innovations, vi) institute an open-door policy for the import of foreign technology, vii) promote producer companies, viii) promote role players in upstream research and downstream work in extension, ix) dovetail recommendations of research and extension agencies in technology dissemination, and x) promote innovations in developing high-yield and pest resistant seeds.

## National Dialogue on Prioritizing Demand-driven Agricultural Research for Development in Nepal

A national dialogue on prioritizing demand-driven agricultural research for development in Nepal was organized by APAARI in collaboration with IFPRI and Nepal Agricultural Research Council (NARC), Nepal on 26 July, 2012 at Kathmandu, Nepal. The dialogue was attended by 47 participants from Nepal including researchers, planners, development officials, NGOs, farmers from Nepal and resource persons from IFPRI and APAARI. As a result of in-depth discussions, the following priorities for research institutions, funding and technology delivery were identified for Nepal:



*National policy dialogue at Nepal*

### Research priorities

The priority commodities identified were: rice, maize, wheat, small millets, oilseeds, legumes, jute, milk and meat. The commodity group priorities included: crops, horticulture and commercial crops (fruits, vegetables, flowers, large cardamom, ginger); livestock (milk and milk products, buffalo meat, poultry, small livestock like sheep and goats, feed and fodder, livestock health and nutrition); aquaculture and fisheries. The priorities identified for resource management were: NRM including adaptation to climate change; biotechnology; farm mechanization and processing, post-harvest management and food and biosafety.

### Structural and institutional priorities

The structural and institutional priorities identified were: i) recruit through an independent commission, ii) dissolve NARC's executive board, iii) ensure NARC's functional autonomy with no political interference, iv) evolve NARC as NARS,

v) make the linkage between NARDF and technology delivery system mandatory; pursue collaborative projects; and institutionalize training, vi) mandate linkages with the private sector, NGOs, academic institutions, and other stakeholders, vii) make ARIs to Deemed Universities, viii) establish technical advisory committees, ix) have professionals to lead the NARC, and x) recruit the Executive Director of NARC in a transparent manner using defined criteria.

### **Funding priorities**

The funding priorities identified were: i) gear priority setting and funding to a needs-based research agenda, ii) raise investment in AR4D from 0.39 to 2.0 per cent of AgGDP, iii) strengthen the NARS with a firm political commitment, iv) strengthen HRD and retain talent and motivate women and youth in AR4D, v) create pressure groups and mobilize people and stakeholders to plead for more resources for AR4D, vi) attract corporate funding to AR4D, vii) improve salary, service rules, and incentives to attract and retain youth in AR4D, viii) make research an attractive profession versus other professions by creating a suitable work environment and providing incentives, ix) mega donor projects should aim at integrating research with development, and x) enhance budget to cover the risk of crop failure.

### **Technology delivery priorities**

The technology delivery priorities included were: i) promote private sector, NGOs, cooperatives, agrovets, and other service providers in technology dissemination, ii) involve scientists more in technology dissemination, iii) documentation and extensive use of IT in technology delivery systems, iv) strengthen the technology marketing system, v) use ICT extensively for promotion of and access to inputs and outputs, vi) make a provision into projects for communication and technology dissemination, vii) use NARS communications strength for technology dissemination, follow a policy of accessing technology from the globe, ix) bridge the knowledge and information gap between researchers and end users through effective delivery and supply of inputs and services, and x) dialogue effectively with the political system, policymakers, activists, and the general public to dispel myths about the benefits of new technologies and other policy and institutional innovations.

## **Demand-Driven Prioritization of Agricultural Research for Development in South Asia**

In order to address the emerging challenges of agriculture and to overcome the problem of poverty, food and nutrition security as well as environmental protection there is a need for developing a strategy for demand driven research in South Asia. For this, three national policy dialogues were organized in Bangladesh, Nepal and India in collaboration with IFPRI in 2012. These policy dialogues attempted to analyse the concerns particularly in the area of AR4D and to suggest a suitable strategic plan for accelerated and inclusive growth within and among countries through higher

and stable investment by the national government and donors. The country reports were prepared first after a detailed review of agriculture and its sub-sectors, formal and informal discussions with all the concerned including specially organized well attended individual country dialogue meetings inviting representatives of all the stakeholder categories (34% from government/public sector, 31% from CSOs/NGOs, 15% from private sector, 12% from farmers and 8% from academia). Based on the country reports, the synthesis report was prepared.

The synthesis report analysed the structural, institutional, funding and technology delivery concerns particularly in ARD and suggests a strategic plan for accelerated and inclusive growth within and among the countries through increased regional cooperation and collaboration. It prioritizes agricultural research investments on the basis of felt needs of farmers and other stakeholders for the study countries and South Asia as a whole. The synthesis report was presented in GCARD2 at Punta del Este, Uruguay in October, 2012.

## Main Concerns/Issues

Specific agricultural policies covering various sub-sectors of agriculture including agricultural research along with policy areas having bearings on agriculture were formulated in these countries around 1990s. They are generally compatible, and synergistic while planning with little coordination and convergence during implementation. These plans are also highly ambitious and well envisioned but there is large gap between plans/policies and implementation on account of weaknesses in institutional capacity, irregular and inadequate funding, highly depleted human resources with limited skills, weak accountability in the system and weak monitoring and evaluation practice. Agricultural policies in these countries while stressing on ARD, mandate the NARS on increasing productivity, profitability, sustainability, employment, poverty alleviation and livelihood security of small farmers particularly located in harsh ecologies and empowerment of women and youth. But, the budgetary support to ARD is always considered inadequate and variable/uncertain, particularly in Bangladesh and Nepal. The involvement of the private sector is less particularly in Bangladesh and Nepal. The agricultural research intensity ratios are much below the ratios prevailing even in some of the developing countries. Apart from budget/funding concerns, the NARS have expressed major structural and institutional, HRD and technology delivery concerns/weaknesses. Although the national agricultural research councils (NARCs) of these countries are independent with autonomous status, they are facing varieties of hassles and stresses relating to resource allocation, rules for expenditure, recruitment/selection/assessment, personnel policy, political interference, lack of centralised/uniform act and rules covering all agricultural research institutes, etc. The institutional issues faced by NARS include weak PME mechanisms and practices, limited decentralization of power, declining human resources both in number and quality, lack of good leadership, lack of manpower planning, creating new institutions without additional manpower and



infrastructure support, restrictions in recruitment, inadequate faculty development/training programs, less emphasis on agricultural education, weak communication and publicity skills, limited national and international linkages and partnerships/cooperation/collaboration, and lack of progressive policy including IPR policy to actively engage private sector in ARD.

The funding issues faced by NARS include inadequate and uncertain/ erratic funding, no systematic planning and prioritization, limited innovations in mobilizing new sources of funding, not being able to follow best fund use practices like use of online FMS, simplified rules and procedures, timely release of funds, outdated procedures, limited core funding from the government, and very low budgetary support to research contingencies/operational cost. The major technology delivery issues confronting NARS include, near collapse of the public extension system, inadequate funding to technology delivery activities, not linking donor funding with development activities, serious manpower shortage and mobility constraints to reach the unreached particularly to support new sub-sectors of agriculture like horticulture, livestock, fishery, agricultural engineering, PHM, NRM issues particularly adaptation to climate change, marketing, prices, agri-business and trade, IPR, food quality and safety, etc.

The use of ICTs is also not sufficient on account of knowledge and infrastructure bottlenecks. The technology delivery issues become further complicated to transfer the technologies generated from modern biotechnologies where technology regulatory issues relating to human and environmental safety are important.

## Major Research Priorities

The strategic plan in terms of identified demand driven commodity, resource focus, structure and institutional, funding and technology delivery priorities for accelerated and inclusive growth in the region as well as different countries in the region are spelt out. The strategic plan emphasizes diversification in farming system perspective with focus on small and marginal farmers, women and youth located in harsh ecologies fully integrated with market. For South Asia as a whole, the top ten priorities include the following:

- Since South Asia is the hot spot of global hunger and poverty, AR4D spending would need to triple or quadruple in the coming years from the current level with the liberal funding from the countries and the donors. This would also require greater political will and strong public lobby of farming, scientific and other communities; exploring innovative funding and fund use mechanisms, linking donor funding with national development plans, best financial and procurement practices, etc.
- Intensify agricultural research by building consortia, partnerships by attracting all knowledge providers including private sector. There should

be emphasis on both staple crops and fodder crops in marginal ecologies where the interest of the private sector is the minimum so far, and higher value horticulture, livestock, poultry and fishery with active partnership with private sector, which is already a leading or fast emerging sector in these areas.

- Place higher priority on research on NRM including adaptation to climate change, resource conservation and efficient input use particularly with respect to soil and water; and genetic resources management to sustainably raise yield ceilings, enhance biotic and abiotic stress resistance, and improve food quality and nutritional content.
- Ensure functional autonomy to NARS through de-bureaucratization. There is a need to professionalize NARS as policy making bodies, think tanks/brain trusts with science friendly, flexible financial and administrative rules and procedures. Competitive service conditions, incentives to merit and performance and other mechanisms and structures contributing to excellence in science for development need to be introduced.
- Strengthen HRD nationally, regionally and internationally with liberal funding and progressive training policies.
- Strengthen agricultural education systems to continuously supply quality human capital to the agricultural sector and agricultural research system.
- Strengthen technology delivery systems and agro-advisory services to contribute to increased linkage, synergy and convergence with the stakeholders, which include scientists, extension workers, champion farmers including women, farm innovators, farmers' organizations, development agencies, private sector and CSOs/NGOs. Extensive use of ICT should be promoted by institutions like Krishi Vigyan Kendras (KVKs), Agricultural Technology Management Agency (ATMA) Centers, etc.
- Strengthen soft skills of the stakeholders, with respect to research policy, long-term planning and visioning, PME, IPR, technology management and agri-business planning and development, documentation, communication and publicity to contribute to better implementation of programs for greater impact.
- Strengthen research on value chain systems, engaging private sector and all other potential players and market integration with efficient and dependable input and services delivery system.
- Strengthen agricultural engineering research inputs and services covering primary processing, value addition, farm and rural storage, grading, rural energy use, small farmer mechanization, precision farming to improve efficiency, add value, remove drudgery and overcome increasing labour scarcity.

## The Way Forward

The research priorities identified above need to be implemented with required changes and the impacts assessed in the region. GFAR, APAARI along with NARS have to continuously, periodically mentor and popularize foresight and research prioritization works to motivate the national governments to demand such studies to aid investment planning. Further, such exercises need to be initiated in the countries where they have not been undertaken or undertaken less systematically so far. A commitment from the NARS to institutionalize these best practices in the system by setting up dedicated technology foresight centres is necessary. Such exercises at the disaggregated lower levels would need to be undertaken involving more and more farmers, NGOs, and other stakeholders to really identify local concerns, gaps and priorities. It is desirable that there should be convergence of micro level (disaggregated level) priorities with the macro level (higher/national level) priorities. All these need strengthening of research and education in foresight methodology and standardization to build a cadre of practioners and well informed users. In fact, there is dearth of skills and interest to undertake such exercises in many NARS. More importantly, there is an urgent need to build a comprehensive, robust, data base to undertake such studies systematically.

# **6** Strengthening Agricultural Information and Communication Management: APARIS Activities and Achievements

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## **Background Information**

With an aim to promote the use of new information and communication technologies (ICT) for better information and communication management (ICM) in agricultural research for development (AR4D) of the Asia-Pacific region, APAARI has been developing and maintaining the Asia-Pacific Agricultural Research Information System (APARIS) since 1999. APARIS serves as a regional de-centralized platform for efficient information and knowledge sharing among the region's national agricultural research systems (NARS) and other ARD stakeholders. In this regional knowledge network, NARS are represented by their respective national agricultural information systems (NAIS or national nodes). APARIS also acts as a regional node linking NAIS to global networks (such as WAICENT, AGRIS, WISARD, ASTI, AROW, etc.) and other regional agricultural information systems (RAIS) such as InfoSys+, AARINENA-RAIS, Agroweb-CAC, FORAGRO-RAIS and FARA-RAIS.

APAARI recognizes that the successful functioning of APARIS depends largely on information content and data standards of its national nodes or NAIS. Therefore, a bottom-up approach has been adopted in developing APARIS. The National Agricultural Information Officers of NARS contribute regularly in APARIS development. APARIS is partially supported by ACIAR and GFAR, and it has its own Steering Committee which meets regularly and directs the technical program. The composition of Steering Committees since the establishment of APARIS is given in Annexure III.

## **Activities and Achievements**

A brief account of APARIS development phases and progress over the past 14 years since its establishment as a specific program under APAARI is presented here (information mainly abstracted from ICT status report recently published by APAARI).

### **APARIS Phase I (1999-2002)**

#### **Main Components of APARIS**

APARIS, being web-enabled, is closely integrated with the APAARI website (<http://www.apaari.org/>). The following were the seven main components of APARIS in Phase I:

**Management Information System (MIS) Tools:** Regional Research Networks (RRNs) Database: This database currently has information on major regional research networks, and it continues to develop in order to cover all the networks that effectively operate at both the regional and the sub-regional levels (i.e., South Asia, South-East Asia and the Pacific). Some examples of RRNs included in this database are NACA, APAFRI, INGER, COGENT, the Regional Network on Plant Genetic Resources, CLAN, CORRA, the Rice-Wheat Consortium and others. This database also provides access to the websites of the RRNs, and to the information resources that these networks offer such as the NARS Database; Regional Associations Database; ARD Projects Database; Daily Agriculture News; Database on Agricultural Research and Development Indicators. Also, APARIS provides access to Agricultural Science and Technology Indicators (ASTI) project of IFPRI.

**Information on regional events related to ARD and to ICM:** This component provides two databases, namely, meetings and events related to ARD and ICM; this database also covers APAARI activities and events, and provides general information on scientific and technological events that are being organized by stakeholders in the region, and ICM training activities in the region.

**Facilitate access to scientific publications generated by agricultural research in the region:** Provides access to all APAARI publications; expert consultations, success stories and others as posted on APAARI website.

**Electronic forums to facilitate dialogue among stakeholders of ARD in the region on issues of strategic importance:** Access to the following electronic forums was provided and is presently available through the APAARI website: Electronic Forum on Information and Training Requirements in the Asia-Pacific region; Access to the EGFAR-NARS Forum; Specialized Thematic Electronic Forums.

**Gateway/Portal services:** Various portals linked through APARIS include the following: Portal to Regional Research Networks (RRNs) to facilitate access to the websites of the Regional Research Networks that operate in the region; Portal to the websites of NARS Institutions in the Asia-Pacific region; Portal to Web-enabled information on key topics/themes of ARD; Intelligent Gateway or Portal Facility. A pilot project was formulated with some initial help from CABI to develop an Intelligent Gateway or Portal Facility to information resources on the web that will provide a very important additional service.

**Strengthen knowledge networks on ARD in the APAARI region:** (i) facilitating access to the information resources of Regional Research Networks (RRNs): in collaboration with the consortium of institutions that participate in the RRNs identified in the RRN Database, information can be provided on what data/information is available in the research organizations that constitute each RRN (i.e. NACA, APAFRI, INGER, Rice-Wheat Consortium, etc.); (ii) pilot project on the Development of Knowledge Networks in specific areas of ARD.

**Dissemination of information through APAARI website and publications:** The objective of this component of APARIS was to: (a) facilitate dissemination of the results of APAARI activities through the APAARI website, through publications and through CD-ROMs, and (b) facilitate access to other relevant publications related to ARD in the region. This was an important activity that was integrated into the regional strategy to implement the APAARI Vision 2025. The following components were developed:



*First ICT expert consultation meeting*

- Provide general information on APAARI (nature, objectives, mandate, members, activities, etc.). This was done in a special section on APAARI website ('About APAARI'), from where all the important documents of APAARI can be downloaded (such as mission statement, Vision 2025, constitution, members, etc.).
- APAARI publications and CD-ROMs: A CD-ROM with 25 Success Stories was developed.
- Access to other AR4D publications: Access to interesting topics, and relevant papers and publications on agricultural research for development that are produced by other partners (i.e. the CGIAR, development agencies, etc.) are also made available through the APAARI website.

## APARIS Phase II (2002-2006)

After the successful completion of Phase I and realizing that a general APARIS framework was in place, APAARI in October, 2002 organized the second ICT Expert Consultation on further development of APARIS. An APARIS Steering Committee was formed to provide policy support, undertake strategic planning, provide overall technical guidance, source



*ICT expert consultation on developing APARIS Phase II*

external funds, and monitor the progress of APARIS work plan. The Steering Committee in its first meeting in October, 2002 reviewed and accepted the terms of reference (ToR) for national information nodal points (NINPs) which were developed during the expert consultation. The ToR of NINPs included the following functions:

- Assess the status and needs of respective NARS with regard to ICT in AR4D
- Monitor and update information to improve relevance and effectiveness of APARIS contributions to APAARI vision and mission
- Identify, collect, organize and make accessible information systems within the subject scope of APARIS
- Establish and operate information services for national and regional clientele based on APARIS processed information
- Share skills, knowledge and experiences in handling and management of information among NINPs

Linking of APARIS with other regional, sub-regional and global agricultural information systems, and functional enhancements or value addition emerged as the priorities for its future development.

## **Developing Regional and International Collaboration/Identifying Support Group**

As a follow-up of the recommendations of the second ICT expert consultation in April, 2003, APAARI organized a meeting to formalize the bilateral cooperation between APAARI and the members of its support group in the area of ICT (FAO, GFAR, ISNAR and AIT). This exercise resulted in identification of specific areas of collaborative activities that synergized the resources of support group members and APAARI.

## **Activities identified for Phase II**

With regard to the Phase II developments in APARIS, the following activities were identified:

### ***Development of a Regional Agricultural Expert Locator (RAEL) on APAARI website***

NINPs serve as links between APARIS and the member NARS for sharing information of general nature. This new initiative, RAEL, was aimed at creating multiple input points (within a NARS) for APARIS. RAEL will maintain a database of agricultural experts and their profiles. The database will be populated by interested experts themselves. The RAEL function had three main modules: (i) Expert-Profile Module: The profile of each expert will be maintained in this module, which will have restricted access and only registered experts will be able to manipulate their respective profile records; (ii) Research-Data Module: This module will maintain a database of the past and present research/consulting projects, publications, presentations and professional activities of the experts; and (iii) Search Module: This will be accessible to all and it will provide results using both the above modules.

### ***A simplified gateway function on APAARI website using open source software***

The APARIS gateway function, consisting of a search module, acts as a multi-host search engine to locate ARD information resources on the internet within the APAARI member institutions. In August 2003, NINPs were requested to provide brief summaries and URLs of digital information resources available in their respective NARS. The gateway function has a search module where a user can enter keyword(s) and get the search results based on it. During the search process, the gateway will perform following actions: connecting to the APAARI member institution's servers; searching the requested keyword in each web file; retrieving the information from the selected file(s); saving the meta-data information in an internal database of the function to reduce the search time in future, and displaying the search results in a standard XML format to the user.

### ***ICT need assessment of member NARS to develop better capacity building programs:***

National Information Nodal Points (NINPs) of APAARI members participated in an ICT need assessment survey and prepared a status reports for their respective NARS. These reports were analyzed by APAARI and the analysis formed a basis for initial development of APARIS. To make the results of this survey widely available, APAARI subsequently published in 2004, a benchmark report entitled "Information Communication Technologies in Agricultural Research for Development in the Asia-Pacific Region: A Status Report."

### ***Redesigning, link validation and update of APAARI website***

The main objective of this activity was to check and update the site content, ensure validity of linkages from APAARI website, and search and add new relevant links at appropriate places. An APAARI CD was developed to provide the APAARI website as an off-line resource to those who lack adequate internet connectivity. Copies of 'APAARI on CD' have been distributed to APAARI's diverse stakeholders. This has now become an annual publication of APAARI. Along similar lines, 'NARS on CD' is also published, which provides a detailed directory of NARS institutes of the region in a user-friendly searchable format.

### ***Linking of APARIS with agricultural information systems developed by GFAR, FAO, CG Centers and other regional, sub-regional and national agencies***

APAARI considered further strengthening of member NINPs a priority for potential linking of APARIS with agricultural information systems of NARS as well as those of sub-regional and global organizations through the proposed GLOBAL-RAIS project of GFAR. The APAARI expert consultations provided NINPs an opportunity to become familiar with the development and management aspects of a distributed information system as envisioned under the GLOBAL-RAIS initiative and also applicable to APARIS. In this respect, APAARI also got benefited from the experiences of other organizations, such as AARINENA, FARA, FORAGRO and EFARD.



## **A National workshop on linking farmers with researchers through ICT**

In order to deliberate on emerging issues, a workshop on ‘Role of ICT in Taking Scientific Knowledge/Technologies to the End Users’ was organized from 10-11 January, 2005, at New Delhi by the Trust for Advancement of Agricultural Sciences (TAAS), India, National Academy of Agricultural Sciences (NAAS), India, Asia-Pacific Association of Agricultural Research Institutions (APAARI), Bangkok, Thailand and Indian Society of Agricultural Statistics (ISAS), New Delhi, India. This workshop clearly highlighted the need for access to value added information/knowledge dissemination through a well coordinated national system (stressed on establishing NAIS) so that farmers gain through ICT networking and are linked to national, regional and global markets for better value of their products in order to get higher income and come above poverty scenario. It also stressed on capacity building of extension functionaries for the transfer of knowledge dissemination to the end users/farmers.



*National workshop on role of ICT held at New Delhi*

## **Expert Consultation on Strengthening Regional Agricultural Information System: Role of ICT in IRD**

The Expert Consultation on ‘Strengthening Regional Agricultural Information System: Role of ICT in IRD’ was held from 1-3 December, 2003 at the Asian Institute of Technology (AIT), Bangkok. Apart from diverse participation from Asia-Pacific region, representatives from regional agricultural fora of West Asia and Africa also participated. The workshop emphasized on the need of using conventional and new ICT together for information and knowledge sharing vis-à-vis role of APARIS in improving the efficiency and effectiveness of the information and knowledge flows related to agriculture in the Asia-Pacific region, with greater role of National Information Nodal Points (NINPs).

## **Inter-regional cooperation for ICT and ICM in ARD**

In July 2006, APAARI organized an inter-regional workshop on ‘Advocacy and Inter-regional Cooperation for Information and Communication Technologies/Management in Agricultural Research for Development’ at AIT, Bangkok with GFAR’s support. The workshop’s objectives were to: (i) identify the role of regional fora (RF) in the emerging global alliance for ICT and ICM in ARD through their Regional Agricultural Information Systems (RAIS); and (ii) develop collaborative activities of RAIS, such as APARIS, AARINENA-RAIS, FARA-RAIS, InfoSys+, AgroWeb, CAC-RAIS, and FORAGRO-

INFOTEC. The workshop was also an opportunity for the new AGRIS Task Force on Advocacy to discuss with RFs the future direction and actions. The workshop was attended by 21 participants from various RFs, selected Asia-Pacific NARS, GFAR, FAO, and representatives from other international initiatives on ICM for ARD.



*Workshop on inter-regional cooperation for ICT/ICM at Bangkok*

## Selected success stories on agricultural information systems

With partial support from GFAR and ACIAR, APAARI published a collection of success stories and best practices of ICT and ICM in ARD. In addition to a descriptive list of several current initiatives on agricultural information systems, the publication provides two different case studies—one on linking farmers with the researchers (RDA, South Korea's Agricultural Information Service) and the other on linking farmers to markets (India's e-Chopal initiative).

## ICT/ICM Priorities Identified

The APARIS plan focuses on three broad themes: advocacy, capacity development and integration of information resources. The deliberations during the third meeting of Steering Committee of APARIS held on 8 August, 2004 prioritized the following activities:

### **Advocacy for enabling, enhancing and enlarging agriculture related information systems at national, sub-regional and regional levels in the Asia-Pacific region**

- Collecting, collating and providing access to information, on a biannual basis, related to status of ICT use and information systems in NARS of the region and agriculture and rural development related ICT use indicators at national and regional level
- Developing an advocacy paper on ICT and agricultural information related policy and strategy issues at national, sub-regional and regional level that can provide fact-based support for advocacy role of APARIS
- Organizing , during APAARI General Assemblies, a half-day sensitization and awareness workshop on policy and strategy issues in enabling, enhancing and enlarging agricultural information systems for senior NARS and agricultural policy makers and managers
- Developing CD on NARS; publish success stories on ICT/ICM in ARD using case studies from selected NARS.

- Collaboration and networking with other initiatives and fora to promote awareness about ICT/ICM in ARD and also publicize APARIS in the on-going forums such as AFITA and APAN conferences

### **Capacity development for ICM and use of appropriate ICT for national agricultural information systems**

- An Asia-Pacific Regional Workshop for NINPs for need assessment and to evolve a framework for National Agricultural Information Systems
- Three sub-regional training workshops for NINPs and two ICT/ICM trainers from each country: (i) South and West Asia (Iran, Afghanistan, Pakistan, India, Nepal, Bhutan, Bangladesh, Sri Lanka) in collaboration with SAIC, Bangladesh; (ii) South-East Asia (ASEAN countries) in collaboration with SEARCA, Philippines; and (iii) the Pacific (APAARI member countries) in collaboration with SPC, Suva, Fiji.
- National workshops, facilitated by NINPs and trained NAIS trainers—two officers from each major national agricultural institutes.

### **Integration of information resources within NARS, in the Asia-Pacific region and with other regional and global agricultural information systems such as the GFAR webring**

- Develop an on-line compendium of good practices, standards, guidelines, protocols, etc. for agricultural information exchange and sharing in the Asia-Pacific region.
- Participate, as a representative of the Asia-Pacific Region's NARS, in negotiations related to setting of standards, guidelines, protocols to agricultural information systems at the global level.
- Conduct seminars at sub-regional levels - South Asia, South-East Asia and the Pacific countries - related to sharing and exchange of information, especially on the use of standards, guidelines and best practices in agricultural information systems in conjunction with the sub-regional training workshops proposed in the capacity development section and other APAARI related activities.
- Further strengthen the directory of agricultural information on the web and the Gateway/Portal function to access the information resources of various institutes.
- Promote data and information sharing among various member institutes using applications such as MetBroker and localized crop models.
- In consultation with GFAR and other regional and sub-regional fora, integrate APARIS as Asia-Pacific node in the Global Webring of Agricultural Information Systems.

Based on the suggestions of APARIS Steering Committee, and to achieve desired goals, APAARI will seek support of GFAR and other potential donors/focal points, organizations such as FAO RAP, ACIAR, AIT, JIRCAS/NARO, CABI, and SDLEARN.

## **APARIS Phase III (2007-2014)**

### **Sensitization and Awareness Building Workshop on Information and Communication Technologies and Management (ICT/ICM) in ARD**

APAARI in collaboration with GFAR and PCARRD jointly organized the Sensitization and Awareness Building Workshop on Information and Communication Technologies and Management (ICT/ICM) in ARD for NARS Leaders and Senior Managers on 30 August, 2007 at PCARRD, Philippines. The workshop was attended by 22 NARS leaders and senior managers representing 10 countries and 3 sub-regions of Asia-Pacific. The workshop provided a good opportunity to discuss progress and share experiences of NARS leaders and senior managers who directly use of ICT/ICM for agricultural research management. Participants were unanimous in recognizing the important role that ICT plays in linking researchers, farmers and markets. In order to strengthen linkages between APARIS and NAIS, recommendation was made to NARS to officially designate their ICT/ICM related units or departments as National Information Nodal Points (NINPs). APARIS was suggested to undertake a major revision of APAARI website ([www.apaari.org](http://www.apaari.org)) using newly available web technologies for a better content management system and linkages to other ARD websites. Outcome of the workshop helps in developing collaborative activities on ICT/ICM afterwards.

### **APARIS Technical Workshop on Development and De-centralized Management of ARD Information Resources**

APARIS Technical Workshop on Development and De-centralized Management of ARD Information Resources was jointly organized by APARIS, GFAR and ACIAR on 19-20 April, 2008 at Bangkok, Thailand. The workshop aimed to strengthen APARIS and its linkages with the National Agricultural Information Systems (NAIS) of the Asia-Pacific using the de-centralization approach of the Global ARD Web Ring. Twenty participants representing 10 National Information Nodal Points (NINPs) from the Asia-Pacific countries attended the workshop. Various priority issues at NAIS level were deliberated at the workshop including standardization, coordination and sustainability. Recommendations were made for further development of the Global ARD Web Ring in which APARIS and its NAIS can participate using available tools/ applications/ frameworks such as RSS feeds, AgriFeeds, and CIARD.

### **International Consultation on Agricultural Research for Development and Innovation: Addressing Emerging Challenges and Exploiting Opportunities through Information and Communication Technologies**

A five-day 'International Consultation on Agricultural Research for Development and Innovation: Addressing Emerging Challenges and Exploiting Opportunities through Information and Communication Technologies' was jointly organized by APAARI, GFAR, FAO and ICRISAT at ICRISAT, Hyderabad, India on 7-11 December, 2009. The

workshop was attended by 60 experts in Information and Communication from 27 countries and 8 international organizations. The main aim was to identify and define new strategies, policies and actions that are needed to enhance and sustain adoption of ICM in ARD keeping the needs of resource poor farmers in focus. Outcomes of the workshop arising from high level of participation of participants in group presentation, plenary session, sharing of think pieces and field visits were fed into Global Conference on Agricultural Research and Development (GCARD, 2010) related processes.

## **Workshop on ICT/ICM got National Agricultural Research Information Systems**

APAARI and AIT jointly organized the ‘Workshop on ICT/ICM got National Agricultural Research Information Systems’ in collaboration with FAO and GFAR at AIT, Bangkok on 14-16 September, 2010. The objectives of the workshop included orientation of participants to the potential opportunities of new ICT/ICM for AR4D, Coherence in Information for Agricultural Research for Development (CIARD) initiative and equip them to contribute effectively towards CIARD Road Map to information Nodes and Gateways (CIARD RING), and identification of mechanisms to strengthen APARIS for efficient exchange of data, knowledge and technologies in the region. 21 Senior Information and Communication Managers from the National Agricultural Research Systems (NARS) of 17 countries in the Asia-Pacific region attended the workshop. More than 12 resource persons representing APAARI, FAO Headquarters, FAO RAP, Bangkok, GFAR, ACIAR, AIT and Kasetsart University participated and provided valuable inputs in the workshop. The important outcome of the workshop was endorsed in the APAARI Communication Strategy for its implementation. The draft APAARI Communication Strategy along with suggestions of the workshop participants was presented to the APARIS Steering Committee in its IX Meeting held on 16 September, 2010 at AIT, Bangkok. The APARIS Steering Committee considered it to be realistic and suggested that the Strategy be implemented during the years 2010-2015 in a step by step approach after prioritizing the activities depending on the availability of resources.



*Workshop on ICT/ICM at AIT, Bangkok*

## Workshop on Information and Communication Management for Agricultural Innovation in Southeast Asia

A Workshop on Information and Communication Management for Agricultural Innovation in Southeast Asia was organized jointly by APAARI, FAO, GFAR and AIT on 27-29 September, 2011 at Bangkok, Thailand. A total of 44 participants attended the workshop which included senior information and communication managers of NARS, information experts from CG Centers and resource persons. The workshop was held to take stock of the current status of ICM in national systems of agricultural Research and innovation as to identify what technological, institutional and community participation related gaps need to be filled for improving availability, access, applicability and effective use of information for agricultural innovations, and promote greater involvement and participation of national systems



*Workshop on ICM at Bangkok*

and organizations in the CIARD movement. The workshop suggested useful recommendations to address technological issues, institutional issues and community participation in use and application of ICM for agricultural innovation. Use of mobile technologies, development of farmers' leaders, building capacity of farmers to use ICTs and information, catalyzing policies through success stories and linking farmers' organizations to markets through use of ICT/ICM initiatives are some of the important steps to be considered for improving ICM for agricultural innovations.

## Special Session on "Openness in Agricultural Information and Knowledge Sharing

APAARI organized a special session on "Openness in Agricultural Information and Knowledge Sharing on 10 November, 2011 at New Delhi, India in the "International Conference on Innovative Approaches for Agricultural Knowledge Management: Global Extension Approaches" which was jointly organized by International Society of Extension Education, India and the Indian Council of Agricultural Research (ICAR) with the partnership of APAARI, GFAR, FAO, TAAS, MSEE, NAAS, Alcorn State

University, Iowa State University and other partners on 9-12 November, 2011. The session was focused on the core issue of “Openness” of agricultural information and knowledge in the context of the emerging paradigm of agricultural innovation that a large part of relevant and useful information generated by and through the public sector or investment, should be available and also accessible as a public good with equity to all its users. The major recommendations of the ‘APAARI Session’ are given in Box 9.

## **Workshop on Moving Beyond Strategy to Improve Information and Knowledge Management for Agricultural Development in the Pacific Islands Countries and Territories**

The Workshop on Moving Beyond Strategy to Improve Information and Knowledge Management for Agricultural Development in the Pacific Islands Countries and

### **Box 9. Recommendations of the APAARI Session**

#### Technology Issues

- Encouraging access and use of information through ICTs at farmers level
- Convergence of media and information from agriculture and other areas
- Collaboration among all actors in ICT/ICM
- Validation of information, need-based information and its updating
- Capacity development in use of ICTs and information
- Strengthening of KVKs, rural communities and farmers’ organizations at local levels

#### Institutional Issues

- Increased and targeted investment in ICT/ICM in agriculture
- New institutional arrangements – change in work processes
- Developing policies, strategies, rules, norms, regulations
- Recognition, rewarding and awarding systems
- Building institutional capacity

#### Community Issues

- Creation of community-based organizations: Farmers’ Clubs, etc.
- Involving community in assessment of information use
- Convergence of information related to agriculture and non-agriculture issues
- Capacity building of community on use of ICT tools and information

Territories was organized jointly by APAARI, FAO, GFAR, ACIAR and Secretariat of the Pacific Community (SPC) at Nadi, Fiji Islands on 21-14 November, 2011. The workshop aimed to promote new information and knowledge management (IKM) for making efficient and effective use of information resources by the Pacific Island countries and territories, as well as to encourage greater involvement and participation of organizations and institutions in CIARD and CIARD RING initiatives. The workshop was attended by 36 experts from 12 countries in the fields of agricultural research, extension, and information and communication technologies from Cooks Islands, Fiji Islands, FSM, Kiribati, Marshall Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. Nine country papers on ICT/ICM initiatives for agricultural development were presented and given very insightful information to understand varied nature of complex issues that each country is facing and different approaches to ICT/ICM use in the Pacific region. Group works and hands-on experience were provided on Web 2.0 and Social Media tools as to use them at institutional level for agricultural information sharing. The need for increased and targeted investment in ICT/ICM in agriculture along with steps to be taken for changes in institutional work processes, procedures were emphasized by participants. It was also felt necessary to involve NGOs and existing networks such as women groups, church groups, youth groups, teachers/schools etc., to harness ICT for agricultural development in the Pacific region.

### **Workshop on Agricultural R&D in the Asia-Pacific Region: The Need to Monitor Investments, Capacities and Institutional Changes**

The Agricultural Science and Technology Indicators (ASTI) initiative, which is facilitated by the International Food Policy Research Institute (IFPRI) and the Asia-Pacific Association of Agricultural Research Institutions (APAARI), organized the Workshop on Agricultural R&D in the Asia-Pacific Region: The Need to Monitor Investments, Capacities and Institutional Changes at Bangkok on 16-17 February, 2012. The objectives of the workshop were to present preliminary results of the survey work in the Asia-Pacific region, to elicit feedback from national collaborators on their experiences in implementing ASTI's national survey rounds, and to explore ways as to continuously monitor and benchmark agricultural research and development (R&D) investment and capacity trends in the region. A total of 24 representatives of national partner organizations and regional organizations participated in this workshop. Preliminary results of the survey showed that overall agricultural R&D investments in the region have grown considerably since the turn of the millennium. Nonetheless, the region as a whole continues to invest a considerably lower share of its agricultural output on agricultural R&D than other developing regions around the world. Hence, the need for monitoring agricultural R&D investment and capacities in the region was stressed during the discussion. Recommendation was made to ASTI to further institutionalize at the country level to enhance the "ownership" of the data at the national level, and it will ultimately increase the use of the data for





*ASTI-APAARI workshop on agricultural R&D at Bangkok*

advocacy, priority setting, and policy influencing purposes. More advanced training on data collection procedures, data synthesis, data analysis, and dissemination is also needed to achieve the institutionalization of ASTI.

### **Regional Consultation on Collective Actions for Opening Access to Agricultural Information and Knowledge in the Asia-Pacific Region**

A regional consultation on “Collective Actions for Opening Access to Agricultural Information and Knowledge in the Asia-Pacific Region” was jointly organized by APAARI, FAO, GFAR, CoRRB, ICS and SAARC Agriculture Center at Thimpu, Bhutan on 13-15 December, 2012. Thirty senior ICM managers responsible for managing agricultural information and knowledge systems from 10 countries in the Asia-Pacific region attended the meeting besides experts from ICRISAT, UNESCAP-CAPSA, GFAR,



*Regional consultation on collective actions at Thimpu, Bhutan*

FAO, SAC and APAARI to discuss on the current scenario of use of ICT for AR4D, issues in opening access to agricultural data and information at different levels and finally identify collective actions to be undertaken by different stakeholders in the region. Several collective actions were identified to be undertaken by different organizations and are given in Box 10.

#### **Box 10. Collective Actions to be undertaken by different organizations**

- Sensitization of SAARC Agricultural Ministers and Senior Policy Makers
- Compilation of ICM projects and experts and testing AgriVIVO
- Need-based training programs to ICM managers in developing NARS.
- Policies and strategies on open access to agricultural research articles.
- Developing catalogue of e-extension initiatives in India with critical analysis of their impact.
- Development of AGROVOC in the countries
- Development of Handbook of Agriculture on Wiki.
- Joining AgriFeeds by the NARS for effective sharing of information and news to global users
- Joining CIARD RING
- Developing Agricultural Information Repositories
- Developing e-learning module on opening access to agricultural information as part of IMARK

Highlights of major achievements of APARIS are given in Box 11.

### **APAARI Communication Strategy 2010-2015**

Communication plays an important role in taking the results of an organization to its stakeholders for ensuring intended impact in knowledge, attitude and actions. Realizing the need for a communication strategy, APAARI Communication Strategy was developed in order to adopt a strategic and systematic approach to communicate with all the stakeholders and audiences.

The brief outline of APAARI Communication Strategy is given under:

- Goal is to raise the profile of APAARI as the lead organization in AR4D in the Asia-Pacific region through communicating results and information in order to influence the stakeholders, partners and ARD community by providing two-way and well-targeted communication to ensure the results of activities by APAARI and its partners achieve impact.

### Box 11. APARIS Highlights

- APARIS, an ACIAR and GFAR funded initiative of APAARI, has been active since 2000, promoting information communication technologies and management (ICT/ICM) in agricultural research for development (AR4D) to support agricultural knowledge management and dissemination in Asia-Pacific region. The thematic areas of APARIS activities include advocacy, capacity building and integration of information resources.
  - Under these themes, APARIS has conducted five expert consultations, two short-term training programs, and eight inter-regional workshops on advocacy for ICT/M in ARD. More than 500 participants from various national, regional and international organizations have taken part in these activities. APARIS training programs have trained national agricultural information officers of 17 NARS of the Asia-Pacific region. APARIS has published the proceedings of the experts consultations, status reports on ICT/ICM in agricultural research for development in the region, and selected success stories on Agricultural Information Systems.
  - APAARI website, managed by APARIS, makes available these as well as all other APAARI publications in user-friendly formats. APARIS is also actively involved in annual CD-ROM publications such as 'APAARI on CD' and 'NARS Directory on CD', targeting users in some developing countries of the region, who take adequate internet connectivity. Through APAARI web site, APARIS also provides services such as Regional Agricultural Expert Locator (RAEL) and Regional Agricultural Information Gateway (GAIG), and links to websites of APAARI members, collaboration and diverse stakeholders of AR4D.
- 
- Using communications as a means to operationalize the APAARI objectives and strategies by continually communicating the Association's activities and services to enhance its role, strengthen its partnerships, provide access to reliable and cohesive AR4D information, increase resources and enhance impact on agricultural research for development in the Asia-Pacific region.
  - It is based on the principles of increasing access to AR4D information, APAARI activities, promoting participation, contribution, and collaboration of stakeholders and partners with APAARI programs; harnessing communication channels and new ICT tools / applications; striving for reliable, relevant, timely and useful information in an open, transparent and coherent manner for all the stakeholders; and establishing APAARI as a facilitator to support coherence in information for agricultural research for development in the Asia-Pacific region.
  - SWOT analysis indicate that there are immense strengths and opportunities to exploit the strength of strong linkages with NARS, increasing importance

of regional fora, networking capabilities and the power of information and communication channels for better management of information and knowledge and targeted communication.

- Target audiences included APAARI Member NARS and other AR4D stakeholders in the region including Farmers' Organizations, NGOs, Governments, Civil Society Organizations, International Agricultural Centers / Organizations, Associations, Private Sector, General Public, etc.
- Audiences generally seek information that included contact details of AR4D stakeholders, database of experts and projects; dialogue/debate on AR4D issues through e-discussion forums; information on country profiles, AR4D policy, projects, and research outputs; linkages to regional and global research networks, libraries and institutional knowledge repositories; employment opportunities; information on APAARI activities, publications, success stories etc.
- The print channels included APAARI Newsletter, Success Stories, Proceedings of Expert Consultations and Workshops, Status Reports on AR4D, Declarations, Concept Notes, Posters, Pamphlets, Flyers etc. The digital channels included APAARI Website, e-mails, digital documents, presentations, mailing list databases, CD-ROM publications, etc.

Based on the stakeholders analysis, information needs and use of communication channels, a Communication Plan was proposed along with key issues and timeframe. The activities proposed included development of Contact Databases; Electronic Discussion Forum; Improving APAARI web space; AR4D Repository; E-Newsletter; CDROM publication, use of RSS newsfeeds, use of web 2.0 and social networking tools for reaching the audiences effectively besides continuation of print-based communication. It also proposed a rigorous monitoring and evaluation mechanism to measure the impact of Communication Strategy.

## Emerging Concerns/Issues

### **Need to prioritize ICT use in AR4D and further sensitize NARS**

The common issues that still emerge at NARS level in enabling ICT use in AR4D, based on discussion held in the APAARI Expert Consultations are:

- How to prioritize ICT use in AR4D for maximum effectiveness? In view of financial and skills constraints, should the focus be on ICT use in scientific and technical information, research data management, research management, extension and outreach, agricultural education and enabling communication between institutions and/or researchers?
- What should be the strategy to provide NARS institutes with appropriate infrastructure, focus on generation of digital content for NARS clients and develop computer use, ICT and ICM skills?

## Addressing heterogeneity in ICT/ICM among NARS

There is great heterogeneity in ICT/ICM development among NARS in the Asia-Pacific region. This enormous disparity, to a considerable extent, interferes with collaboration and coordination, and APARIS is trying to educate weaker NARS (APARIS has grouped NARS in order of NAIS development) (Box 12). The principal role of ICT in AR4D is to integrate information content to satisfy the needs of agricultural communities and participants in agricultural commodity chains, connecting people who generate and use innovations and enable learning at individual, household and community levels. The use of ICT also enables

Box 12. Grouping of NARS in descending order of NAIS development					
Group A	Group B	Group C	Group D		
Australia	China	Bangladesh	Papua New Guinea	Afghanistan	Laos
Chinese Taipei	India	Fiji		Bhutan	Mongolia
Japan	Pakistan	Indonesia	Sri Lanka	Cambodia	Myanmar
Malaysia	Philippines	Iran	Vietnam	E. Timor	New Caledonia
South Korea	Thailand				

breaking of conventional institutional, geographical, disciplinary, commodity and similar boundaries in the exchange and sharing of information, knowledge, skills and resources. The use of ICT enables NARS to strengthen existing linkages and bringing new forms of linkages. They are also enabling evolution of ‘agricultural innovation systems’ at various levels and in replacing the current NARS-centric approaches in AR4D and giving rise to something new in sharing and exchanging innovations globally. Regional collaboration and cooperation for ICT management and ICM hold great promise in contributing to agricultural development in the region.

## Innovative use of ICT in agriculture and rural development

Several countries in Asia are looking for very innovative use of ICT in agricultural and rural development. India leads the pack with more than 57 per cent of all ICT enabled rural initiatives in the region with 4 per cent each in Pakistan, Thailand, Malaysia, the Philippines, Bangladesh and others; 3 per cent in China; 2 per cent each in Cambodia, Indonesia, Nepal, Sri Lanka; 1 per cent each in Bhutan, Vietnam, Japan and Laos and four countries outside the region—Israel, Russia, America, Jordan (data from Digital Dividend Website).

## Training Programs

APARIS in collaboration with stakeholders organized several training programs

on important aspects related to agricultural information. The details about these training programs are given in Chapter 10 on “HRD/Capacity Development”.

## Publications

A large number of publications were brought out under APARIS including proceedings of workshops/expert consultations and success stories/status reports since its establishment. The details are given in Chapter 11 on “Information Dissemination”. These publications have been widely distributed to collaborators, concerned scientists/organizations and other stakeholders.

## Future Strategies

APARIS future thrusts will center around the implementation of communication strategy of APAARI covering three broad themes: advocacy, capacity development and integration of information resources.

Advocacy for enabling, enhancing and enlarging agriculture related information systems at national, sub-regional and regional levels in the Asia-Pacific region will include: (i) collect, collate and provide access to information related to status of ICT use and information systems in NARS of the region, (ii) develop advocacy papers on ICT and agricultural information related policy and strategy issues, (iii) organize, sensitization and awareness workshops on policy and strategy issues, (iv) update CD on NARS; publish success stories on ICT/ICM in AR4D, (v) associate with other initiatives and fora to promote awareness about ICT/ICM in AR4D.

Greater thrust is also needed on capacity development for ICM and use of appropriate ICT for national agricultural information systems through various need based training programs in different countries in region.

Integration of information resources within NARS, in the Asia-Pacific region and with other regional and global agricultural information systems such as the GFAR webbing will be very important. This will include: (i) develop an on-line compendium of good practices, standards, guidelines, protocols, etc. for agricultural information exchange and sharing in the Asia-Pacific region, (ii) participate, as representative of NARS, in negotiations related to setting of standards, guidelines, protocols to agricultural information systems at the global level, (iii) conduct workshops/seminars at sub-regional levels - related to sharing and exchange of information, (iv) strengthen the directory of agricultural information on the web and the Gateway/Portal function to access the information resources of various institutes, and (v) promote data and information sharing among various member institutes using modern methods and tools.

# **7** Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB): Activities and Achievements

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## **Introduction**

The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) was established in 2003 under the umbrella of APAARI. Its genesis is linked to three meetings organized by APAARI during 2002-2003 to discuss the status of agricultural biotechnology in the Asia-Pacific region, and the need for such a consortium to provide regional coordination to undertake and promote this program for the benefit of NARS and the farming community. APCoAB is located at ICRISAT office in NASC, Pusa Campus, New Delhi office. Apart from APAARI, its activities are supported by ACIAR, COA, Mahyco and, on specific activity basis, by GFAR.

## **Mission**

APCoAB's mission is "To harness the benefits of agricultural biotechnology for human and animal welfare through the application of latest scientific technologies while safeguarding the environment for the advancement of society in the Asia-Pacific region".

## **Major Thrusts**

- Serve as a neutral forum for the key partners engaged in research, development, commercialization and education/learning of agricultural biotechnology as well as environmental safety in the Asia-Pacific region.
- Facilitate and promote public awareness and understanding relating to important issues of IPR, *sui generis* systems, biosafety, risk assessment, harmonization of regulatory procedures, and benefit sharing in order to address various concerns relating to adoption of agricultural biotechnology.
- Facilitate human resources development for meaningful application of the diverse agricultural biotechnology tools to enhance sustainable agricultural productivity as well as product quality for the welfare of both farmers and consumers.



*Meeting on establishment of APCoAB*

## Main Activities

The major focus of APCoAB has been on the following activities:

- Organize expert consultations/high level meetings/brainstorming sessions and policy dialogues on biotechnology for agriculture and related subjects
- Public awareness and information sharing regarding benefits and concerns on genetically modified organisms exchange
- Promote developing appropriate institutional mechanisms for testing and release of biotech products
- Create new public-private research partnerships
- Convince national policy makers regarding potential benefits of agricultural biotechnology to the society
- Identify/promote problem-solving research
- Capacity building/HRD through workshops and specific training
- Organize publication of NARS/regional developments in biotechnology for knowledge dissemination and technology transfer.

As APAARI program, APCoAB takes up these activities in a phased manner through its annual work plans as per national/regional needs and in collaboration with NARS, IARCs, private sector and other institutions. A Steering Committee oversees the implementation of programs and activities and gives strategic directions. The composition of Steering Committees since 2004 is given in Annexure IV. Strategic areas and priorities for APCoAB are given in Box 13.

## Major Achievements

APCoAB, an APAARI program, has built up its activities in a phased manner which



### Box 13. Strategic areas and priorities for APCoAB

#### Policy Advocacy

- Policy advocacy relating to research, testing, release and biosafety issues of GMOs and other biotechnology products
- Policies for the exchange of material and technology
- Policy advocacy on other biotechnology priorities

#### Capacity Building

- Conduct training programs/ workshops on:
  - ◆ Conventional and modern biotechnology
  - ◆ Biosafety, bioethics & related issues
  - ◆ Issues related to IPRs, patenting and benefit sharing

#### Knowledge Resources and Dissemination

- At all levels based on scientific assessment and validation
- Providing basic information and links with other websites
- Facilitate public awareness

have now reached on impressive level in terms of topics covered and participation. The major achievements are given below.

### Workshops/Conferences/Expert Consultations organized

APCoAB had organized/facilitated following Workshops/Conferences/Expert Consultations/Brainstorming Sessions/Stakeholders Dialogues since its establishment:

#### Dialogue on ‘Enabling Regulatory Mechanism for Release of Transgenic Crops’

Dialogue on ‘Enabling Regulatory Mechanism for Release of Transgenic Crops’, was organized by Trust for Advancement of Agricultural Sciences (TAAS) at New Delhi, India on 18 October, 2003. The recommendations emerged were widely circulated to the researchers, policy makers and other stakeholders.

#### Brainstorming Session on ‘Enabling Regulatory Framework and Procedures for Promoting Agricultural Biotechnology in the Philippines

Brainstorming Session on ‘Enabling Regulatory Framework and Procedures for Promoting Agricultural Biotechnology in the Philippines’ was organized by PCARRD,

Los Baños, Philippines on 19 November, 2003. The recommendations emerged were widely circulated to the researchers, policy makers and other stakeholders.

### **Workshop on ‘Enabling Regulatory Framework and Procedures for Promoting Agricultural Biotechnology Developments in Thailand**

The workshop was organized by National Center for Genetic Engineering and Biotechnology (BIOTEC) & National Science and Technology Development Agency (NSTDA), Bangkok, Thailand during February 2004. The recommendations emerged were widely circulated to the researchers, policy makers and other stakeholders.

### **Workshop on ‘Public-Private Partnership in the Use of Agribiotechnology for Sustainable Solutions to Brassicas Pest Problems**

The workshop was jointly organized by AVRDC/APAARI/APCoAB/CIMBAA at India Habitat Center, New Delhi, India on 10 February, 2005. The recommendations emerged were widely circulated to the researchers, policy makers and other stakeholders.

### **Brainstorming Session on ‘Public-Private Partnership in Agricultural Biotechnology**

The brainstorming session was held at New Delhi, India on 14 March, 2005. A clear message that emerged was the need of a mutual trust between the public and private sector, that developing countries should come out with a national strategy on public-private partnership identifying the specific priority areas of cooperation between the public and private partners; need for a macro-level policy change and a well-defined mechanism for IPR and benefit sharing, using existing models of partnership; also capacity building in the field of scientific policy and legal matters.

### **High level policy dialogue on ‘Biotechnology for Food Security and Poverty Alleviation: Opportunities and Challenges’**

High level policy dialogue on ‘Biotechnology for Food Security and Poverty Alleviation: Opportunities and Challenges’ jointly organized by FAO, APAARI and GFAR facilitated by APCoAB at Bangkok, Thailand on 7-9 November, 2005. The recommendations emerged were widely circulated to the researchers, policy makers and other stakeholders.

### **Workshop on ‘Biosafety Regulations for Transgenic Crops and the Need for Harmonising them in the Asia-Pacific Region’**

Workshop on “Biosafety Regulations for Transgenic Crops and the Need for Harmonising them in the Asia-Pacific Region” was jointly organized by APCoAB and ICRISAT at Patancheru on 31 July-2 August, 2006. The workshop recognized

that modern biotechnology is a powerful tool for agricultural improvements, and can help in alleviating hunger and malnutrition. Developing appropriate measures for safe application of the technology in compliance with the Cartagena Protocol on Biosafety would facilitate sharing of its benefits among the stakeholders in the Asia-Pacific region. The workshop expressed a general consensus that the countries should move towards identifying issues that need harmonization at the regional level while recognizing that every country would have their own regulations and stand on the subject. A strong need was felt for capacity building in selected areas as per priority. Both national and regional initiative, would be required to operationalise the recommended actions. It was also recommended that APCoAB should play a leading role in networking and dissemination of information on agricultural biotechnology and biosafety in the Asia-Pacific region.

### **Brainstorming Session on Models of Public-Private Partnership**

The Brainstorming Session was organized in collaboration with Trust for Advancement of Agricultural Sciences (TAAS) on 7 April, 2007 at the National Agricultural Science Centre Complex, New Delhi, India. The objective was to revisit the various intersectoral partnerships in agricultural biotechnology and identify appropriate models of PPP so that the benefits of agricultural biotechnology reach the resource poor farmers, consumers and other stakeholders in the region. The event was attended by 46 participants comprising researchers, research managers and experts in biotechnology and related issues from public and private sectors and NGOs. Presentations and discussions were held on three main themes: Existing Models of Public-Private Partnership, Issues in Public-Private Partnership, and The Way Ahead. The participants deliberated on the status of various PPP partnerships in agricultural biotechnology, factors contributing to their success or otherwise, and regulatory, IPR and other issues impacting intersectoral partnerships.



*Brainstorming session on public-private partnership in agricultural biotechnology at New Delhi*

There was general consensus that PPP is the most effective mechanism for translating the potential of biotechnology into products that will help in enhancing agricultural productivity and improving the economic condition of farming community. While a number of successful partnerships have emerged during the last few years, more needs to be done to build new partnerships and strengthen the existing ones.

## Recommendations

- In view of the highly diverse nature of agricultural biotechnology projects operating successfully in partnership mode, there is no single model that can be recommended as the most appropriate one. However, some basic requirements are essential for making a PPP successful: i) the partnership should be based on common goals of the partners to achieve objectives of mutual interest that are also aimed at addressing national challenges in agricultural growth and farmers' incomes; ii) the partners should have matching resources which also complement mutual strengths; iii) the partnership should be built on mutual trust and commitment to create a dynamic and result oriented working environment. iv) ultimately, the output of the partnership should be more than the potential of individual partners.
- The existing PPP models should be analyzed to develop appropriate guidelines for entering into future partnerships and for negotiating terms of benefit sharing.
- PPPs need to consider partnering seed industry, including seed associations, to enable expeditious multiplication and distribution of the seed to farmers.
- All projects should be analyzed for Freedom to Operate from IPR perspective before they are operationalized.
- A Senior Level Working Group comprising ICAR/DBT/DST/IITs/universities to be constituted to frequently review the technological developments in the public sector and identify the appropriate ones which are fit to be commercialized in a partnership mode. APCoAB could facilitate identification of potential partners in a network.
- All partners must ensure that the project at any stage does not adversely impact ecology and biodiversity.
- With changing perceptions of partnership in a globalized world, multinational companies may be considered at the same level as Indian national companies for entering into partnerships with public sector.
- Private sector needs to make long-term investment in basic and strategic research in molecular aided selection, genomics and bioinformatics, and enter into partnerships with public sector right from project inception stage.

- There is a need for building comprehensive infrastructure and human resources in public sector for biosafety and transgene testing.
- Human resource development in public sector institutions on technical and legal aspects of IPRs and MTAs is essential to build capacities for negotiating

## **Expert Consultation on Agricultural Biotechnology for Promoting Food Security in Developing Countries**

APAARI in collaboration with Malaysian Agricultural Research Institute (MARDI) organized the expert consultation in Malaysia on 20-22 August, 2008. Seventy participants comprising experts on agricultural policy and planning, biotechnology and other academic institutions, civil society and farmer organizations, private sector, and other stakeholder groups attended the meeting. The participants represented, besides international organizations, several developing countries of South and Southeast Asia, Near East, Africa and the Pacific.

There was consensus that biotechnology provides powerful tools to increase and diversify agricultural production. However, there is a need to make wide ranging reforms in the agricultural production systems to fully address the issues of food security in developing countries. A summary of the recommendations is given below:

- Countries need to adopt appropriate policies and strategies to encourage adoption of biotechnology in agriculture. The objective should be to increase productivity in conventional crops as also help in crop diversification.
- Non-food crops like cellulosic grasses and microalgae need biotechnological interventions to render their use for biofuel production economically viable.
- Facilitating regulatory management would help in rapid dissemination of useful products to meet agriculture and food security needs across countries. This can be done by simplifying regulatory norms for GM food crops and traits of apparently limited environmental and human risk; and facilitating transboundary movement of GM food crops through bilateral or regional agreements on biosafety information requirement and acceptance.
- South-South, South-North and Public-Private linkages will help in promoting agricultural biotechnology R&D among developing countries and bridge regional and interregional gaps.
- Improve communication with stakeholders by training young scientists as communicators, develop farmer-scientist linkages and cooperation through field visits and seminars and educational tools including websites.
- Strengthen capacity in developing countries especially in the area of scientific risk assessment and management and IP issues.

## Expert Consultation on Biopesticides and Biofertilizers

The expert consultation was organized at Taiwan Agricultural Research Institute, Taichung on 27-29 October, 2009 under the APAARI-COA collaborative program on agricultural biotechnology. Seventy two participants from 23 countries representing NARS, CG centres, other academic institutions, CSOs, private sector and farmer organizations attended the three days program comprising two days of deliberations and one day field trip. Six technical sessions comprised: Presentation of Lead Papers; Presentation of Country Status Reports; Reports of Regional/International Institutions and other Stakeholders; Biopesticide and Biofertilizer Innovations and Commercialization; Break-out Group Discussions (Issues for Research and Development; Commercialization; Policy Regulation and Regional Cooperation); and Plenary Session.

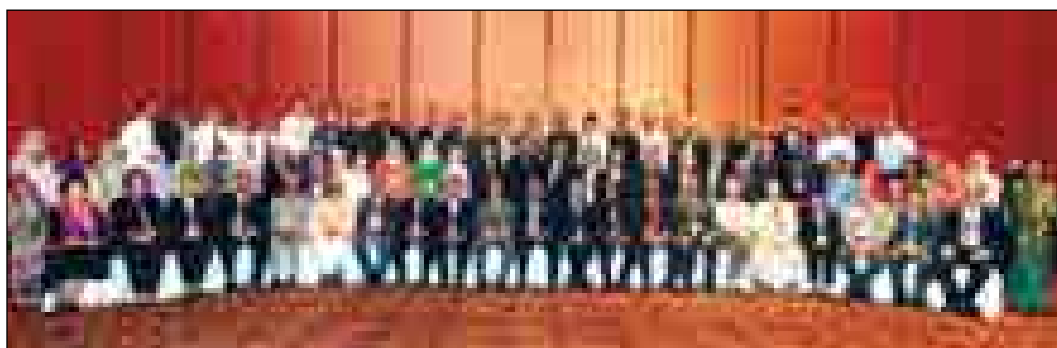
There was consensus that biopesticides and biofertilizers have an important place in repertoire of inputs aimed at developing sustainable agricultural production systems. The recommendations to promote the development and use of these bioagents in agriculture included:

- Intensify efforts to develop more efficient products and technologies, and enhanced capability and capacity for the production, availability, access, refinement, promotion, adoption and assessment of environment friendly bio-inputs through participatory mode involving public and private sectors, self help groups, farmers and other stakeholders.
- Increase emphasis on formulation of research and development, particularly the active material/organism formulant/auxiliary/other ingredient(s), to yield standard and stable, quality products, Improvement of shelf and field lives be specifically focused.
- Promote indexing, cataloguing, documentation of products, technologies, indigenous folklore knowledge and other information, and make the data banks accessible for reference and use, particularly for improvement of plant and microbial species and strains for the desired traits.
- Enhance government support and incentives in terms of policy, procedures, intellectual property (development, protection and sharing), fiscal and non-fiscal benefits, risk insurance, research, development, training, knowledge based extension and other efforts to promote the bio-intensive, environment benign, pest and nutrient management systems in the respective countries of the region.
- Develop and implement regulatory and biosafety protocols for the bio-products, including for the genetically modified organisms, improved strains, individual organisms and/or microbial consortia, and others.
- Establish a Regional Network on Biopesticides and Biofertilizers among APAARI member countries for promoting partnerships, knowledge sharing, capability and capacity building, and other activities to focus on a time bound promotion of these bio-inputs, including their need based integrated use along with the chemical inputs in the region.

## Expert Consultation Meeting on Post-harvest and Value Addition of Horticultural Produce

The consultation was organized in collaboration with the Malaysian Agricultural Institute (MARDI) Kuala Lumpur, Malaysia on 29 November- 2 December, 2010. The need for this consultation was felt in view of the enormous postharvest losses (upto 30-50%) suffered by fruits and vegetables in the Asia-Pacific region, which in turn adversely affect the income of farmers, the quality and price of produce available to consumers, and the human and environmental health due to accumulating biowastes.

Eighty six participants attended the four day event comprising two days of presentation and group discussions, and two days technical visits. The presentations were organized under four sessions: (i) status of ARD initiatives on postharvest and value addition of horticultural produce in the Asia-Pacific Region; (ii) technology spectrum for managing quality and safety of horticultural produce; (iii) initiatives and experiences of farmers and farmer organizations on postharvest handling technology of horticultural produce; (iv) global ARD future directions on post-harvest and value addition of horticultural produce, followed by two sessions of Group Discussions, and Plenary Discussion.



*Expert consultation on post-harvest and value addition at Kuala Lumpur*

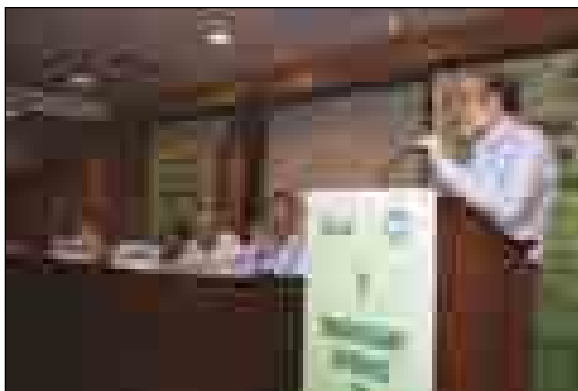
The recommendations emerged on the following broad areas were adopted after discussion:

- There is a need to enhance policy support including funding for R&D in post-harvest technology.
- Detailed assessment of the post-harvest losses needs to be made along the entire production and marketing chain to identify the critical gaps and remedial measures.
- Develop infrastructural support base for post-harvest management that will facilitate quality retention, in-time delivery, and reduce handling costs and losses.

- Adopt appropriate and integrated post-harvest management practices. Low cost technologies that can be adopted by small farmers are most suited for countries of this region.
- Establish a regional post-harvest center to couple an education center with a one-stop-shop that will sell post-harvest technologies and services.
- Train urban and peri-urban horticultural growers in cropping systems, pre- and post-harvest handling and marketing techniques.
- Post-harvest information management is an emerging need for farmers to keep abreast of the market demands, and labeling and traceability requirements. Infrastructure and local skills need to be developed for the benefit of resource poor farmers to remain competitive in the globalized markets.

### Stakeholders' Interface on GM Food Crops

This meeting was organized in collaboration with Trust for Advancement of Agricultural Sciences (TAAS) at National Agricultural Science Centre, New Delhi on 19 May, 2011 to deliberate on issues relating to adoption of GM food crops in India. It was attended by 45 participants representing a wide cross-section of stakeholders including policy makers, technical experts on biotechnology and biosafety, agricultural scientists, representatives of seed sector, NGOs and farmers. The participants expressed clear consensus that adoption of GM technology is a must for ensuring both food and nutrition security of fast increasing population in India. This technology also offers new options to meet the challenges of biotic and abiotic stresses and the emerging global climate change.



*Dr. M.K. Bhan, Secretary, DBT, Govt. of India delivering keynote speech*

### Recommendations

- Development and adoption of appropriate GM technologies would need a mission mode approach for which a strong public research system needs to be built /strengthened. Along with, the private sector investments on GM technologies must be ensured through enabling environment.
- There is a strong need for the prioritization of crops and traits in order to effectively use GM technologies for improving specific traits.
- The biosafety regulatory system needs to be made more efficient and fool



proof so as to facilitate effective and safe application of biotechnology. At the same time, it should not be too stringent to slow down the release process.

- There is also a need to have a strong post-release monitoring system for which an appropriate mechanism has to be put in place.
- Plant breeders and biotechnologists must join hands and work as one team to address specific research problems. Their efforts should be synergistic and not competitive. Similarly, strong public-private-partnership right from the beginning of the project, with needed understanding, mutual trust and defined roles for research and benefit sharing, be encouraged through enabling environment.
- Public perceptions about GM technology are often not based on scientific facts. Information communication system, including public extension and awareness services need to be considerably improved in order to effectively deliver correct and unbiased information to farmers and the general public.
- Priority investments are needed on capacity building, especially in areas of biosafety research, regulatory systems (including legal aspects), communication tools and IPR issues since they all are critical for out scaling innovations for greater impact.
- There must be a defined focus on agri-business and agri-biotechnology in the 12th Five Year Plan for which ICAR should, take a major initiative and Department of Biotechnology (DBT) must extend required funding support. Agri-business Platforms and Technology Parks have to be established for building much needed public-private-partnership and for faster delivery of GM products to both the farmers and consumers.

## Stakeholders' Interface on Genetically Modified Crops

A Stakeholders' Interface on Genetically Modified Crops was co-organized with the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) Asia-Pacific Consortium on Agricultural Biotechnology - Asia-Pacific Association of Agricultural Research Institutions (APCoAB-APAARI) on 27 September, 2012 at Manila, the Philippines. The objective of the interface was to discuss issues and concerns governing the potential of GM crops in alleviating hunger and poverty, achieving food security, and ensuring environmental sustainability in the Philippines and the Asia-Pacific Region.

Among the advantages of using GM crops discussed by speakers were the increase in



*Stakeholders' interface on GM crops at Manila*

yield of Bt cotton and brinjal in India, decrease in pesticide use in India, and the relative improvement in the economic status of Bt corn farmers in the Philippines, making them proud to be called “farmers”. The issues raised, on the other hand, were:

- Farmers’ need for access to resources and marketing/marketing information
- Need to accelerate transfer of technologies
- Acceptability, especially for food crops
- Important role of media in advocacy
- Need for the public to be communicators for biotechnology for the local/lay people to easily understand what biotechnology and its products are
- Legal challenges despite the S&T based proof on safety
- Need to improve the Philippine regulatory system such that approval can be event-based or be based on results from other countries, hence maximize utilization of meager resources
- Affordability of GM products
- Need to discuss targets of the DA Biotechnology Road Map vis-a-vis time and several priorities
- Need to have a unified direction and partnership
- Ownership of technologies/products especially for those generated from partnerships (among countries and institutions)

## **Expert Consultation on Agricultural Biotechnology, Biosafety and Biosecurity**

The consultation was held in collaboration with Taiwan Agricultural Research Institute (TARI), Chinese Taipei on 27-28 October, 2011 at Taichung. The meeting was attended by 73 participants from 22 countries representing Asia, Australia,



*Expert consultation at TARI, Taichung*

the Pacific, Africa and North America. The participants included international experts and leaders from APAARI member NARS and CG Centers, representatives of industry, civil society organizations and farmer groups, and local participants from government agencies, farmer cooperatives and private sector. The program comprised presentation of status reports on biotechnology, biosafety and biosecurity R&D in Asia-Pacific countries, followed by regional status reports (Africa, Asia and the Pacific), expert lectures on advances in biotechnology and biosecurity for food security, and group discussion.

The expert consultation recognized that agricultural biosecurity is essential for food security, food safety, protection of human health and biodiversity, and market access. Promoting adoption of biotechnological tools, facilitating biosafety systems and developing integrated legislative framework and capacity for addressing diverse agricultural biosecurity threats were recommended during group discussions. The major recommendations were:

### **Promoting Biotechnology for Food Security**

- Build capacity particularly for “omics”, biopesticides and biofertilizers, and GMOs.
- Enhance funding, provide policy support and build partnerships.
- Stimulate entrepreneurs for production and marketing of products.
- Remove bottlenecks of infrastructure, regulatory uncertainty and low public awareness especially for GM promotion in least developed countries.
- Demonstrate impact, particularly on smallholder farmers’ income and environment.

### **Facilitating Biosafety Adoption**

- Create a dynamic database on national biosafety systems, transgenic events, import/export, labeling and other regulatory norms.
- Promote awareness and confidence in regulatory system.
- Exchange information on best practices, cost-benefit analysis and organize workshops involving different stakeholders.
- Build capacity in communication tools and methodologies, regulatory framework, and stewardship on product development and deployment.
- Strengthen regional institutional and public-private partnership for biosafety adoption, technology transfer and translational work.

### **Building Biosecurity Systems**

- Frame enabling legislations addressing complete food chain.
- Adopt integrated biosecurity systems approach.

- Develop capacity (infrastructure and human resources) on biosecurity management (diagnostics, detection, disinfestation, risk analysis, survey and surveillance).
- Develop biosecurity related SOPs, procedures and protocols.
- Develop operational linkages across implementing organizations.
- Strengthen communication systems and outreach for awareness.
- Enhance supportive research on diagnostics, disinfestation treatments, quarantine and tools for pest identification.

## Expert Consultation on Managing Trans-Boundary Diseases of Agricultural Importance

The expert consultation was co-organized with Indian Council of Agricultural Research (ICAR) at New Delhi on 10-12 October, 2012. TBDs not only threaten agricultural productivity but also contribute to poverty, hunger, particularly of small holder farmers, and act as to trade. In recent years diseases like UG-99, plant viral diseases, barrier avian influenza, NIPAH virus and foot and mouth disease have adversely affected agriculture and associated communities in the Asia-Pacific region. The expert consultation was attended by 140 participants comprising international experts on plant, animal and fish TBDs, APAARI members, CG centres, FAO, CABI and other international and local organizations.

Following important recommendations were made in different sessions:

- Documentation of potential TBDs of Asia-Pacific region and prioritization based on risk analysis. Among the trans-boundary animal diseases, there is a need to focus on high priority diseases such as FMD, HPAI, PPR and CSF.
- Strengthening epidemiological and disease reporting with improved communication system
- Risk analysis and modeling capacity strengthening



*Expert consultation on trans-boundry diseases at New Delhi*

- Identification of working groups for surveillance of emerging TBD threats and their vectors at regional level to map hot-spots
- Creation of rapid response teams and developing appropriate human resources to deal with emergency situations, like locust attacks
- Establish antisera banks/vaccine banks for exotic pests/pathogens as well as new emerging pests/diseases.
- Invest in setting up local fish breeding centers to avoid risk of import of pathogens along with SPF stocks.
- Strengthening of quarantine and certification framework establishment of national strategies and institutional mechanism for managing disease risks (National Biosecurity Authority)

## Stakeholders' Dialogue on Biosafety Regulations in the Asia-Pacific Region

The Stakeholders' Dialogue was held in Bangkok on 16-17 April, 2013. The meeting was attended by 25 participants from Asia-Pacific countries, including AP AARI members, CG Centers, FAO, CABI and other international and local organizations. The program included presentations on overview of biotechnology and biosafety in Asia-Pacific, country status reports, key-note lectures on related topics, discussion on key issues and plenary discussion.



*Stakeholders' dialogue on biosafety regulations at Bangkok*

## Major Recommendations

Following major recommendations were made in the meeting:

### ***Biotechnology R&D priorities especially aimed at smallholders***

- GM technologies need to be focused to address the still unmet needs of smallholder farmers.
- Since private sector is putting most of its efforts on major crops, there is a need to give more attention by public sector organizations to niche crops, like cassava and Bt brassica.
- Countries need to adopt best technology options for GM production.
- Regional prioritization of crops for GM intervention should also be based on agroecology.
- There is a need to address those problems on priority for which the entire technology can be packaged into seed.

- Biosafety compliance costs can be lowered by assisting countries in implementing biosafety policies through collaboration and optimization of testing.

#### ***Enhancing communication for public awareness***

- Enlist farmers' support for technology awareness and inputs at the field trial stage itself rather than later when the tests have been completed. To ensure their greater acceptance, it is important to make farmers a part of the product development process.
- Make use of farmer champions post-introduction for disseminating the practical experiences with the technology.
- Resources need to be allocated by research institutes/technology developers for adopting appropriate communication strategies developed through professional communicators.

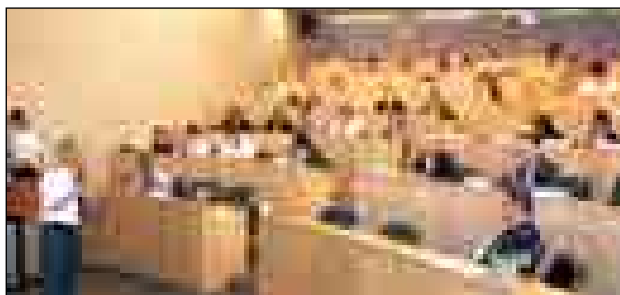
#### ***Regional cooperation for biosafety management***

- Cooperation, collaboration, linkages and networking in modern biotechnology/biosafety among the Asia-Pacific countries need to be initiated, implemented and strengthened.
- There is a need for alignment and synergies among the existing biosafety policies under different national component authorities in each Asia-Pacific country and within sub-regional or regional economic/political associations.
- There exists an acceptable resolution on the co-existence issues among conventional agriculture, organic farming and biotech crop cultivation. A settlement of this issue is urgently needed within and among Asia-Pacific countries.

In order to accomplish these aims and make them sustainable, there is a need of an effective financial assistance mechanism at the regional level similar to the one existing under GEF.

### **Asian Food and Agribusiness Conference 2013: Biotechnology and Global Competitiveness**

The event was co-organized by APCoAB along with the Asia Productivity Organization; Council of Agriculture, Taipei; China Productivity Center; and Food and Fertilizer Technology Center, Chinese Taipei. It was held at Taipei on 15-18 July, 2013. The conference consisted of thematic sessions, open forums,



*Asian food and agri-business conference in session*

panel discussions, poster exhibition, and a visit to the Bio Taiwan 2013 exhibition. Seventy four participants from 13 Asia-Pacific countries attended and shared their expertise through thematic presentations and discussions on biotechnology- related topics.

The important outcome of the conference was the widespread view among the experts and participants that biotechnology is one important tool to help Asia-Pacific countries to meet the challenges arising from climate change, natural resource constraints, food in security, and sustainable development. Additionally, experts shared experience in the many varied, proven, safe, effective applications of biotechnology ranging from biopesticides and biofertilizers to genetically modified crops. Recommendations were made under heads: A. Policy/Regulatory Enablers, B. Risk Management and Risk Communication, C. Investment, D. Biotechnology for Green Productivity/Technology Solutions, E. Strategies for Sector Advances

### **Asia-Pacific Symposium on Molecular Breeding**

The Symposium was organized in collaboration with Council of Agriculture, Chinese Taipei and AVRDC - The World Vegetable Center on 1-3 October, 2013 at AVRDC, Tainan, Chinese Taipei. It was aimed at promoting marker-assisted selection in crop and animal breeding in the region with the purpose to enhance food security and income generation along the whole agricultural value chain. More than 60 participants involved with plant and animal breeding from ten Asia-Pacific countries attended the symposium. The program was divided into three parts: The first part provided a technical update on marker-assisted selection in breeding and on genotyping innovations. The second part reported on the status and the progress of molecular breeding in the countries represented in the symposium, and the third part comprised a networking session designed to connect people and build bridges between the research institutions in the region to enhance research collaborations in marker-assisted selection. The group discussions led to identification of three molecular



*Symposium on molecular breeding at Tainan*

breeding networks; cereals, vegetables, and livestock with identified network partners. Commodities, work areas and work flow. Steps to formalize the partnerships and initiate network activities were also identified.

Three networks were proposed and the next required steps to establish these were identified:

### **I. Molecular Breeding Network: Cereals**

- Organize capacity development activities
- Exchange germplasm
- Develop joint project proposals

### **II. Molecular Breeding Network: Vegetables**

- Seek funding for network activities
- Germplasm distribution via AVRDC and other International Centers
- Trait-based marker development (in collaboration with the Asian Pacific Seed Association and similar organizations)

### **III. Molecular Breeding Network: Livestock**

- Identify national reference labs for MAS
- Set-up MAS protocols

## **Website redesigned and updated**

Initially, APCoAB website was established as a link to APAARI website. This website is now directly operated by APCoAB office in New Delhi, which besides giving updates on APCoAB activities provides information on current research and development in agricultural biotechnology, particularly in the Asia-Pacific region. The website can be visited at [www.apcoab.org](http://www.apcoab.org). The site provides several useful links as well as databases on various Asia-Pacific institutions, and on scientists/experts involved in agricultural biotechnology. It acts as a resource-base for collaboration among NARS of the region in particular. Information on meetings organized has been posted on the website alongwith other information abstracted from published literature. More webpages are under construction in order to provide value-added information.

## **Training Programs**

APCoAB in collaboration with stakeholders organized several training program on important aspects related to agricultural biotechnology. The details about these training programs are given in Chapter 10 on “HRD/Capacity Development”.



## Publications

APCoAB brought out a large number of publications including proceedings of workshop/expert consultations/stakeholder dialogues and success stories/status reports since its establishment. The details are given in Chapter 11 on “Information Dissemination”. These publications have been widely distributed to collaborators and concerned scientists/organizations.

## Future Strategies

During the past one decade of its existence, APCoAB has established itself as an important facilitator of agricultural biotechnology related policy discussions, human resource development, and information generation and communication. High level meetings, training programs and publication of success stories/status reports have been organized on diverse topics covered under biotechnology in its broadest sense like, tissue culture, post-harvest, biopesticides and biofertilizers, genetic modification, biosafety, genetic resources conservation, transboundary diseases and food safety. These efforts have helped in enhancing awareness and knowledge among Asia-Pacific NARS and other partners about contemporary developments in agricultural biotechnology and policy options to increase farm production and productivity, and enhance benefits to farmers. Along with, knowledge and skills of scientific and technical personnel engaged in application of biotechnology tools and techniques have been augmented.

In future, while continuing with its mandated activities of policy advocacy, human resource development and information generation and communication, APCoAB will focus on regional and sub-regional cooperation in adoption of biotechnology tools and products, and biosafety and biosecurity harmonization. Technology transfer along with capacity building with respect to tissue culture for rapid and disease-free multiplication of elite planting material, animal reproduction, genetic modification, disease diagnostics, post-harvest handling, bioresources conservation and food safety are some of the areas in which the national agriculture research systems will be encouraged to cooperate and benefit from mutual strengths in infrastructure and know-how.

Cooperation in biosafety regulation has been widely felt as an imperative for effective international exchange of biotechnology products. APCoAB through its high level meetings, seminars and workshops will endeavour toward adoption of robust science based and transparent regulatory systems, enhance cooperation and harmonization at regional/sub-regional level in GMO risk assessment and risk management, and establishment of regional/sub-regional information centres on agriculture biotechnology and biosafety. Information exchange and awareness will be facilitated through compilation and regular updation of biosafety regulations of Asia-Pacific countries. Also, APCoAB database on biotechnology related institutions of the Asia-Pacific region will be updated at regular intervals.

## **8** Agricultural Research for Development (AR4D) Programs

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Agricultural Research for Development (AR4D) in the Asia-Pacific region is effectively promoted and facilitated through novel partnerships among NARS and other related organizations so that it contributes to sustainable improvements in the productivity of agricultural systems and to the quality of the natural resource base that underpins agriculture, thereby enhancing food and nutrition security, economic and social well being of communities and the integrity of the environment and services it provides. APAARI had organized a large number of conferences/workshops/expert consultations in order to promote agricultural research for development (AR4D) in the Asia-Pacific region. Details of these are given below:

### **Asia-Pacific Global Partnership Program on Linking Farmers to Markets**

APAARI and GFAR jointly convened a planning workshop on 6-7 June, 2006, of an Ad Hoc Working Group (RWG) for the preparation of Asia-Pacific's participation in a Global Partnership Program (GPP) on Linking Farmers to Markets (LFM). The workshop participants included representatives from the NARS, advanced research institutions, private sector, farmers' organizations, academia, NGOs, and regional financing and development institutions. The RWG achieved greater definition of what the partnership program on "Linking Farmers to Markets" will look like and defined initial commitments from a number of important stakeholders. The LFM program envisioned "enhanced livelihoods of rural households and farming communities by providing opportunities of choice for market integration through responsive R & D". The RWG agreed on the four components of the LFM program: information (and documentation), cluster and linkages, responsive R&D, and training. The following initial commitments were expressed and acknowledged: Farmer group training (APRACA); NGO training (FAO); Information and documentation (APAARI, FAO); Research responsiveness (BPRE-Philippines and CFTRI India); JIRCAS – dispatch of experts on market analysis; Private sector (Nuhem Seeds) – Research to deliver products); and CLT/FFF/IFAP as partners in the long-term.

### **Expert Consultation on Agricultural Innovations: Linking Farmers to Markets**

The Asia-Pacific Association of Agricultural Research Institutions (APAARI) organized an "Expert Consultation on Agricultural Innovations: Linking Farmers

to Market (LFM)” and its 9th General Assembly on 6-7 November, 2006 in NASC Complex, ICAR, New Delhi, India. The Expert Consultation was inaugurated by Hon’ble Shri Sharad Pawar, Union Minister of Agriculture, Consumer Affairs, Food and Public Distribution, Government of India, and attended by 100 participants representing APAARI members from more than 20 national agricultural research systems (NARS), and 15 CGIAR Centers other regional and international organizations; and its stakeholders such as the NGOs, farmers/farmer organizations, the youth, private sector and donor agencies. The two-day expert consultation acknowledged that as countries in the Asia-Pacific diversify their agricultural economy, they do address marketing issues invariably. The issue is not just finding the markets but also looking at the entire value chain, and making farming a remunerative business. The major recommendations emerged were:

### **Enabling Policies**

- Legislative review and refinement of policies for formation of effective and innovative groups for efficient horizontal and vertical integration to cover production, processing, trading and consumption areas.
- Development of policies and legal aspects to encourage producer companies, preferred to the producer cooperatives so as to have effective involvement and ownership by smallholder producers.
- Governments to negotiate effectively with the developed countries in the on-going World Trade Organization (WTO) debates to streamline subsidies to agricultural producers so as to create level field competitive environment for the smallholder farmers in the developing countries.
- Government policies to encourage and provide free exchange and access to market and marketing information to various stakeholders involved in making the smallholder sector more efficient.
- Favourable policies to help extension agencies and make them more effective.
- Appropriate policies needed on credit, risks, and insurance, as well as agricultural inputs (seeds, fertilizers) and incentive systems.
- Consider global health, energy, and land use issues for policy framework.
- Enhance regional cooperation and trade to expand market access to small farmers.
- The NARS will have to be reorganized to become much more efficient and effective in conducting and applying innovative research for development. They will have to adopt innovative and creative approach and strategies to develop and implement appropriate training and educational programme for youth and women, and others so that they can effectively contribute to agricultural development. The youths can be provided with suitable job-training in agri-business areas, and the women farmers must be provided opportunities so that they are better integrated into the value chain system.

- In collaboration with NARS, the regional organization like APAARI and international organizations such as GFAR need to assess different models of successes in various regions, countries and settings so as to create knowledge banks for sharing pertinent information to others. CSOs and the private sector stakeholders should i) consolidate at all levels i.e. at production, processing, retailing and consumers in an innovative way so as to integrate vertically all those involved; and ii) make special efforts to specify value attributes for the products coming from smallholders and fragmented sectors such as organic producers, underprivileged people, etc. for niche markets so as to attract better prices from consumers for competitive and comparative advantages.

### **Partnership Building**

- Develop partnership of LFM either with a contractual or legal framework which is binding on both parties
- Demonstrate the interest and commitment by bringing appropriate contributions based on the guiding principle of equity
- Adopt participatory value/ chain management with strong involvement of all stakeholders. Facilitating market linkages may need retooling both public and private extension services. The priority areas for inter-regional collaboration identified were knowledge and information sharing, and capacity building.
- There is a need for knowledge and information sharing on good agricultural practices (GAP) such as SPS, food safety and quality improvement. Capacity building on GAP for all actors in the value chain including women will have to be supported. APAARI should share “best practices” in technological and institutional innovations, put up knowledge bank on case studies of value-chain, good agricultural practices and, evidence-based policy relevant “best practices”.
- APAARI and GFAR should jointly convene expert consultation on GAP and policy relevant “best practices” and should also consider expert consultation on emerging areas such as biofuels with required focus on LFM and how farmers will benefit from these new initiatives.

### **Upscaling/Outscaling of Innovations**

- There is need for exploring alternative institutional arrangements (involving private sector, corporate, NGO’s, CSO’s etc.) to disseminate technological innovations to the farming community.
- The LFM process should be holistic and include a continuum of ‘before, during and after production’ so that farmers are involved in the whole chain of production to consumers. The following areas considered critical in the market-processing consumption continuum were: i) capacity building of stakeholders in technologies, ii) supply of appropriate inputs for production, and iii) infrastructural and policy support in marketing.

- Specific areas recommended for up-scaling, included: i) self-help group (SHG) approach, with micro-credit included; ii) use of ICT to disseminate information and to help networking of farmers (including radio, newspapers, T.V., mobile phones, internet based systems such as e-choupal, village information centers, etc.), iii) providing timely technical services to farmers (based on several models such as Bhartiya Agro-Industries Foundation (BAIF), Iran wheat revolution, etc.), and iv) enabled infrastructure and policy support to ease restriction and enable marketing.
- Some areas will have to be strengthened in developing countries, namely: i) farmer – participatory research and development (the term farmer should include all stockholders, farmers, traders, processors and consumers), ii) product standards to be agreed and followed to encourage market access to poor farmers, iii) match demand and supply to avoid wide fluctuations in prices and ensure profitability to producers, iv) enhance farmer outlets (retail market) and linking them with corporate super markets (ITC, Shri Ram, Reliance, etc. in India), and v) effective and efficient “Seed Production and Delivery System” to ensure that farmers get the quality seed at right time and at reasonable price.
- APAARI and the NARS should: i) document and disseminate success stories of innovations in technology that has enhanced LFM; and ii) involve youth in technology transfer and also vocational training to young farmers, school/ collage pass outs with the aim of making agriculture an attractive enterprise for enhanced income and livelihood for resource poor farmers.

## Expert Consultation on Biofuels

APAARI in collaboration with IRRI, CIMMYT, and ICRISAT organized an Expert Consultation on Biofuels on 27-29 August, 2007 at IRRI, Las Banos, Philippines. In all, 44 participants attended the Expert Consultation organized into five sessions: (i) Global Opportunities and Constraints, (ii) Country Status Reports, (iii) Food Security vs Biofuels in Asia, and (iv) Plenary Session and General Recommendations. There was consensus that biofuels will play a major role in the global economy in future. Many countries are exploring different strategies and policies on alternative energy sources, and the Asia-Pacific region, in particular, is expected to play a significant role in development and promotion of biofuels.

### Major recommendations

- Biofuels will play a major role in the global economy in future. Many countries are exploring different strategies and policies on alternative energy sources and the Asia-Pacific region, in particular, is expected to play a significant role in that direction.
- The introduction and/or expansion of biofuel crops will cause major land use changes, and that many feedstocks (although originally targeted at marginal

lands) will compete with food crops in productive eco-regions. The challenge is to ensure a balance between food and biofuel production.

- Policy makers need to protect the poor from rising commodity prices likely to be triggered by diversion of crop produce or area expansion of biofuel crops. Therefore, there is an urgent need to strengthen policy research in order to avoid decisions that may lead to competition between food and bioenergy; and identify a complementary approach that benefits both sectors.
- International organizations and the International Agricultural Research Centers (IARCs) must accelerate their biofuel-related research in order to generate much needed International Public Goods (IPGs) that will benefit resource-poor farmers. They also need to enhance regional coordination of R&D efforts on bioenergy; encourage regional information sharing; and facilitate research networking and capacity building of NARS.
- Public sector research needs to ensure that technology advances made in the private sector ultimately benefit the poor in the developing world. This is important for many second generation biofuel technologies, which may not be accessible to poor farmers in Asia. Public-private partnerships need to be established and promoted.
- Scientists should examine and share unbiased information on the life cycle performance and economics of bioenergy technologies, and their impact on food security and poverty. The social and environmental impacts of these technologies will also have to be assessed. This requires a standardized typology of food-feed-fiber-energy producing agricultural systems as well as standardized methodologies for their integrated assessment.
- Asian countries should consider utilization of crop residues, especially rice and wheat straw, which are largely being burnt in most countries. This is a priority area for R&D, particularly with regard to thermal conversion technologies for different scales and the level of residue retention which may be needed for sustainable land use under different cropping systems.
- Potential biofuel producing countries in Asia should conduct their own national assessments critically and devise appropriate strategies to meet long-term bioenergy goals. APAARI and other regional/global organizations should devise strategies for the Bioenergy Revolution, and sensitize policy makers so that countries in the Asia-Pacific can reap the expected benefits.
- The donor community should fund new R&D efforts on bioenergy, since the long-run benefits will lead to both poverty alleviation and protection of environment, thus meeting the two of the major Millennium Development Goals (MDGs).

## National Dialogue on Farmer-led Innovations towards Plant Variety Improvement and Conservation

A two-day national dialogue on “Farmer-led Innovations towards Plant Variety Improvement and Conservation: Protecting Farmers’ Rights, Geographic Indication, Appellation of Origin, etc. in the National Context” was held on 12-13 November, 2006 at the National Agricultural Science Centre Complex (NASC), New Delhi. It was jointly organized by the Trust for Advancement of Agricultural Sciences (TAAS) and Protection of Plant Varieties and Farmers’ Rights Authority (PPVFRA); and was co-sponsored by Agricultural and Processed Foods Export Development Authority (APEDA) and Asia-Pacific Association of Agricultural Research Institutions (APAARI). The participants represented included Government/Public sector agencies, ICAR, State Agricultural Universities (SAUs), international organizations, and other stakeholders representing academies, attorney firms, NGOs, private sector and farmers. The focus of the Dialogue was on farmer-led innovations, their art and science of growing and managing crop agriculture, design of farm implements to reduce drudgery and increase farm efficiency and their contributions to value addition in agriculture produce.

A specific focus in the Dialogue was given to intellectual property rights (IPR) related national laws to understand the various dimensions of benefit-sharing requirements with the farmers to ensure continued innovations by the farming communities. A lack of understanding on protection of farmers’ rights for their own varieties as well the requirement of programs to encourage other farmer-led innovations were the important areas of concern in the Dialogue. The deliberations of the meeting were conducted in three technical sessions namely, Session I: Farmer-led Plant Diversity Conservation- Case Studies; Session II: Farmers’ Variety Protection – National and International Efforts; Session III: Site Specific Variety, Crops and their Reputation. Major recommendations emerged out of the discussions among the participants broadly focused on the following aspects:

- Need to accelerate the pace of national seed regulatory reforms
- Importance of ‘extant’ crop varieties as a vital national resource
- A national program on farmers’ varieties and innovations needed
- Urgency for the accreditation of laboratories and institutions for crop variety testing
- A system for quality saplings, planting materials and organic agriculture needed
- Innovative use of various legal IPR tools for economic gains
- Need for continued germplasm exchange
- Inter-departmental coordination required for reforms in the Indian seed sector

## **Symposium on Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific, 21-22 October 2008, Tsukuba, Japan**

Global climatic changes are affecting agriculture through their direct and indirect effects on crops, soils, livestock and pests and hence, the global food security. IPCC report has particularly indicated vulnerability of developing countries of the Asian region, especially its megadeltas to increasing climate change and variability due to its large population, predominance of agriculture, large climatic variability, and limited resources to adapt. Asia is the home for more than one half of the world population. The rapid and continuing increase in population and economy implies increased demand for food. It is estimated that by 2020, food grain requirement in Asia would be almost 30-50 per cent more than the current demand. This will have to be produced from same or even shrinking land resource due to increasing competition for land and other resources by non-agricultural sector. Accordingly, the world food situation will be strongly dominated by the changes that would occur in Asia because of its huge population, changes in diet pattern and associated increased demand for food and feed. Alleviating poverty and attaining food security would be the major challenges to most countries in the Asia-Pacific region in the 21st century. Producing enough food with reduced resources in adverse environmental scenario would be a major challenging task before most of the Asian nations. Concerted efforts will be needed to maximize food production, minimize environmental degradation and attain socioeconomic development through reorientation of agricultural research that would comprehensively address all urgent concerns including adaptation to and mitigation of climatic change. Accordingly, APAARI and Japan International Research Centre for Agricultural Sciences (JIRCAS) jointly decided to organize a



*Symposium on global climate change at Tsukuba*



Symposium to develop required framework for reorientation of agricultural research to address specifically issues related to the climate change adaptation and mitigation in crops, livestock, fisheries and agroforestry.

The international Symposium on Global Climate Change: Imperatives for Agricultural Research in the Asia-Pacific was held in International Congress Center, Tsukuba, Japan on 21-22 October 2008 and was co-sponsored by GFAR, CIMMYT, ICARDA, ICRISAT, and AVRDC. The Symposium was attended by 158 participants from 30 countries representing APAARI member NARS, CGIAR, IARCs, GFAR, ACIAR, JIRCAS, ARIs, universities, regional fora, NGOs, FOs, private sector and the donor organizations. The Symposium had plenary sessions and panel discussions to debate the key issues and to develop appropriate recommendations for research to enhance adaptive capacity and mitigation potential of agriculture in Asia-Pacific region while ensuring continued agricultural growth and development. The deliberations were conducted in four technical sessions that dealt with research strategies in national and international context, panel discussion on adaptation and mitigation options, followed by plenary session. The specific objectives of the symposium were:

- To review the current state of understanding of the climate change and to assess its impacts on agriculture in Asia-Pacific region
- To understand and analyze the available scientific, technological, and policy options in the region for adaptation and mitigation to climatic change and their possible implications in agriculture
- To identify short, medium, and long-term research priorities that would ensure enhanced adaptation and mitigation in agriculture. The landmark of the symposium was the “Tsukuba Declaration on Adapting Agriculture to Climate Change”, adopted unanimously by the participants.

Based on in-depth discussions, “Tsukuba Declaration on Adopting Agriculture to Climate Change” was unanimously adopted. The details of Tsukuba Declaration are given in Chapter 10 on “Policy Advocacy”.

## **International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region**

Agrobiodiversity is the foundation of sustainable agricultural development. Plant Genetic Resources for Food and Agriculture (PGRFA) are an essential resource to meet the future food security needs. The threats to these resources are growing, whereas the efforts to conserve and use genetic diversity are not very satisfactory. At the same time, the large scale adoption of few improved varieties has resulted in displacing diverse genetic variability. Traditional knowledge associated with the use of old varieties/landraces, has largely been ignored and is rather disappearing. Besides, the reduced agricultural biodiversity on-farm can significantly increase the



*International symposium on agrobiodiversity at Suwon*

vulnerability of farmers and existing agro-ecosystems. In view of these concerns, concerted efforts were made by various international/regional organizations and some national governments towards collecting, characterizing, evaluating, documenting, conserving and utilizing available crop diversity. In recognition of the critical role played by biodiversity in sustaining lives and livelihoods, the United Nations General Assembly at its sixty-first session decided to designate 2010 as the International Year of Biodiversity.

Rededicating to the efforts in the 2010 International Year of Biodiversity, APAARI in partnership with the Rural Development Administration (RDA), Republic of Korea, Bioversity International and other International Centers organized an “International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region” on 13 - 15 October, 2010 at Suwon, Republic of Korea. The symposium was co-sponsored by IRRI, ICRISAT, CIMMYT, ICARDA, GFAR, FAO, ILRI and other doors provided an opportunity to the major stakeholders in the Asia- Pacific region to review, identify and redefine the role and directions of agricultural R&D especially in the context of conservation through use of valuable agrobiodiversity for sustainable agricultural development. It also helped in deciding the ‘Way Forward’ for access and benefit sharing of valuable genetic resources.

The objectives of the Symposium were as follows:

- To review the current status and trends for the conservation through use of agrobiodiversity for sustainable agricultural development at national, regional and global levels
- To bring together stakeholders to discuss issues that currently hinder the use and exchange of agrobiodiversity

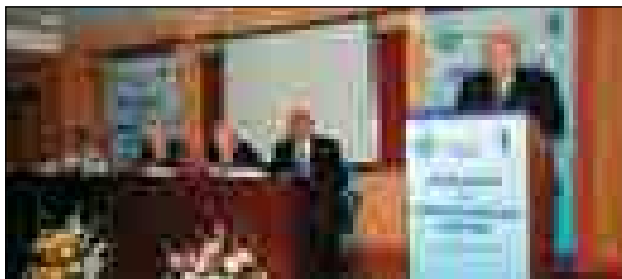
- To discuss issues and concerns relating to access and benefit sharing of agrobiodiversity in the region
- To discuss policy framework and research priorities of NARS in the region aiming at effective conservation and use of agrobiodiversity for sustainable agriculture production

The symposium was organized in sessions comprising country reports and thematic lectures on status of agrobiodiversity conservation and use; recent advances in global initiatives and advances for managing agro-biodiversity; group discussions on topics like: collaboration for PGR, strengthening PGR conservation and use in Asia-Pacific, implementation of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and role of PGR networks in strengthening partnership followed by plenary sessions. International and national experts on scientific, technical and policy aspects made presentations. Representatives of civil society and farmers' organization were involved to present stakeholders' perceptions. Representatives from APAARI member institutions, Bioversity International, Global Forum on Agricultural Research (GFAR), FAO and Treaty Secretariat, CGIAR and other International Centers (IRRI, ICRISAT, ICARDA, CIMMYT, AVRDC, CIAT, ILRI), PGR Networks in Asia-Pacific, NGOs and donor organizations/foundations also participated in the symposium.

Based on the deliberations and in-depth discussions “The Suwon Agrobiodiversity Framework: A Framework for Conservation and Use for the Sustainable Agriculture in the Asia-Pacific Region was developed. The major highlights of the Suwon Agrobiodiversity Framework are given in Chapter 10 on “Policy Advocacy”.

## Regional Dialogue on Conservation Agriculture in South Asia

A Regional Dialogue on Conservation Agriculture was jointly organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI), International Maize and Wheat Improvement Center (CIMMYT) and the Indian Council of Agricultural Research (ICAR) on 1-2 November, 2011 at National Agricultural Science Center (NASC), Pusa, New Delhi, India. The dialogue focused on Conservation Agricultural Research for Development (CAR4D) through innovations for greater impacts on small-holder farmers in the region and 64 participants including the policy makers, R&D managers, researchers, private sector representatives, NGOs, CGIAR institutions, CSOs and farmers attended.



*Dr. Raj Paroda delivering speech in the inaugural session*

The major objectives of the dialogue were: i) to provide a common neutral platform to assess local/national and regional needs, exchange information, and define priorities for the deployment of conservation agriculture (CA) with a focus on small holder resource poor farmers, ii) to help develop common strategies for resolving the common problems in the region, iii) to develop mechanisms for facilitating the exchange of knowledge and products and learn from each other's successes and failures, and iv) to evolve future Road Map for CA in South Asia. The dialogue was structured in four Technical Sessions on: i) Status of Conservation Agriculture, ii) Initiatives of CG Centers on CA in South Asia, iii) Focused Discussion through Break-out Groups on a) out-scaling for impact, b) partnerships for regional cooperation, and c) capacity building, and iv) Research and Development Needs of CA in South Asia. All presentations were followed by in-depth discussions.

### **Recommendations**

The important recommendations that emerged from the regional dialogue are given below:

- There is a great need to establish long-term basic and strategic research in different production systems and ecologies for monitoring of effects (in terms of resource/input use efficiency, pest dynamics, soil health, sequestration etc., and link them with participatory adaptive research modules for outscaling of potential technologies as per their recommendation domains.
- The component technologies that suite the basic elements of CA under different situations and production environments need to be developed and deployed. Efforts should be made to initiate breeding programs on CA platforms and in cropping systems perspective to tailor varieties suited to system needs for realizing potential benefits.
- There is large potential for CA in the region and with suitable policy support and good human resources available on the ground; concerted efforts need to be made for easy access to region-specific technologies so as to expand CA adoption to over 20 million ha area in South Asia.
- Greater adoption and impact of CA will have to come from non rice-wheat systems and rainfed ecologies which are untapped yet in the region. Hence, intensified efforts are needed in this direction for faster adoption of new CA technologies. Large investments are being made by the national systems for example in India National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), National Agriculture Innovation Project (NAIP), National Initiative on Climate Resilient Agriculture (NICRA), ICAR Platform on Water, etc. but there was no visible impact. Hence, there is a need for integration and complementary approaches for implementing such schemes with appropriate monitoring and evaluation (M&E) for mid-course correction so as to achieve greater impact at the ground.

- Efforts need to be made to develop appropriate mechanisms for capacity building on CA for different target groups e.g. inclusion of CA in course curriculum at graduate and post-graduate level at all the State Agricultural Universities, deploy M. Sc. and Ph.D. students in long-term CA trials, train service providers and machinery operators, etc.
- For large scale acceleration of CA, a mechanism of ‘Single Window Service’ needs to be established. Efforts should be made to capture farmer innovations on CA and align them with science principles. A mechanism should be developed for tracking and documentation of CA database in the region enabling researchers and policy planners to peruse the existing technologies and plan for further initiatives.
- There is a need to develop analytic and communication tools to help policy makers understand economic, social and political implications of CA based technologies vis-à-vis existing farmers’ practices. Also, the use of ICTs for access of information on location specific technologies/inputs, services and farm advisory need to be encouraged. In order to have faster adoption of new and innovative CA technologies, there should be an appropriate mechanism in place for providing suitable incentives to CA adopters including carbon credits.
- An appropriate mechanism needs to be established for ensuring the minimum quality standards of CA machinery with all spare parts, after-sale services and the operational manuals which are lacking at present. CA comprises relatively knowledge intensive systems and hence multi-disciplinary and multi-stakeholder partnerships should be developed and strengthened for better delivery of the benefits to the farmers.

## Global Conference on Women in Agriculture

The First Global Conference on Women in Agriculture (GCWA) was organized at New Delhi on 13-15 March, 2012 by the Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the Indian Council of Agricultural Research



*Global conference on women in agriculture at New Delhi*

(ICAR), with support from the Global Forum on Agricultural Research (GFAR). It was co-sponsored by CGIAR, USAID, ACIAR, ADB, World Bank, IDRC, UK Aid, BMGF, TAAS, and RAGA. The Conference was attended by 760 participants from 50 countries, including Government Ministers, World Food Prize laureates, representatives of institutions in agricultural research, extension and education, gender experts, non-governmental organizations and farmers' groups. The overarching goal of the Conference was Empowering Women for Inclusive Growth in Agriculture.

The Conference was organized into three main components; a policy forum; six parallel sessions; and three working groups. In addition, poster presentations were made on diverse topics under thematic areas. The conference also organized an innovation market place event, showcasing agriculture and rural innovations and women entrepreneurship.

The opening sessions of the Conference on high-level policy issues highlighted the need for policy reforms, institutional changes and capacity building to empower women in agriculture. Such changes are urgently needed to address gender inequalities in the household. Linking women, agriculture and nutrition requires multi-sectoral thinking and action to address major nutritional deficiencies that continue to hamper children's development around the world. It requires institutionalization of research and extension through joint decision making that involves women themselves in participatory approaches.

The six thematic sessions were focused on: assessing women's empowerment; agricultural innovations for reducing drudgery; linking women to markets; women's roles in household food security and nutrition; access to productive and household assets, resources and knowledge, policies and services; and climate change - related risks and uncertainties. Three Working Group sessions identified the new roles required for agricultural research, extension, and education to respond to women's needs in agriculture, and to actively involve rural women's representatives in such work. A number of cross-cutting priorities were identified across the themes. In order to address gender inequalities, action is required at all levels from household and community to national, regional and international scales. These priorities formed the basis for collective action through the Gender in Agriculture Partnership (GAP) - the first multi-layered global mechanism embracing all the actors involved in addressing gender-related issues in agriculture. Partners included in this initiative included UN Agencies, the CGIAR, Regional Fora and national public institutions. Also included were women's producer organizations, foundations, universities and NGOs which will drive change in local actions on the ground. The Government of India pledged its commitment to host and facilitate such a global partnership, with the expectation that it will inspire other governments to also collaborate and support. The Forum for Agricultural Research in Africa (FARA) offered to host the next global conference in Africa in 2015.

While formally closing the conference, the President of India, H. E. Pratibha Devi Singh Patil highlighted that *“There is a deep interlinkage between women and agriculture, the development of both being essential for the progress of every nation”*.

As a result of in-depth discussions, the following priorities were identified:

- Collective advocacy to raise awareness of women’s needs in agriculture and ensuring their visibility in terms of their contributions
- Generating the information and evidence base to show the economic and social impacts and value of addressing women’s needs in agriculture
- Encouraging collective action and leadership among women to develop programs that directly meet women’s needs and to make the agricultural support systems gender sensitive
- Addressing discrimination through appropriate policies, legislation and enforcement mechanisms and establishing women’s rights (e.g. access to markets, ownership of land)
- Ensuring that institutions and support mechanisms promote women’s ownership and control of resources (e.g. land, bank accounts, policy changes) and social change enabling participation in household decision making.

## Regional Consultation on Improving Wheat Productivity in Asia

A regional consultation on ‘Improving Wheat Productivity in Asia’ was jointly organized by Food and Agriculture Organization of the United Nations (FAO) - Regional Office for Asia and the Pacific (RAP), and Asia-Pacific Association of Agricultural Research Institutions (APAARI), in collaboration with CIMMYT, ICARDA and JIRCAS, at Bangkok, Thailand on 26-27 April, 2012. The regional consultation was attended by 53 participants representing national agricultural research systems (NARS), CGIAR Centers, FAO, APAARI, NGOs, farmers and private sector. This consultation provided a platform to all the stakeholders to deliberate and prepare a strategy to accelerate the overall production and productivity of wheat in view of changing climate and shrinking natural resources.



*Regional consultation on improving wheat productivity at Bangkok*

The regional consultation was structured in inaugural session, technical sessions, working group discussions and plenary session. The technical sessions included:

i) strategy for increasing wheat productivity, ii) national/ regional wheat scenario, iii) managing wheat diseases, iv) stakeholders dialogue on CRP 3.1 (wheat), and v) addressing emerging challenges. The two working groups on: i) research priorities and need assessment, and ii) development initiatives for inclusive growth, were also organized. The country reports were presented by program leaders from different countries. All the presentations made under technical sessions were followed by detailed discussions.

## **Key recommendations**

### ***Research***

- There is strong need to enhance wheat productivity through collaborative research at global, regional and country level utilizing conventional approaches and new tools. In view of changing climate and new threats of emerging diseases, concerted efforts are required involving institutions like CIMMYT, ICARDA, FAO and APAARI to create awareness and take lead in terms of mobilizing resources to tackle future problems.
- Managing stripe rust in South Asia is a priority issue in view of the potential threats to wheat production.
- Greater inter-regional cooperation for exchanging technologies and information to mitigate such problems is urgently needed. For managing disease and pests, a platform for regional survey and monitoring of new diseases and races should be developed to facilitate information about occurrence of new threats and their timely redressal and management. Collaborative research for development of hybrid wheat in a mission mode approach is urgently needed in order to enhance productivity per unit area.
- There is an urgent need for enhancing system based productivity through agronomic, genetic and physiological interventions and also to introduce resource conservation technologies at small farm level.
- Greater thrust is needed for inter-regional /global exchange of germplasm to meet mutual or individual country needs and also for collective testing of advanced lines.

### ***Development***

- There is a need for higher investment for strengthening of seed systems in all wheat growing countries to address the issues of quality seed production, storage and supply.
- Greater emphasis is required for infrastructure development for research in different areas particularly for developing phenotyping facilities to match international standards.
- Higher investment is needed for training and capacity building for enhancing the skills of farmers, researchers, NGOs and other stakeholders including women.



### **Policy**

- There is a need for higher investment by public sector and public sector undertakings (PSUs) on research and development in wheat.
- Efforts are needed to have appropriate policies for linking farmers to market and providing them needed information for market intelligence and vital inputs.
- There is a great need to establish strong research and development agenda on wheat which would require close collaboration and partnership with institutes within and outside country, and also with farmers and other stakeholders.
- In order to provide a common platform for discussing country specific and regional problems, regional meetings/consultations need to be organized on regular basis. The institutional structures in some countries are not adequate and need to be established.
- There is need to establish /strengthen institutional mechanism to take up research on priority for ensuring food production and its supply to the people.
- The national systems should come together at one platform to share their experiences for mutual benefit and regional coordination and appropriate monitoring mechanism should be established in Asia.

### **Workshop on Foresight and Future Pathways of Agricultural Research through Involvement of Youth**

A total of 300 participants from different ICAR institutes and agricultural universities, including farmers, students and private sector representatives; and senior resource persons attended the workshop. The two days' deliberations by young and senior agricultural professionals covered wide range of disciplines and components of Indian agriculture and identified that there is a need to reorient the agricultural research towards inter-institutional and interdisciplinary mode through creating state of-art integrated and collaborative research facilities, creating seed grant facilities



*National Workshop on involvement of youth in agriculture at New Delhi*

for young professionals and more collaborative research with advanced foreign institutions. The deliberations also emphasized on capacity development of young professionals through short to long-term trainings for young scientists at advanced international institutions and involving them in different decision making processes.

### **Major Recommendations**

- Reorient the agricultural research towards inter-institutional and inter-disciplinary mode through creating state-of-art integrated and collaborative research facilities
- Emphasize on joint research with private sector through development of common facilities
- Create seed grant (Rs. 10-15 lacs) for newly recruited scientists to initiate research in a program mode rather than project mode
- Emphasize on collaborative research with advanced foreign institutions
- Make provision of special grant for young scientists on competitive basis
- Encourage scientists to develop patents and use of newer innovative scientific tools like nanotechnology, etc.
- Sponsor young scientists for short to long-term trainings at advanced international institutions
- Provide institutional grant to present research work in International Conferences and its publication in referred journals
- Involve young scientists as members in decision making committees like RAC, SRC, etc.
- Make provision of training program by NAARM for young, mid carrier and senior-level scientists for developing scientific leadership
- Emphasize more on human resource development through a bottom up approach
- Balancing the funding resources for basic, applied, strategic and participatory research
- Creating ICT facilities to discourage the repetitive research as well as for timely scientific accounting of the scientists IAdopt a bottom up approach for more scientific and administrative freedom
- Creating centralized research facilities in collaboration with private sector

### **Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security**

The Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security was jointly organized by ICAR, in collaboration with Bioversity International and with support from ITPGRFA, FAO, ICRISAT, ICARDA and APAARI at National Agricultural Science Centre (NASC), PusaCampus, New Delhi



*Global consultation on use of agrobiodiversity at New Delhi*

on 12-14 February, 2013. The Consultation was attended by 55 delegates from 32 countries and 60 participants from national agricultural research system (NARS). The Consultation discussed on issues related to management, exchange and use of agrobiodiversity for sustainable development. The deliberations led to enhancing the capacity and capabilities of national partners through South-South cooperation and further strengthening of North- South partnership. The Global Consultation deliberated on the following five themes:

- Genetic resources conservation strategies at global, regional and national level
- Documentation and sharing mechanism for effective use of genetic resources
- Collaborative research, capacity building and sharing of expertise
- Strategies for implementation and monitoring of the Second Global Plan of Action (GPA), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and Global Research Initiative
- Conservation and use of animal, fish, microorganisms and agriculturally important insects

Participants stressed that the Contracting Parties should use the Standard Material Transfer Agreement (SMTA). Provision of Easy-SMTA, is a positive development for facilitating further the exchange of germplasm. However, the systematic use of SMTA for the exchange of Annex. I crops still faces a number of impediments given the different situations in different countries. In some countries which are Parties to the Treaty, further work is needed to put in place an enabling administrative and/or legal framework for the implementation of the Multi-lateral System (MLS). In this regard, guidelines for the implementation of the International Treaty were welcomed and considered useful. Countries through their national programs have the primary responsibility to fund and implement the second GPA in accordance with their own national priorities. Participants recognized the Benefit-Sharing Fund (BSF) of the International Treaty and the Global Crop Diversity Trust (GCDDT) as essential for the implementation of the second GPA. Need was felt for monitoring progress in

the implementation of second GPA. The web-based approach adopted to manage the proposed indicators for monitoring the second GPA will help increase transparency.

To make *in situ*/on-farm conservation more effective, involvement of local communities is essential and can be achieved by providing more support and sharing of benefits. There is a great need for expansion of Annex. I crops of the Treaty by adding more species in the list. GPA is in place and needs to be further revisited for follow-up, in the best interest of parties/ stakeholders. There is a need for involvement of committed people with service motive in PGR/ FAO initiatives. National Biodiversity Laws in each country need to be enacted in harmony with the provisions of the Treaty. Activities need to be undertaken to further improve genebanks to avoid duplication of samples and for safe duplication using modern approach or tools. Wherever possible, safety duplicates should be maintained to conserve PGRFA. There is need to exchange experience with other research institutes to understand as to how the regulations of Convention on Biological Diversity (CBD) and ITPGRFA are harmonized. The global donors should provide greater funding support for PGR activities. Training and capacity building in PGR, research funding and grants for country projects for PGR activities need to be encouraged. Priority attention needs to be given to the development of trait-specific PGR, biotic and abiotic stress tolerant varieties to overcome climate change and impart heat and salt tolerance and for development.

Partnership among different centers and countries and capacity building in PGR need to be strengthened. Prebreeding initiatives, viz., Prebreeding 1 (base broadening, wide hybridization) and Prebreeding 2 (gene discovery, genotyping, phenotyping and association genetics) for further breeding programs should be given greater thrust.

## National Workshop on Outscaling Farm Innovation

A National Workshop on Outscaling Farm Innovation was organized at the National Agriculture Science Centre (NASC) Complex, New Delhi on 3-5 September, 2013. The national workshop was jointly organized by Trust for Advancement of Agricultural Sciences (TAAS), Indian Council of Agricultural Research (ICAR) and Asia-Pacific Association of Agricultural Research Institutions (APAARI) and cosponsored by Global Forum on Agricultural Research (GFAR), Haryana Kisan Ayog (HKA), Bharat Krishak Samaj (BKS), Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) and National Rainfed Area Authority (NRAA). In all, 272 participants comprising administrators, researchers, policy planners, innovative farmers including women, civil society organizations (CSOs), non-government organizations



*Inaugural session in progress*

(NGOs), farmer organizations and representatives of farming communities as well as private sector in India and representative of PROLINNOVA attended the workshop. An exhibition was also organized to showcase the potential of innovations for greater impact on small holder farmers.

### Major recommendations

- A paradigm shift in AR4D is needed to address the needs of small farmers and place renewed emphasis on “Farmer First” through participatory approach, better knowledge sharing and enabling policy environment to ensure food security.
- Outscaling of innovations based on their techno-economic feasibility, relevance and utility would be the key for inclusive growth of small farmers. Identification of innovations and their faster adoption or use will benefit considerably the smallholder farmers, and hence needs urgent attention.
- Mission-mode programs on small farm mechanization, protected cultivation, low cost rural based agro-processing for value addition, livestock development, promotion of hybrid technology, micro-irrigation, etc. would go a long way in increasing both productivity and income of farmers. Hence, greater policy support for promotion of these innovations will be needed.
- Farmer led innovations relating to new crops, new areas, new on-farm/ off-farm based secondary agriculture, etc. must be identified, tested, refined and advocated for large scale adoption for greater benefit to our farming community.
- Integrated farming systems involving high value crops and livestock should be developed and encouraged for different agro-ecosystems. This would help in increasing income of small farmers.
- Market reforms should be given high priority for promoting farmer-led innovations. There is a need to revise Agricultural Produce Marketing Committee (APMC) Act especially to delink horticultural produce, provision of Kisan Bazars/Huts, cool chain and credit linked trade/marketing options, and linking farmers to markets.
- Convergence and connectivity of different institutions and development programs for outscaling of innovations and development of necessary social skills is necessary. The innovations in use of renewable sources of energy, like bioenergy and solar energy should be improvised and outscaled.
- Market innovations should ensure greater share of farmers in the value created, transparency in price discovery, better delivery of quality inputs, flow of market information and risk management.
- There is a need for more effective and rather efficient extension mechanisms like information communication technology (ICT), smart phones, radio and television (dedicated channel exclusively on agriculture). Creation of a cadre of young technology agents for custom hire services in specialized areas will help in reducing dissemination losses while outscaling farm innovations.

- Incentives and rewards to innovative farmers will be needed to promote useful technologies on farmers' fields. For this, central and state governments must create "Farm Innovation Fund" so as to ensure their sustained interest in creating and promoting new initiatives for enhanced productivity and income.
- Incentives and venture capital funds should also be provided to the entrepreneurs for upscaling and outscaling farm innovations and technologies, which need substantial investment in producing material (planting material, machine, seed, feed, etc.) for outscaling the innovations.
- There is an urgent need for institutional reforms for better coordination, convergence and efficiency. Linkage between Krishi Vigyan Kendra (KVK) and Agriculture Technology Management Agency (ATMA), linking schemes under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), etc. with outscaling of useful farm innovations, will help in having greater impact of new innovations. Also, successful public-private partnership models will need to be replicated by creating enabling policy environment.
- Innovative farmers must be rewarded and given incentives as well as recognition as "Farm Professors", so as to share their knowledge and experience, while imparting training to others. Farmer to farmer training will have much greater acceptability and generate confidence for outscaling new innovations.
- Availability of credit at low interest rates and provision of insurance schemes for promotion of activities by SGHs, cooperatives, farmers, companies, especially for processing, grading, storage and primary value addition will encourage small holder farmers in outscaling their innovations, since such provisions will reduce risk factor and build much needed self confidence to promote farm innovations.
- Farm innovations in livestock and other high value products are rather less documented and outscaled. There are many innovations relating to low cost medicinal and nutritional products in livestock sector. These need verification, improvement and outscaling.
- There is also need to provide adequate visibility to protection of farmers' innovations including varieties and sharing of benefits from their commercialization. Special programs must be supported to promote innovations in on-site conservation of genetic resources.

## **Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region**

A Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region was organized jointly by Asia-Pacific Association of Agricultural Research Institutions (APAARI) and Pakistan Agricultural Research Council (PARC)



*Regional workshop on youth and agriculture at Islamabad*

at Best Western Hotel, Islamabad on 23-24 October, 2013. The workshop was co-sponsored by CIMMYT, ICARDA, ICRISAT. About 150 participants from different countries of Asia-Pacific region, CGIAR institutes, private sector, farmers and students attended. Out of these, more than 50 per cent participants were young professionals.

### **Recommendations**

- Concerted efforts are needed at the national, regional and international level to reorient agriculture into Agricultural Research 4 Result (AR4R) by promoting agri-innovation, agri-business and entrepreneurship through involvement of youth.
- Agriculture must compete with other sectors of economy. Hence, there is an urgent need for greater involvement of youth in agriculture to address the emerging challenges and to achieve second green revolution this time for household nutrition security.
- To make agriculture intellectually interactive and rewarding for youth, special emphasis will be needed henceforth on secondary agriculture, diversification, protected cultivation, crop intensification, service providers and use of ICT in agriculture.
- The future challenges would require linking agriculture with health, environment, nutrition and other basic science disciplines so as to address effectively the challenges by young professionals.
- In order to attract youth in agriculture, we urgently need innovative approaches in developing and transferring technologies, efficient funding mechanisms, openness in knowledge sharing and much required marketing reforms.
- Focused attention on capacity development of youth, through vocational trainings, inclusion of agricultural education in school curriculum and farmers participatory approach for technology generation, transfer and adoption is currently needed to ensure faster growth in agriculture.

- Greater thrust is required to create synergies and regional networks for capacity development, access to new knowledge and linking science to society with human face through involvement of youth.
- It is high time that we involve youth in decision making processes both for research and development programs at the national, regional and global levels.
- Higher investments are needed to motivate young professionals to adopt agriculture as a profession, create more job opportunities in agriculture, and develop agriculture on lines of industry so that youth in future become 'job creators' and not 'job seekers'.
- Emphasis should now be on policy support for inter-institutional partnership as well as public-private partnership for attracting youth in agriculture
- There is also an urgent need for creating awareness amongst the youth, through the help of media, regarding emerging opportunities in agriculture.
- There is need for strong political will and enabling policy environment for greater youth involvement in AR4D initiatives. For this, we need to focus more foresight, research partnership and capacity development.
- A regional network is urgently needed in the overall interest of future agricultural growth for sharing the knowledge, innovations, and expertise in similar target environments and socioeconomic settings. For this, international organizations like FAO, IFAD, WB, ADB, CG Centers and regional organizations like APAARI, ASEAN, SAARC need to devise appropriate mechanisms involving NARS of the region.

## Expert Consultation on Promotion of Medicinal and Aromatic Plants

The Asian region is very rich in the diversity of medicinal and aromatic plants (MAP). Any threats to these vital genetic resources will jeopardize the livelihood of millions of people. The significance of medicinal and aromatic plants has risen in recent years due to significant change in the life style and realization about negative impact of modern medicines and awareness for use of bio-safe products. Considering these facts, FAO RAP and APAARI jointly organized a Regional Expert Consultation on Promotion of Medicinal and Aromatic Plants in Asia and the Pacific at Bangkok, Thailand on 2-3 December, 2013 with an objective to: i) assess the current status of production, utilization and conservation of MAP in the Asia-Pacific region



*Expert consultation on MAP at Bangkok*



and identify future needs of conservation and opportunities for their development, ii) exchange information and share knowledge and technologies available in different countries in the region and learn from each other's experience; iii) create awareness on the value of MAP among producers in order to promote cultivation with a special focus to small scale farmers, iv) identify relevant policy options for strengthening the conservation and sustainable development of these resources, and v) strengthen regional collaboration and networking and develop a regional strategy for promotion and sustainable use of medicinal and aromatic plants.

In all, 40 delegates from 14 countries, namely, Bangladesh, Bhutan, India, Japan, Malaysia, Myanmar, Nepal, Papua New Guinea, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand and Viet Nam and representatives of FAO RAP and APAARI participated.

### **Major Recommendations**

- There is an urgent need to prioritize the species (5-10) in each country that have high demand and comparative advantage for medicinal use. These need to be accorded high priority for research, general cultivation and value addition. Also, the rare and endangered species need to be identified for their proper evaluation and conservation. Also, it will be highly desirable to develop a long term strategy for R&D concerning MAP by each of the NARS in the region. The impact of herbal products invariably depends on their quality. Therefore, product quality management be given due attention right from the production of raw material to that of the finished product stage. Accordingly, adoption of good agricultural practices (GAP), good collection practices (GCP), good manufacturing practices (GMP), and good laboratory practices (GLP) need to be given high priority while promoting use of MAP. For this, it will be desirable if each country develops proper guidelines/ monographs for good practices, including the requirement of labelling.
- Countries in the Asia-Pacific region have rich knowledge on MAP. Therefore, there is an urgent need to build a regional database covering: (a) list of medicinal plants being cultivated at commercial scale, (b) list of medicinal plants being collected from the wild, and (c) list of species on which countries in the region have valuable information but not well documented.
- The number of MAP being quite large in many countries, a strong R&D system is required to be put in place. Hence, there is an urgent need to build strong institutional base so as to undertake systematic research work in different fields like ethnobotany (including molecular taxonomy, distribution and economic significance); genetic conservation, evaluation and improvement; agronomy; and post-harvest management and processing/value addition. Research efforts on medicinal plants for new drug discovery, especially for therapeutical use against various pharmacological targets would require strong institutional as well as funding support. State-of-the art bioactivity and biosafety screening

techniques would also be needed to harness full benefits from MAP in the region.

- In order to create immediately the much needed infrastructure and R&D base, it was unanimously felt that the level of investment on MAP be tripled at each country level, supported by proper policy advocacy and general public awareness. Also, the required emphasis be given to build much needed competent human resource, which is currently lacking in many developing countries in the region.
- In the Asia-Pacific region, it was interesting to find that there are several MAP, which are common and for which there exists considerable traditional knowledge. Hence, the countries in the region could benefit immensely by sharing the knowledge, material and the production and processing technologies.
- There is an urgent need to develop a regional network on MAP for the Asia-Pacific region. Participants unanimously resolved that FAO Regional Office in Bangkok, with needed facilitation role of APAARI, may help initially to start this network and eventually pass on this responsibility to one of the willing NARS in the region. For this, all MAP growing countries be requested to join the Network formally.
- Linkage between research and industry is invariably lacking in most of the countries and hence, needs to be developed using successful models. For this, public private partnership for initiating research for development programs, through enabling environment and suitable policies, will be critical both at the national and regional levels.
- Regulatory mechanism for biosafety and international trade, including adherence to quality standards, will be important to link producers with consumers while ensuring Inclusive Market Oriented Development (IMOD).

## **12th Asian Maize Conference and Expert Consultation on Maize for Food, Feed, Nutrition and Environmental Security**

APAARI in collaboration with CIMMYT, FAO RAP and DOA, Thailand will be jointly organizing the 12th Asian Maize Conference and Expert Consultation on Maize for Food, Feed, Nutrition and Environmental Security at Bangkok on 30 October - 1 November, 2014. The overall goal of the Conference is to enhance food, feed, nutrition and environmental security in Asia. The specific objectives are to: i) assess the regional priorities and niches for enhancing maize production and productivity, ii) share experiences and latest information/knowledge on cutting-edge maize technologies among the maize research and development community, iii) create general awareness and provide a platform for synergies among institutions and stakeholders for better use of maize as food, feed and industrial crop in Asia, and iv) develop an innovative and impact-oriented regional strategy and road map through access

to and accelerated adoption of resilient technologies, market opportunities, networks, investment priorities, and policy guidelines. The expected outputs include: i) national and regional priorities for enhancing maize production and productivity identified, ii) experiences and knowledge on innovations relating to sustainable maize production and utilization shared among diverse stakeholders, iii) awareness created for promoting the use of maize for diverse purposes, iv) synergies and convergence opportunities among maize R4D stakeholders in Asia identified, and v) a regional maize strategy for sustainable food and nutritional security in Asia developed. The conference is structured with panel discussions in Plenary Sessions and presentations by invited speakers in 12 Technical Sessions on important themes and also the poster presentations. About 330 participants are expected to participate which will include researchers, policy makers, service providers, innovative farmers, and private sector involved in maize breeding, biotechnology, production management, seed systems and value chains.



## 9 Collaboration and Networking

### Strengthening Research Networks and Consortia

The Perspective Plan of APAARI developed in 1994, and the Expert Consultation on research priorities in 1996, laid particular emphasis on regional collaboration/networking of programs focusing on agricultural research for development. To achieve these objectives, APAARI in 1997, organized an 'Expert Consultation on Management and Strengthening of Research Networks in the Asia-Pacific Region' jointly with AREO, Tehran, Iran. The outcome of this meeting resulted in a clear understanding of the agricultural research networks operational in the region among the member countries, the need for strengthening their structure, coordination, and assesses possible ways for their improvement and sustainability. Subsequently, APAARI organized another Expert Consultation in 2001 at Bangkok, to identify the important priorities for ARD.



*Expert consultation on research networks at AREO, Tehran*

The common areas of research opportunities identified were: (i) natural resource management, (ii) genetic resources, (iii) commodity chain development, (iv) meeting protein demands, and (v) tree and forest management. Two important cross cutting areas of research opportunities identified were: (i) information management/access and use for agricultural development; and (ii) capacity building/human resource development, and research and policy development (food insecurity and poverty).

In order to conceptualize these research priorities into programs, an assessment of the ongoing R&D programs through a well planned gap analysis was conducted based on some of the existing research networks in the Asia-Pacific region. This Expert Consultation on 'Strengthening of Research Partnerships through Networks and Consortia' was jointly organized by APAARI and the World Fish Center, from 2-4 December, 2002 at Penang, Malaysia. Also, the progress of regional research networks

was further discussed and assessed in the APAARI Expert Consultations organized at Asian Institute of Technology (AIT), Bangkok, and FAO RAP, Bangkok during 2003-05.

The following suggestions were offered in organizing future research networks:

- NARS must serve as network hubs for ownership by the stakeholders for long-term sustainability;
- Engage development institutions, civil society organizations and the private sector as partners in research networks; and
- Sunset clauses for networks.

Following elements were considered crucial for the success of the networks:

- Clearly defined objectives
- Strong interest of members
- Effective coordination
- Members committing their own resources
- Sustained external funding

The challenges of proliferation, sustainability and accountability are glaring realities that are faced while moving ahead with these networks. Thus, APAARI made concerted efforts to address the importance of ARD Networks for strengthening agricultural research partnership in the Asia-Pacific region. Research in network mode was considered important for diversification of agriculture.

### **APAARI's Collaboration with Regional Research Networks**

APAARI had been associated with the following important regional and some inter-regional networks and consortia, having its role as a facilitator (Box 14).

**CORRA** : The Council for Partnerships on Rice Research in Asia (CORRA) supported by IRRI had been meeting regularly and discussing issues relating to IPR, sharing of information, germplasm and other policy matters. CORRA deliberated on International Treaty on Plant Genetic Resources for Food and Agriculture and also on the role of NARS relating to their involvement in the CGIAR Challenge Program. It also supported the building up of Global Rice Germplasm Database, facilitating technology transfer and information dissemination. APAARI had active involvement



*CORRA meeting held back-to-back with  
APAARI meeting at Bangkok*

Box 14. Major Regional ARD Networks Linked/Associated with APAARI*	
• PGR/Agrobiodiversity	AFGRN, ANMAP, APFORGEN, BAPNET, EA-PGR, SANPGR, PROSEA-PGR, PAPGREN
• Crop Improvement	CLAN, CORRA/INGER, INCANA, RWC, TAMNET, TFNet, UTFANET
• Fisheries/Aquaculture	GoFAR, NACA
• Agricultural Growth and Development	ANGOC, ASTI
• Agricultural Biotechnology	APCoAB
• Information Communication Management (ICT/ICM)	APARIS, SAIC
• Capacity building	GCHERA

\*For full names of networks, see Acronyms and Abbreviations

in CORRA activities, participating in its meetings, and vice-versa. Some meetings of CORRA were also been held back-to-back with APAARI’s Expert Consultations.

**CLAN:** APAARI had provided continued support to the ICRISAT based Cereals and Legumes Asia Network which serves as a research and technology exchange network for Asia involving sorghum, pearl millet, chickpea, pigeonpea, and groundnut. Subsequently, the scope of the Network was enlarged by including legumes such as mung bean and lentil with cooperation of AVRDC and ICARDA. The network had successfully undertaken exchange, testing, and use of germplasm and breeding material and human resource development to upgrade research skills of NARS scientists. CLAN is an active network and APAARI participated in its meeting held in the Philippines co-sponsored by ICRISAT, ICARDA, AVRDC and APAARI. CLAN membership consists of 13 countries in Asia, namely, Bangladesh, China, India, Iran, Indonesia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Vietnam, and Yemen. ICRISAT, AVRDC, ICARDA and other regional and international institutes in the Asia-Pacific region are a part of the Network, providing genetic material, technology and research information and training input. The expanded



CLAN meeting held in the Philippines

CLAN is now co-facilitated by ICRISAT, ICARDA and AVRDC. The coordination unit is located at and supported by ICRISAT, Patancheru. Apart from ICRISAT, ICARDA and AVRDC, APAARI and concerned NARS, selected NGOs from these countries are also the partners.

**RWC:** The Rice-Wheat Consortium is an eco-regional initiative of the CGIAR involving the NARS of South Asia, namely, Bangladesh, Nepal, India and Pakistan, the IARCs and Advanced Research Institutions. The activities were coordinated by Facilitation Unit at CIMMYT India office. RWC activities address the issues of productivity enhancement of rice and wheat in a sustainable manner. The major focus of RWC was to address concerns of tillage and crop establishment, water, nutrient and pest management, socioeconomics and policy issues. APAARI was appreciative of RWC activities and collaborated with it during its meetings. APAARI brought out a success story highlighting its work on resource conservation technologies and their impact/benefits to farmers in the Indo-Gangetic Plains.

**GoFAR:** APAARI was instrumental in the establishment of Group on Fisheries and Aquaculture Research (GoFAR) Network by the International Center for Living Aquatic Resources Management (ICLARM), now named as the World Fish Center (WFC), realizing its important role and complementarity with other networks such as the International Network on Genetic Resources of Aquaculture (INGA). The priority areas for research collaboration were identified and thrust provided for genetic improvement of various fish breeds and for wider knowledge dissemination among member NARS. APAARI provided support to GoFAR activities to make it more sustainable since the Network served a very useful purpose.

**UTFANET:** The Underutilized Tropical Fruits Asia Network (UTFANET) was supported by ICUC that operated from Colombo, Sri Lanka. APAARI had been inviting ICUC to its meetings to address its concern on promoting research on underutilized fruits in the region and felt that the Center in future will be able to play an important role in partnership with APAARI and GFAR as well as in collaboration with Global Facilitation Unit on Underutilized Plants established at IPGRI.

**PGR Networks:** APAARI recognized its increased role in promoting/strengthening plant genetic resources networks in Asia-Pacific region, so well established by Bioversity International (formerly, IPGRI) four sub-regional networks (RECSEA-PGR – South-East Asia, 6 countries; SANPGR – South Asia, 5 countries; EA-PGR – East Asia, 5 countries;



*Consultation PGR in the Asia-Pacific Region*

PAPGREN – Pacific, 11 countries) and crop networks (COGENT – Coconut Genetic Resources Network, 38 countries; BAPNET – INIBAP – Banana and Plantain Network, 11 countries; AFGRN – Tropical Fruits, 10 countries) and the new PGR Networks, such as the Asian Network on Medicinal and Aromatic Plants and Asia-Pacific Forest Genetic Resources Program (APFORGEN). APAARI also established linkage with APAFRI. APAARI served as a catalyst to improve information-flow and sharing of PGR in the region. APAARI and IPGRI-APO worked out specific activities to be initiated jointly under the MoU, and this joint collaboration was later widened to include the following: implementation of ITPGRFA, with APAARI as facilitator, as evident from the roundtable conference on this topic held, back-to-back with APAARI meeting at Bangkok during December 2005; developing regional conservation strategies (SSEEA meetings); and on the Standard Material Transfer Agreement (SMTA) in the meeting organized at Bangkok during April, 2006 (see Chapter 10).

**TAMNET:** APAARI had been stressing on the importance of Tropical Asia Maize Network that was established with support of FAO RAP, Bangkok, Thailand, and contributed well to maize improvement during the last decade to meet the growing NARS needs. However, TAMNET activities gradually receded. However, APAARI was the main player in the initiatives taken jointly by FAO, APSA and APAARI to revive TAMNET. With well-coordinated efforts of CIMMYT Office in Bangkok during 1998 onwards hybrid-maize trials were conducted in different countries and the research findings/materials shared. Based on performance, several tropical yellow maize lines and white maize lines were developed and material distributed to public and private sector. The importance of disseminating single cross maize hybrid technology to the developing countries has been stressed. CIMMYT may play a proactive role and become an effective partner in promoting TAMNET.

**INCANA:** APAARI actively participated in the establishment of Inter-Regional Network on Cotton in Asia and North Africa (INCANA), as per the recommendation of the Inter-Regional Workshop on Cotton held at Tehran from 12-13 October, 2002 with participation of scientists from Azerbaijan, India, Iran, Pakistan, Tajikistan, Turkmenistan, Uzbekistan and Greece. The workshop was co-sponsored by AREO, AARINENA, GFAR, CAC-Forum, APAARI, and ICARDA with AREO, Tehran, Iran providing facilitation function. The Network Aimed at fostering inter-regional collaboration in cotton research and addressing issues of common interest through exchange of germplasm, information and expertise. The second meeting of INCANA organized by PFU and ICARDA-CAC was held at Tashkent, Uzbekistan from 6-8 September, 2004. It was co-sponsored by GFAR, AARINENA, CACAARI and APAARI. It stressed on information and germplasm exchange, INCANA regional varietal trials, collaboration amongst networking countries in hybrid cotton research, integrated pest management (IPM), Bt cotton and cotton-wheat rotation. Two travelling workshops were organized on: (i) hybrid and Bt cotton in India from 21-26 November, 2005, wherein APAARI supported and facilitated the participation of Iran; and (ii) Cotton IPM on 16-21 August, 2006 in Syria, wherein APAARI sponsored participation of



one expert each from India and Pakistan. Also, two databases on cotton research institutes and cotton researchers were developed and posted on website.

**Biosaline Networks:** The International Center for Biosaline Agriculture (ICBA) supported ARD collaboration with two networks, namely, Global Biosaline Network (GBN) and Inter-Islamic Network on Biosaline Agriculture (INBA). ICBA had been particularly appreciative of APAARI's role in ensuring regional support. Also, biosaline research is specific, and salinity tolerance and crop improvement assumed importance in the semi-arid tropics of South Asia/India. Thus, sharing of information and research findings of these Networks benefited the concerned NARS in the Asia-Pacific.

**TFNet:** The International Tropical Fruits Network (TFNet) based at Kuala Lumpur, Malaysia aimed to: (i) promote sustainable development of the tropical fruit industry globally in relation to production, consumption, processing, marketing and international trade, (ii) provide an easy access to updated global information on tropical fruits, and (iii) strengthen research partnership in the region. APAARI showed keen interest in promoting this for the benefit of the Asia-Pacific NARS, particularly when this region holds rich diversity in indigenous and well acclimatized, widely adapted exotic diversity. APAARI recognized the importance and more active involvement of IPGRI, ICUC/ACUC, and UTFANET.

### Further Considerations/Concerns

These Networks served a very useful purpose and must be further strengthened as well as supported, especially through active involvement of concerned NARS, APAARI and CGIAR Centers/IARCs. APAARI, for NARS benefits, also collaborated with other specific organizations such as AVRDC for promoting regional vegetable Networks. The main concern was for better funding support to these Networks and APAARI made efforts to facilitate such needs through initiatives taken by Networks in active collaboration with concerned organizations. APAARI and other support organizations as facilitators expressed concern about the sustainability of Networks, review of existing Networks and if required their restructuring. Overall, APAARI is mindful on the benefits being received by member NARS through Networks and how best their future needs could be served by promoting such regional and international collaboration, also involving the private sector. In this context, through APAARI's initiatives, two new programs were established and are actively contributing towards the application of agricultural information/ICT, ICM (APARIS) and agricultural biotechnology (APCoAB) – dealt with in details separately in Chapters 6 and 7, respectively as APAARI's specific programs. A regional *ad hoc* working group was established to prepare a regional partnership program on linking farmers to markets to be linked with global partnership program facilitated by GFAR.

Several of these regional and sub-regional networks are no more functional due to lack of funding resources and diminishing interest of collaborating partners and other stakeholders in the region. However, to address the emerging challenges in

agricultural research for development (AR4D), there is an urgent need to revitalize these Networks with support of FAO, CGIAR, GFAR and regional fora for the benefit of partners and other stakeholders in the region.

## Promoting Collaboration and Partnerships

APAARI's diverse activities as per its mission and objectives are complementary to NARS needs and priorities vis-à-vis overall regional collaboration in agricultural research for development in the Asia-Pacific region. The progress on the activities planned as per strategies for implementing Vision 2025 in particular, superimposing the mid-term perspective plan vis-à-vis regional priority setting during the past 22 years had been possible due to strong collaboration and partnership with organizations at the national, regional and international level. During this period, APAARI had emerged as a strong regional forum with a focus on harnessing agricultural research for a better future (Box. 15).

APAARI since its establishment made significant achievements. It played a very constructive role by bringing in an element of cooperation among NARS in the region. The regular meetings, conferences, expert consultations and workshops resulted in finding suitable solutions to diverse agricultural problems and further strengthened inter-NARS/IARCs and other collaborative partnerships. The achievements in developing regional collaboration and networking, policy advocacy, HRD/capacity building, technology transfer, and information dissemination are highly impressive.

It needs to be emphasized that APAARI, unlike some other regional/sub-regional organizations, is in a very unique and advantageous position of having members that come from some of the poorest to some of the richest countries of the world. Depending on the stage of growth of NARS, APAARI facilitates building up of NARS, helps in carrying out functions of implementation, research programs, coordination, policy formulation and technology transfer, commercialization and information dissemination.

## International Collaboration

### Collaboration with FAO

APAARI had a close collaboration with Food and Agriculture Organization of the United Nations (FAO). APAARI was one of the co-sponsors of the 'Regional Meeting to Promote and Facilitate Implementation of the Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture in Asia and the Pacific', held at Manila, Philippines from 25-28 December, 1998. The meeting was convened by the FAO, APAARI and the CGIAR Systemwide Genetic Resources Program (SGRP). APAARI participated in this workshop and presented a paper highlighting its activities vis-à-vis its role in facilitating GPA implementation. APAARI was also a co-sponsor in the policy meeting organized by IRRI at Los Baños, Philippines in February,

### Box 15. APAARI emerges as a strong Regional Forum: 22 years of development 'Harnessing AR4D for NARS Needs'

- Proactive, dynamic, growth-oriented with bottom up approach and strongly NARS driven, with membership of diverse stakeholders; 20 NARS as regular members, 16 international/regional organizations as associate members, 10 affiliate members, and 10 reciprocal members.
- Trust builder for NARS consistently adopting GFAR principles of inclusiveness and subsidiarity, promoting diverse partnerships, rich expertise and knowledge-base in all areas to strengthen AR4D initiatives; involving member NARS, CGIAR Centers/IARCs, FAO, GFAR, ACIAR, JIRCAS, NGOs, farmers/farmers' organizations and more recently, the women and youth (YPARD).
- Building a think-tank with changed mind-set among NARS with its role as a catalyst, to debate on diverse AR4D issues and prioritize research areas at regional/sub-regional and national level.
- Keeping track of fast developments in AR4D to meet new challenges through strategic areas of research and prioritization of activities; has organized over 65 expert consultations/workshops/conferences on diverse topics mainly of regional concerns, for the benefits of NARS.
- Promoting effectively the exchange of scientific/technical know-how and information on AR4D; wider-research-base exists for AR4D vis-à-vis technology development and transfer.
- Successfully coordinating as facilitator, the regional/sub-regional networks, platforms, making these more interactive/effective to cater to NARS needs; supportive of their development and sustainability.
- Providing thrust in knowledge exchange through its unique efforts/contributions to enhance publication and information dissemination; the only regional forum to have produced over 50 Success Stories and Status Reports on diverse problem-oriented topics, meeting NARS needs for technology transfer/adoption.
- Strengthening new initiatives/programs, namely, on regional agricultural information system and on agricultural biotechnology; upcoming programs on natural resources management, conservation agriculture, farmer-led innovations, linking farmers to markets.
- Supporting global interventions, advocating strategies and action programs/activities that match with CGIAR Challenge Programs, CGIAR-/Science Council priorities and the Millennium Development Goals (MDGs), to address policy issues, poverty alleviation, malnutrition, food and security and environmental protection.
- Fosters a culture of learning among members and instills an impact culture among stakeholders.

2000 on 'Impact on Research and Development of *Sui Generis* Approaches to Plant Variety Protection of Rice in Developing Countries'.

APAARI participated in the FAO 25th Regional Conference for Asia and the Pacific held in Yokohoma, Japan. Dr Ian Bevege, the then Chairman APAARI particularly invited attention for increase in investment in agricultural research for development and highlighted the role of APAARI as a regional forum for facilitating ARD activities in the Asia-Pacific region. APAARI also participated in the FAO meetings held in Rome and at FAO RAP, and the CGIAR Mid-Term meetings.

APAARI participated in FAO RAP supported regional meetings, in IPGRI/GFU/MSSRF organized specific meeting – the High Level Consultation on Biodiversity at MSSRF, Chennai, India from 18-20 April, 2005, and in the Philippines in CLAN meeting, and in the conference organized by the Global Consortium for Higher Education and Research in Agriculture (GCHERA), held from 12-15 September, 2005 at Hangzhou, China. Dr. Raj Paroda, Executive Secretary, APAARI participated in this conference and was elected by GCHERA as an Executive Member for South Asia region. APAARI in the Governing Council meeting of NACA held in Tehran, Iran from 25-28 February, 2006. APAARI representatives attended the meeting of the International Federation of Agricultural Producers (IFAP) held on 15 May, 2006 in Seoul, Korea and also participated in the 28th FAO Regional Conference for Asia and the Pacific held at Jakarta, Indonesia from 15-19 May, 2006. APAARI attended the 29th FAO Biennial Regional Conference for Asia and the Pacific was held at the United Nations Conference Center (UNCC), Bangkok, Thailand, from 26-31 March, 2009. The Conference identified the priority themes: i) strengthening food and nutrition security; ii) foster the agriculture sector's optimum contribution to growth and equity; iii) promote equitable, productive and sustainable natural resource management and utilization. APAARI also collaborated with FAO in organizing workshops/expert consultations on coherence in information for AR4D (CIARD), information and communication technologies/management for AR4D, and policy forum on Asian Livestock.

A Workshop on Development Opportunity Crops Network (DOC Net) for the Promotion of Agrobiodiversity was organized at FAO, Rome on 10-11 January, 2012. The workshop was attended by 23 participants from diverse organizations, viz., GFAR, GlobalHort, FAO, Bioversity International, AVRDC, INBAR, CFF, APAARI, ARRINENA, FARA, PROTA, LI-BIRD, ASNAPP, and CaFAN. The workshop emphasized the need for such a network in order to address three major areas, i) health and nutrition, ii) enhanced income and social aspects, and iii) resilience of production systems. The following major recommendations/points emerged: i) a strategy paper involving case studies needs to be published; ii) a brochure highlighting the vision, mission, objectives and strategies, etc. needs to be brought out on priority; iii) the case of establishment of DOCNet needs to be presented in GCWA in March, 2012 in India; GCARD2 Meeting in Uruguay in October, 2012; and World Food Prize meeting; iv) efforts need to be made to get FAO involved for

carrying forward the agenda under “Save and Grow” Strategy; vi) peer reviewed papers and book chapters on specific topics relating to DOCNet species need to be published; vii) DOCNet website needs to be in place as soon as possible; viii) DOCNet database need to be prepared and included in FAO database; ix) DOCNet should look beyond crops and should focus on crop production systems in diverse agro-ecological regions and x) country reports on use of underutilized crops should be developed

APAARI and FAO jointly organized the following workshops and expert consultations: i) Regional Workshop for Improving Wheat Productivity in Asia at Bangkok on 26-27 April, 2012; and ii) Expert Consultation on Promoting Medicinal and Aromatic Plants in Asia, 1-2 December, 2013 at Bangkok. Details of these workshops/expert consultations are given in Chapter 8 “Agricultural Research for Development (AR4D) Programs”.

### **Collaboration with GFAR**

APAARI, as a regional forum for the Asia-Pacific, collaborates with Global Forum on Agriculture Research (GFAR) as one of its regional initiatives in its global and regional activities. It had presented at GFAR-2000 at Dresden, Germany, some case studies in research partnership conducted by NARS with IARCs and other partners. These case studies dealt with regional networks, such as TAMNET, Rice-Wheat Consortium and Network Aquaculture Centers in Asia-Pacific (NACA), and also on Hybrid Rice in India, besides reporting on other regional activities. GFAR management team (GFAR/NARS-SC) participates in APAARI meetings/expert consultations regularly. GFAR is supportive to development of information technology system for the Asia-Pacific region. APAARI participated in the RAIS under Global-RIAS Initiative towards information sharing in developing ICM for ARD, as per deliberations of the Second International Workshop organized by GFAR in Cairo, Egypt, 10-11 May, 2005. Apart from APARIS activities, GFAR promoted activities on post-harvest technology and on agricultural biotechnology initiative of APAARI; GFAR is represented on the Steering Committee of APCoAB. It has supported specific regional/NARS activities such as on research needs assessment, priority setting, research gap analysis. Also, an Inter-regional Network on Cotton (INCANA) was established in which APAARI actively participated with AARINENA and GFAR. APAARI was earlier represented on NARS-Steering Committee of GFAR. The Chairman APAARI and Executive Secretary participated in the management group meetings of the GFAR and represented APAARI in the meeting organized at Marrakech, Morocco on 1 December 2005, and presented a report on APAARI, activities. APAARI was also represented in GFAR’s/DURAS Project workshops’ evaluation. APAARI and GFAR had jointly organized a planning workshop on 6-7 June 2006, of an ad hoc Working Group for the preparation of Asia-Pacific participation in a Global Partnership Program (GPP) on Linking Farmers to Markets (LFM). It focused on developing regional strategy and highlighting some NARS case

studies as success stories in LFM such as in the Philippines and India. Overall, the LFM program envisions enhanced livelihoods of farming communities by providing opportunities of choice for market integration through responsive R&D. APAARI (with FAO) will be involved particularly in one of the four components of this program dealing with information and documentation; more specific details will be worked out in the inter-regional meeting to be held on 11-15 September, 2006 at Cairo, Egypt, being convened by GFAR. APAARI facilitated 3rd GFAR Triennial Conference (GFAR 2006) back-to-back with APAARI General Assembly, deliberating on the topic 'Reorienting Agricultural Research to achieve the Millennium Development Goals'. Also, GFAR is represented in the Executive Committee of APAARI.

The India-APAARI-GFAR Day was jointly organized by the Indian Council of Agricultural Research (ICAR), Global Forum on Agricultural Research (GFAR) and APAARI on 8 November, 2006 at the National Agricultural Science Complex (NASC), New Delhi, India. The event was attended by 300 participants from the NARS, CGIAR centers, NGOs, farmer organizations, public and private sectors, donors, the youth, and the media. APAARI, as a regional forum, has been actively associated with GFAR in facilitating the GCARD process in the Asia-Pacific region in collaboration with the Asian Development Bank (ADB) by involving all stakeholders of ARD in the region. It has played a catalytic role in facilitating the GCARD process in the Asia-Pacific region which includes coordination of e-consultation on agricultural research for development involving more than 300 participants; preparation of 3 sub-regional reports (South Asia, South Asia; and the Pacific) and preparation of regional report on agricultural research for development in the Asia-Pacific. It successfully organized Face-to-Face meeting on 30-31 October, 2009 involving 75 ARD stakeholders from 17 countries and representing APAARI member NARS, CGIAR, IARCs, GFAR, ARIs, Universities, NGOs, farmers and farmers' organisations, private sector and donors organizations. An important outcome of the regional meeting was a joint Bangkok Declaration that reflected the collective thinking of stakeholders from the region. The details are given in Chapter 10 on "Policy Advocacy".

The first Global Conference on Agricultural Research for Development (GCARD) was held during 28-31 March, 2010 in Montpellier, France by the Global Forum on Agricultural Research (GFAR) and other partners with a huge participation of more than 900 delegates representing national agricultural institutions, governments, international organizations, CG institutions, regional fora, donor agencies, banks, NGOs, farmers' representatives, private sector etc., from all over the world. Lively panel discussions were held through high-level dialogue, focusing on changes and actions required by global, regional and national institutions for agricultural research to have greater development impact for the poor. At the GCARD Conference, Dr. Raj Paroda, Executive Secretary, APAARI made a presentation on "Reorienting Agricultural Research for Development in Asia-Pacific: The Way Ahead" focusing on issues that emerged from the consultations made at the regional level. Major outcome of the conference was the "GCARD Road MAP," (Box 16) which provided



*Dr. Raj Paroda speaking at GCARD1 at Montpellier*

a framework for linking science and innovation to the needs of farmers and the rural poor. It showed possible ways forward and offers possible commitments in effort to shift the focus of agricultural research for development towards the poor farmer. There was a consensus that the concepts offered by the conference broadly matched those that were put forward by the CGIAR throughout its reform process.

The second Global Conference on Agricultural Research for Development (GCARD2) was successfully organized on 28 October–1 November 2012 at Punta del Este, Uruguay by GFAR in partnership with the CGIAR and the Government of Uruguay. Dr. Raj Paroda Executive Secretary, APAARI was the Chairman, Program Committee, GCARD2. A total of 660 stakeholders from 101 countries participated in the conference. The pre-conference sessions enabled organizations such as the CGIAR, Regional Fora and FAO to discuss their programs in detail and shape their inputs to the conference. APAARI shared its experiences on putting the GCARD Road Map relating to foresight exercises, capacity building and innovative partnerships into practice in the Asia-Pacific region during 2011-2012. The significant achievements of APAARI through several initiatives, viz. prioritization of demand-driven agricultural research; agrobiodiversity framework; expert consultations on climate-smart agriculture and improving wheat productivity; global conference on women in agriculture; capacity development programs in agricultural biotechnology and bridging knowledge gaps in sharing agricultural information and knowledge were well appreciated by all. The major efforts made by APAARI in the implementation of GCARD Road Map are given in Box 17.

The GCARD2 strongly emphasized the need for better foresight in guiding AR4D investments and processes. The GCARD process enabled exciting new initiatives such as advocating increased AR4D investments, new models of public-private partnership, launching new collective actions in the Tropical Agriculture Platform (TAP), attracting young professionals into agriculture (AWARD and YPARD), fostering Gender in Agriculture Partnership, strengthening CIARD for opening access to agricultural information and strengthening of advisory services and relevant education and policy activities through GFRAS.

The GCARD2 was highly successful and evoked an overwhelming response from diverse stakeholders for 'Delivering the Change Together'. It has pioneered a new approach to partnership. Each institution has also set out: immediate actions that they can undertake with existing resources.

### Box 16. The GCARD Road Map: Transforming Agricultural Research for Development (AR4D) Systems for Global Impact

- The need for collective focus on key priorities, as determined and shaped by science and society
- The need for true and effective partnership between research and those it serves
- Increased investments to meet the huge challenges ahead and ensure the required development returns from AR4D,
- Greater capacities to generate, share and make use of agricultural knowledge for development change among all actors
- Effective linkages that embed research in the wider development context and actions enabling developmental change
- Better demonstration and awareness of the development impact and returns from agricultural innovation.

### Collaboration with CGIAR

APAARI had a very strong collaboration with Consultative Group on International Agricultural Research (CGIAR). The major emphasis had been on collaborative partnership for national and regional benefits utilizing international expertise. Presently,

### Box 17. Implementing GCARD Road Map: APAARI's Efforts

- Outscaling of conservation agriculture
- Moving forward on Suwon agrobiodiversity framework
- Promoting climate-smart agriculture
- Enhancing the role of women and youth in agriculture
- Prioritization of demand-driven AR4D
- Ensuring increased investments in AR4D
- Strengthening inter-regional partnerships
- Increased stakeholders' participation
- Public awareness on agricultural biotechnology, biosafety and biosecurity
- Emphasis on capacity development
- Improved knowledge sharing and communication
- Development impact returns from agricultural innovation



CGIAR centers are associate members of APAARI. The CG Centers/IARCs are well represented in the expert consultations, workshops, conferences, dialogues and other meetings organized by APAARI and along with other international organizations, such as FAO, ACIAR, GFAR, JIRCAS have played significant role in finalizing APAARI's regional priorities and Vision 2025, facilitating networks, and overall providing thrust on ARD in regional context. Some of these collaborative activities are: APAARI organized an Expert Consultation on NARS-CGIAR partnership during 1996; and APAARI members meet CGIAR TAC 69 meeting. CG Centers participated in APAARI Expert Consultation on Promoting Research Networks and Consortia during 2002; discussed activities of CORRA, PGR Networks, BAPNET, RWC, CLAN, GoFAR, TAMNET, APCoAB, APARIS and others; with overall role of APAARI as facilitator. APAARI facilitated/supported IFAD funded project proposal with joint collaborative role of ICRISAT, ICARDA and AVRDC, to strengthen/expand CLAN activities.

During the General Assembly Meeting of APAARI, held in Tsukuba, Japan, the strategy to revitalized CGIAR was discussed in detail in order to understand its implications for the ARD in the Asia-Pacific. The APAARI General Assembly came up with the unified response for the consideration of CGIAR (Box 18)

#### **Box 18. Revitalized CGIAR– A New Way Forward – Response of APAARI**

- APAARI fully supports the on-going CGIAR reform process and would like to have the important recommendations of the Review Panel speedily implemented. NARS leaders from the South should also be inducted in the Team for a balanced representation.
- Research prioritization and impact assessment related activities be carried out (by the Science Council/ CGIAR) in close collaboration/partnership with concerned Regional Fora and the GFAR.
- The change process should facilitate an enabling environment for efficient and smooth functioning of the Centers.
- The System-wide or the Eco-regional programs, be given high priority in addressing location specific problems.
- Role/contribution of research scientists need to be fully recognized and due credit given, being equal research partners, by the Future Alliance Centers. Also the capacity building process of NARS be given high priority.
- APAARI also endorsed the important role of GFAR towards involvement and partnership of various stakeholders and to organize in future the biennial Conference on Agricultural Research for Development (CARD).
- APAARI places on record its appreciation for the important contributions made by the CGIAR towards food security, poverty reduction, environmental sustainability, beside developing both the institutions and human resource capacity.

Regional Dialogue on Strengthening Partnership between National Agricultural Research Systems (NARS) and the Consultative Group on International Agricultural Research (CGIAR) Centers engaged in South Asia was organised jointly by Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the Pakistan Agricultural Research Council (PARC) on 22 October, 2013 at National Agricultural Research Centre, Islamabad. The dialogue mainly focussed on future priorities and the implementation strategies for strengthening partnership between NARS and CGIAR for shared vision in AR4D and for catalysing the policy makers/planners to create enabling environment to ensure food, nutrition and livelihood security in the region. About 100 participants, including NARS Heads, CGIAR Director Generals, policy makers and young agricultural professionals from NARS, GGIAR, NGO, the private sector and farmers' organizations attended. The dialogue was structured to have an in-depth discussion on: i) past successes and future prospects for joint collaboration, ii) emerging challenges and opportunities in the region, and iii) needed policy reorientation for new partnerships.

The details of collaborative activities with CGIAR centers are given below:

**ICRISAT:** ICRISAT organized 'South Asia Integration Meeting' in 2001. ICRISAT jointly organized with ICAR and APAARI, the 'South and West Asia Research Need Assessment Meeting' in 2004. Also, ICRISAT had been hosting APCoAB Secretariat at its New Delhi office since 2004; ICRISAT and APCoAB, jointly organized a workshop on 'Biosafety Regulations for Transgenic Crops and the Need for Harmonizing them in the Asia-Pacific Region' on 31 July- August, 2006. ICRISAT honoured APAARI for its partnership efforts (Box. 19). APAARI endorsed ICRISAT's CRP 3.5-Grain Legumes and 3.6-Dryland Cereals. APAARI in collaboration with ICRISAT organized several activities which included (i) Expert Consultation to Review Progress of Agricultural Research

#### Box 19. ICRISAT honoured APAARI for its Partnership Efforts

On its 35<sup>th</sup> Anniversary, the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) honoured Asia-Pacific Association of Agricultural Research Institutions (APAARI) with "Outstanding Research Partner Award". The award was given on 22<sup>nd</sup> November, 2007 in recognition of several partnership initiatives taken jointly by ICRISAT and APAARI such as expert consultations, training programs and organization of research networks such as CLAN. Dr. Raj Paroda, Executive Secretary, received the award on behalf of APAARI from Dr. William Dar, Director General, ICRISAT. Dr. Dar had also been closely associated in developing these partnerships, earlier as Head of the national agricultural research system known as Philippines Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and also as Chairman, APAARI.

Networks and Consortia in Asia- Pacific, (ii) Symposium on Global Climate Change, (iii) Workshop on International Consultation on Agricultural Research Development and Innovation, (iv) International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity, and (v) Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security.

**IRRI:** IRRI with DA-BAR, Philippines and APAARI organized and hosted the ‘South-East Asia Priority Setting Sub-Regional Meeting’ during 2001, 2005. Also, several CORRA meetings were organized back-to-back with APAARI meetings. International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity was organized in collaboration with IRRI and other CG centers at Suwon Republic of Korea on 13-15 October, 2010. APAARI also reviewed and endorsed ICARDA's CRP 3.3-Rice GRiSP (Global Rice Science Partnership).

**CIMMYT:** CIMMYT Regional Office initially was instrumental in collaborative activities on maize improvement, promoting TAMNET activities, CIMMYT's Rice-Wheat Consortium (RWC) was very active and APAARI was involved with this network. A success story on RWC was published by APAARI for NARS benefits. Other meetings organized in collaboration with CIMMYT and other International Centers were: (i) Symposium on Global Climate Change, (ii) International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity, and (iii) Regional Consultation on Improving Wheat Productivity in Asia.

**ICARDA:** ICARDA has been supportive of the inter-regional research network on cotton, namely, INCANA. A success story on lentil improvement in Bangladesh based on ICARDA-BARC/BARI initiatives, published by APAARI. APAARI in collaboration with ICARDA organized (i) Symposium on Global Climate Change: Imperatives for Agricultural Research, and (ii) International Symposium on Sustainable Agricultural and Use of Agrobiodiversity, (iii) Regional Consultation on Improving Wheat Productivity in Asia, and (iv) Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security in collaboration with other CG centers.

**Bioversity International:** Bioversity International (formerly, IPGRI) and APAARI collaborated in strengthening of PGR activities, APAARI-IPGRI MoU was developed in 1998; Expert Consultation on PGR Management was jointly organized by IPGRI-APAARI in 1996; IPGRI activities related to ITPGREFA, and SMTA were facilitated by APAARI in the regional context. APAARI in collaboration with Bioversity International and other International Centres organized: (i) International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity, (ii) Regional Workshop for Implementation of Suwon Agrobiodiversity Framework, and (iii) Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security.

**IFPRI:** IFPRI/ASTI-APAARI collaboration had been effective and ASTI had synthesized information based on its survey conducted in 15 countries of Asia-Pacific region. APAARI organized workshop in collaboration with IFPRI/ASTI on (i) ARD Investment

Trends : An Implementation Workshop on Measuring and Analyzing Agricultural R&D Investment and Capacity Trends in South Asia and (ii) Agricultural R&D in the Asia-Pacific Region. The Need to Monitor Investments, capacities and Institutional changes. National Policy Dialogues on Prioritizing Demand-Driven Agricultural Research were jointly organized by APAARI and IFPRI in Bangladesh, Nepal and India in 2012 followed by a joint discussion which culminated into a synthesis report for South Asia which was presented in GCARD2 in Uruguay in 2012.

**WFC:** The World Fish Center (WFC), formerly ICLARM, had been supportive of the activities of GoFAR, a Network on Fisheries and Aquaculture Research hosted by WFC. The Center also organized jointly with APAARI an expert consultation on priority setting in aquaculture, and fisheries R&D in 2001.

**ILRI:** APAARI also initiated collaboration with International Livestock Research Institute (ILRI). APAARI organized an International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in collaboration with GFAR, FAO and many CGIAR centers including ILRI. APAARI in future will collaborate with ILRI for strengthening livestock research in Asia.

**ICRAF & IWMI:** APAARI also plans to initiate activities on agroforestry in collaboration with World Agroforestry Center (formerly, ICRAF). Similarly, the activities will be initiated on water management in collaboration with International Water Management Institute (IWMI).

### Other International Centers/Fora

**AVRDC - The World Vegetable Center:** APAARI has established close linkage with AVRDC-The World Vegetable Center (formerly, Asian Vegetable Research and Development Center). Several activities have been organized by APAARI in collaboration with AVRDC. A Symposium on Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific was organized by APAARI in collaboration with Asian Vegetables Research and Development Center (AVRDC), GFAR, CIMMYT, ICARDA and ICRISAT at Tsukuba, Japan on 21-22 October, 2008, the details of which are given in Chapter 8 on “Agricultural Research for Development (AR4D) Programs”. AVRDC also supports APAARI programs and activities as its Associate Member.

**CABI:** Two workshops focusing on information management were organized during November 1999, with APAARI as a co-sponsor: (i) The workshop on “Harnessing Information for Development” was organized by CABI South-East Regional Center in collaboration with the University Putra Malaysia (UPM), Serdang, Malaysia from 15-19 November 1999. APAARI supported participation of six scientists, one each from Nepal, Bangladesh, Sri Lanka, Pakistan, Philippines and Malaysia. Partial support was also provided to one participant from AREO, Tehran, Iran. on (ii) The workshop “Information for Agricultural Research” was sponsored by CABI, ISNAR, ACIAR and

JIRCAS, and organized at the Asian Institute of Technology (AIT), Bangkok, Thailand from 22-29 November 1999. Three participants each from India and Thailand attended this workshop, apart from some experts.

**JIRCAS:** Training on Marker Assisted Selection was organized during March 2005 in Japan – 10 days training supported by JIRCAS; 3 scientists (2 from Thailand, 1 from India) participated. JIRCAS also supported (i) Global partnerships programs on Linking Farmers to Markets in 2006; (ii) Regional Consultation on Improving Wheat Productivity in Asia in 2012. More activities on HRD for APARIS and APCoAB have been given in Chapters 6 & 7, respectively.

**GFRAS:** APAARI collaborates with the Global Forum on Rural Advisory Services (GFRAS) and participated in a meeting on “Strengthening Extension and Advisory Services in Asia and the Pacific on 25 March, 2014 organized through Videoconferencing. Ten participants from various organizations, viz., GFRAS, FAO RAP, SATNET-CAPSA, APAARI, APIRAS, AESA, PIRAS, and PARC, Pakistan participated. The roles, responsibilities and major achievements of APAARI were presented at the meeting, which were received well. An important topic of discussion the establishment of an Asia-Pacific regional network for agricultural extension services based on APAARI model. The discussion concluded with focus on use of resources to strengthen existing networks rather than starting new ones. Ideas for follow-up and to strengthen collaboration were to: i) share the meeting notes, documents, and email contacts of participants for this meeting, ii) invite one another to events, iii) join one another’s networks, iv) use the email list to share what we are doing, v) have further consultants among stakeholders on these issues, and vi) share documents and information about events, meetings and conferences.

**TAP:** The Tropical Agricultural Platform (TAP) has been established at the initiative of G20 nations and supported by FAO to facilitate and promote capacity development (CD) in agricultural innovations in developing countries of the tropics for agricultural development and growth. The platform comprised of and represented by over 40 national, regional and international organizations/agencies has created a mechanism of Global Task Force (GTF) to plan, coordinate and oversee the further progression of the implementation of the TAP activities globally. The TAP Inception Workshop was held at Hainan, China on 4-6 September, 2013. The first TAP Global Task Force Meeting was held in Montpellier, France on 10-11 April, 2014 in which APAARI participated. APAARI was elected as a member of TAP GTF and is also a member of Regional Task Force (RTF) for coordinating TAP activities in the Asia-Pacific region. This meeting represented by over 15 regional and international organizations was specifically called to deliberate and decide on the CD framework/ tools, modalities of Global Task Force operations, election of chair and vice chair of GTF, modalities of CD expert group, and modalities of Regional Task Force. It was agreed that at least two countries from the Asia-Pacific region would be selected for piloting various activities of TAP to be started from the beginning of 2015.

**GCHERA:** APAARI collaboration with Global Consortium of Higher Education and Research for Agriculture (GCHERA). Dr. Raj Paroda, Executive Secretary, APAARI participated in the meeting organized by GCHERA at Hangzhou, China in 2005. He was member of the Steering Committee of GCHERA during 2004-2006.



*Dr. Raj Paroda at GCHERA meeting at Hangzhou*

**PROLINNOVA:** APAARI sponsored a representative from the NGO, Institute of Himalayan Environmental Research and Education (INHERE), India to participate in the Prolinnova International Partners Workshop (IPW) held in Bamako, Mali from 11-14 March, 2012. Prolinnova's strategy of work for the period 2011-2015 focuses on Innovation for Sustainable Livelihoods – Farmers Call. The workshop was attended by 26 participants from Africa, Asia, Europe and the USA through parallel regional review and planning meetings. APAARI representative took part in the Asian planning meeting on participatory innovation development for adaptation to climate change and had the opportunity to provide a brief on the GFAR, GCARD process, the upcoming GCARD2 and the opportunity for Prolinnova partners to contribute through participation in GCARD2 events through engagement and contributions at the regional level through the regional fora. During the World Café Session, she explained to the participants on how they would contribute to the GCARD process, which was well received. The proposal for Prolinnova India Country Platform was accepted by the Prolinnova Oversight Group as a full member in the Prolinnova international community of practice.

APAARI had organized a large number of activities including conferences, workshops, expert consultations, brainstorming sessions and dialogues with different CGIAR Centers and several other International organizations during 2006-2014. The details of these meetings are given in Annexure V.

## Regional Collaboration

**SAC:** APAARI has established strong collaboration with South Asia Association for Regional Cooperation (SAARC) Agriculture Center (SAC) which is also the Associate Member of APAARI. SAC representative participated in the meetings organized by APAARI under its Asia-Pacific Agricultural Research Information System (APARIS) Program. APAARI in collaboration with FAO, GFAR, CoRRB, ICS, and SAARC Agriculture Center (SAC) organized "Expert Consultation on Collective Actions to

Agricultural Information and Knowledge in the Asia-Pacific region” at Thimpu, Bhutan on 13-15 December, 2012.

**AIT:** APAARI Signed MoU with Asian Institute of Technology (AIT) on 12 February, 2010 at AIT Campus. The MoU provided a framework for cooperation between APAARI and AIT Extension for mutually beneficial cooperation in promoting, participating and delivering leadership development programs, and conducting training and building capacity. Under the MoU, APAARI and AIT agreed to facilitate greater adoption of ICTs in agricultural research in the Asia-Pacific region, share resources as well as responsibility for management of joint programs and projects based on mutual interest.

**CAPSA:** The Expert Consultation on ‘Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security’ was jointly organized by FAO and Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) with support from APAARI and the European Union funded project ‘Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia’ (SATNET Asia) on 11-12 December, 2013 in Bangkok.

The meeting agreed upon an Action Framework to guide stakeholders in enhancing research-extension linkages and partnerships for follow-up actions in the region. It is expected to contribute to more sustainable food systems and help improve farm productivity in Asia and the Pacific. The key outcome was the support for incubation of an Asia-Pacific regional network for agricultural extension services with an aim to enhance agricultural research and extension linkages to harness research results for the benefit of farmers, especially smallholder farmers.

The Network will be hosted by FAO-RAP initially for 2-3 years until the transfer of the secretariat function to a participating country. It would include Government, international/regional organizations, NGOs/CSOs and private sector actors involved in rural advisory services, regulatory actions, ICT applications and other extension services. The SATNET Asia project can provide useful linkages with existing networks and capacity - building activities. The important outcomes of the meetings were as follows:

- Adapting to a new research-extension environment
- Creating space for research-extension interface
- Enhancing quality of extension services
- Mobilizing resources and establishing stakeholder partnerships
- Fostering enabling policy initiatives
- Documenting evidence

**APIRAS:** A meeting of the Regional Forum on Strengthening Rural Advisory Services in Asia-Pacific Islands (APIRAS) at SEARCA, UPLB College, Laguna, Philippines was held on 14-15 September, 2011. A total of 35 participants from different organizations

including APAARI attended the meeting. The programme schedule was structured in two workshops: i) in-depth discussions on vision, mission, goals, structure and governance, and ii) issues and challenges in providing rural advisory services in the area of capacity building, policy advocacy, networking and monitoring & evaluation, the strategies, and problems/ constraints. There was a general agreement on vision, mission, goals, structure, governance, and strategies.

The statements of commitment of support were made by the representatives of 14 different organizations, namely, FAO, APAARI, IRRI, SEARCA, FFTC, CRiSP, BIOTROP, PIEN, APEN, TES Center, FLIFLY, Zanjan University, East-West Seed Co., and DAATI & PEN. The scope of collaboration between APAARI and APIRAS was emphasized and also that APAARI fully supported the establishment of APIRAS which will help in strengthening collaboration in the area of policy advocacy, training and capacity building, technology transfer and information dissemination etc. A Committee was also constituted with Dr. Virginia Cardenas from the Philippines as Chair and the representatives identified from South Asia, Southeast Asia, West Asia and Pacific Islands to discuss and decide about the future course of action in order to further streamline the operational aspects.

**EFARD:** APAARI established close linkage with the European Forum for Agricultural Research and Development and participated in the meetings organized by EFARD as well as by the other networks supported by EFARD. This provided an opportunity for better interaction to understand better about the programs and activities of each other.

**ERA-ARD:** APAARI took the lead in enhancing involvement of Southern Regional Fora in the European efforts to coordinate better their agricultural research on the occasion of the 4th Steering Committee meeting of the European Research Area –Agricultural Research for Development (ERA ARD) held in Maribor Slovenia on October 2-3, 2007. ERA ARD brings together 14 European countries (Austria, Belgium, Denmark, France, Germany, Hungary, Italy, Lithuania, Netherlands, Poland, Slovenia, Spain, Switzerland, United Kingdom) to promote collaboration in European agricultural research for the world's poor. It likewise gives a very high priority to the participation of partners from the South in the decision making process, thus the creation of the Southern Advisory Group (SAG) comprised of representatives of regional fora, namely, APAARI, AARINENA, ASARECA, CACAARI, CORAF, FARA, FORAGRO, FANR (SADC). The SAG's involvement is envisaged at three levels, namely, (i) participation in ERA ARD Steering committee meetings, (ii) involvement in project activities (working groups, workshops), and (iii) support the identification of relevant experts from their respective regions as may be required.

APAARI participated in the Steering Committee meeting of ERA-ARD II Project held at the Ministry of Economic Affairs, Brussels, Belgium on 4 June, 2013 which was attended by 26 participants, mostly from the European countries and the representatives of regional fora. During the meeting, a need was expressed to have



concrete plans, financial resources and strong will for greater collaboration between Europe and Southern Emerging Economies on equal partnership basis. Also, the important points emerged were: (i) formation of regional alliances was agreed by the Steering Committee (SC); (ii) proposals for improving European research contribution to IAR agenda were approved; (iii) SEAG emphasized the importance of partnerships especially with regional fora; (iv) a briefing paper will be prepared for sustainability of joint activities; (v) portal of portals needs be developed for providing information on ARD actors and programs; (vi) establish a new Strategic Working Group to have an advisory role to EIARD and SCAR and should involve SEAG; (vii) need was felt for long-term partnerships, sustainable programs and alliance concept. SEAG stressed the need for linking mid-term plans of regional fora through GFAR.

***Southern-European Alliances/Platform on ARD:*** A regional consultation workshop on “Supporting Southern- European Alliances/Platforms on Agricultural Research for Development” was organized at the Asian Institute of Technology (AIT), Bangkok on 16-17 March, 2011 to explore the scope for an Asia-Europe Platform on Agricultural Research for Development (ARD). The workshop was hosted by the AIT in collaboration with APAARI, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) and AIT. A total of 19 participants representing farmers’ organizations, non-government organizations, research institutes, educational organizations, policy institutions and regional bodies attended the workshop. APAARI participated in the meeting and expressed its commitment for supporting the regional platform on ARD. There was a general agreement among participants that there is a need for an Asia-Europe Platform on ARD to help address the serious challenges of food insecurity, poverty and climate change which continue to affect the Asia region. The platform should be multi-stakeholder, address the needs of stakeholders and facilitate interaction between organizations with interest in ARD.

***APAEON:*** The Asia Pacific Agricultural Extension and Outreach Network (APAEON) supported by FAO was established based on the recommendation made in the Expert Consultation on Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security held during 11-12 December, 2013 in Bangkok, Thailand. APAARI participated in this meeting. The main objective of the Network is to support strengthening linkages between the research and extension institutions in FAO member countries in the Asia-Pacific region with a goal to achieve food and nutrition security. The APEAON members, including research outreach and extension actors from governmental and non-governmental organizations will seek to (i) share knowledge and experience among members; (ii) promote mechanisms for research-extension and outreach linkages ensuring research results are effectively utilized for sustainable agricultural production and productivity growth; (iii) identify and implement common priorities for joint actions; and, (iv) promote collaboration and team work among concerned institutions for concerted efforts. APAARI is a member of this important Network.

## Collaboration with Other Regional Fora

APAARI has developed a strong inter-regional collaboration and participates in the meetings organized by other fora, namely, Forum on Agricultural Research in Africa (FARA), Central Asia and Caucasus Association of Agricultural Research Institutions (CACAARI), and Association of Agricultural Research Institutions in the Near East and North Africa (ARINNENA) and Foro Regional de Investigación Desarrollo Tecnológico Agropecuario (FORAGRO). Also, the representatives of these regional fora are invited to participate in APAARI organized meetings. In order to strengthen of this collaboration, these fora have been given the status of reciprocal members of APAARI.

APAARI also collaborates with Asia-Pacific Association of Forestry Research Institutions (APFPRI), Bangkok, Thailand; Asia-Pacific Seed Association (APSA), Bangkok, Thailand; South Asian Association for Regional Cooperation (SAARC), Association of Southeast Asian Nations (ASEAN), Network of Aquacultures Centers in Asia-Pacific (NACA) and Secretariat of the Pacific Community (SPC), Fiji. These organizations participate in APAARI organized meetings and APAARI also participate in the meetings organized by these fora. Some these regional fora, namely, APSA, NACA, APAARI and SPC are also the reciprocal members of APAARI.

## Collaboration with NARS

APAARI had been undertaking diverse activities in collaboration with National Agricultural Research Systems (NARS) in its member countries. The activities mainly included organization of conferences, symposium, workshops, expert consultations, brainstorming sessions, policy dialogues and training programs. The major collaborating NARS include Indian Council of Agricultural Research (ICAR), India; Australian Centre for International Agricultural Research (ACIAR), Australia; Japan International Research Center for Agricultural Sciences (JIRCAS), Japan; Philippine Council for Agriculture and Natural Resources Research and Development (PCAARRD), Philippines; Council of Agriculture (CoA), Chinese Taipei; Pakistan Agricultural Research Council (PARC); Rural Development Administration (RDA), Republic of Korea; Pakistan; Malaysian Agricultural Research and Development Institute (MARDI), Malaysia; Bangladesh Agricultural Research Council (BARC); Bangladesh; Nepal Agricultural Research Council (NARC), Nepal; Vietnam Academy of Agricultural Sciences (VAAS), Vietnam; Department of Agriculture (DoA), Thailand; Sri Lanka Council for Agricultural Research Policy (SLCARP), Sri Lanka; Council of Renewable Resources of Bhutan (CORRB), Bhutan; National Agricultural Research Institute (NARI), Papua New Guinea; Ministry of Agriculture, Fisheries and Forest (MAFF), Fiji. Besides, APAARI collaborates with several other research institutes, namely, Asian Institute of Technology (AIT), Thailand; Trust for Advancement of Agricultural Sciences (TAAS), India; Protection of Plant Various and Farmers Rights Authority (PPVRF), India; Agricultural & Processed Food Products Export Development Authority (APEDA), India; South East Asia Regional Cooperation in

Agriculture (SEARCA), Philippines; Taiwan Agricultural Research Institute (TARI), Chinese Taipei, and South Pacific Commission (SPC), Fiji etc. The details of workshops/expert consultations/dialogues organized by APAARI with NARS during 2006-2013 are given in Annexure VI

## Collaboration with Civil Society Organizations (CSOs)

The role of Civil Society Organizations (CSOs), largely the non-governmental organizations (NGOs), is becoming increasingly important in providing the benefits of agricultural research to farmers, through their grassroot level approach. However, much concerted efforts of diverse stakeholders are needed in a collaborative, partnership mode to achieve agricultural sustainability with focus on poverty alleviation, food security, environmental protection etc. with the required thrust on agricultural research for development (AR4D).

**IFAP:** APAARI participated in the meeting of the International Federation of Agricultural Producers (IFAP) Asian Committee on 15 May, 2006, in Seoul, Korea, which was part of the 37th World Farmers Congress and 60th Anniversary Celebration of IFAP. APAARI strives to involve all stakeholders including CSOs, in its programs and activities. Both APAARI and IFAP opined that the active engagement of the Regional Farmers Network in APAARI activities and vice-versa can contribute to more meaningful partnerships in AR4D, with the farmers being the primary beneficiaries of APAARI's efforts.

**ANGOC:** APAARI strongly endorsed to GFAR the establishment of an Asia-Pacific NGO Consortium being spearheaded by the Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC). ANGOC is a regional association comprised of 24 national and regional networks of NGOs from 10 Asian countries actively engaged in food security, agrarian reform, sustainable agriculture and rural development activities. Its member networks have an effective reach of some 3,000 NGOs throughout the region. A meeting of small group of NGOs was convened by ANGOC on 6 November, 2006 in New Delhi, India and discussed the rationale and the process leading to the launching of an Asia-Pacific NGO Consortium.

In order to deliberate on this emerging concern, APAARI, jointly with ANGOC and with support from GFAR, organized a regional workshop at Bangkok on 17-18 April, 2008, to discuss possible ways of strengthening regional cooperation among the NGO community actively associated with AR4D activities and to explore possibilities for the establishment of a regional NGO consortium which can provide a neutral platform for regular interaction and legitimacy for representation in the national, regional and global organizations engaged in AR4D. The participants unanimously decided to form a "NGO Association for Agricultural Research in Asia-Pacific, NAARAP". The major goal of the Consortium was to develop strategic partnership with APAARI and GFAR in the conduct of AR4D agenda. All NGO participants agreed to be the members of NAARAP with its Secretariat for the first two years

at ANGOC in the Philippines. Both APAARI and GFAR agreed to support and work closely with NAARAP in future. It was also agreed that representation of NGOs at Asia-Pacific level could be ensured in the regional and global fora through NAARAP in future.

**AFA:** APAARI has a strong collaboration with the Asian Farmers' Association for Sustainable Rural Development (AFA). AFA in collaboration with the Asia-Pacific Association of Agricultural Research Institutions (APAARI) and support of the Global Forum on Agricultural Research (GFAR), organized a "Regional Consultation on Agricultural Research for Development" on 10-11 September, 2012, at Bangkok, Thailand. The consultation was attended by 22 participants (16 men and 6 women) representing 10 national farmers' organizations from 9 countries, whose combined membership is about 12 million small scale women and men farmers, fishers, and producers. The main objectives of the consultation and the recommendations thereof were: i) to build and strengthen the capacities of farmers and their organizations in the areas of information and database management and analysis business planning, organizational management, food processing and value addition, marketing and policy advocacy; ii) to develop *in-situ* model farms and identify, train and support model farmers/farmer technicians/extensionists; iii) to provide platform for farmer-to-farmer learning exchanges, study visits and knowledge learning-sharing activities at national, regional and international levels. Make available and accessible appropriate tools, equipments and machines to farmers, iv) to enhance support to build the capacities of women farmers to and make available and accessible appropriate tools, equipments and machines to farmers; v) to provide institutionalized mechanism within CGIAR/GFAR for meaningful participation of representatives of small-scale farmers, fishers and indigenous peoples in planning, evaluation and monitoring of and development initiatives. AFA represents the Farmers Organizations (FOs) on the Executive Committee of APAARI.

**BRAC:** APAARI has established collaboration with Bangladesh Rural Advancement Committee (BRAC) Bangladesh. BRAC representative participated in Regional Consultation on Improving Wheat Productivity in Asia organized by APAARI in collaboration with FAO, CIMMYT, ICARDA and JIRCAS at Bangkok in April, 2012. BRAC also participated in the Regional Workshop on Youth and Agriculture: Challenges and Opportunities organized by APAARI in collaboration with GFAR, ICARDA, ICRISAT, CIMMYT IFPRI and Bioversity International at Islamabad in October, 2013. BRAC represents NGOs on the Executive Committee of APAARI.

## Collaboration with YPARD

APAARI has established good linkage with Young Professionals for Agricultural Development (YPARD). A meeting of YPARD and ANGOC was facilitated by APAARI on 5 November, 2006 in New Delhi, India. The objectives of the meeting were to assess possibilities for collaboration among YPARD, ANGOC, and APAARI based on

topics/issues of common interest and to identify concrete steps and YPARD contact persons for the APAARI sub-regions. Two presentations on YPARD and ANGO C gave the participants a better appreciation of their respective mandates, goals, mission and areas of common interests. They reaffirmed that agriculture is instrumental in poverty reduction and in realizing the MDGs. Yet, investment in agriculture and research is declining. The role of youth in reversing these trends was duly recognized. The following important points emerged:

- APAARI and ANGO C will facilitate the mainstreaming of a new stakeholder group, young professionals, in the ARD bodies of Southeast Asia, in particular NARS.
- YPARD will receive mentoring from ANGO C on policy advocacy and negotiations with national government and universities.
- APAARI and ANGO C will assist YPARD in identifying, and guiding its Regional Focal Point (RFP) and partner organizations in Asia-Pacific and eventually branch out in subregions.
- Carry out and present pilot/case studies on youth in agriculture, young professionals in AR4D, and on curriculum development studies (initially in India and Philippines).
- Document the success studies (of YPARD process).

On the initiative of APAARI, a number of CSOs (NGOs and FOs) and farmers have taken active part in APAARI organized meetings (Annexure VII). More such partnership of representative/established organizations from the region involved in agricultural research for development is envisaged. There are two seats for CSOs, one each for NGO and FO on the Executive Committee of APAARI. Currently, BRAC, Bangladesh represents NGO seat and Asian Farmers' Association (AFA), Philippines represents the FO seat on the Executive Committee.

## **Collaboration with Private Sector/Public-Private-Partnership**

APAARI has widened its activities with more collaboration/partnership of the private sector. These include APSA's involvement with APAARI in reviewing the TAMNET research network, APSA's representation on GFAR, a major collaborator/supporter of APAARI activities. Realizing the increased role of private sector in biotechnology vis-à-vis sharing of expertise, MONSANTO and MAHYCO were represented on Steering Committee of APCoAB. These organizations are also co-funding its activities. SYNGENTA also participated in APCoAB Steering Committee meetings, programs and extended support in capacity building/short regional trainings to be organized by APCoAB/APAARI particularly on molecular marker studies and their usefulness. Private sector organizations have been supporting the conferences/workshops/expert consultations as co-sponsors and also participating in these events.

APAARI envisages increased role of collaborative activities involving public-private-partnerships, particularly in APCoAB activities. APCoAB had organized a brainstorming session on 'Public-Private Partnership in Agricultural Biotechnology' in New Delhi which was well-attended by the private sector and its recommendations laid stress on national strategy on public-private partnership, identifying specific areas of collaboration. Similar emphasis was laid in the high level policy dialogue on biotechnology for food security and poverty alleviation organized by FAO/APAARI/GFAR and facilitated by APCoAB, at Bangkok from 7-9 November 2005. APCoAB also brought out success stories on commercialization of Bt corn in the Philippines and Bt cotton in India, and these highlight the usefulness of such collaboration. The collaboration with private sector has been quite helpful in moving forward the agenda for AR4D in the region.

### **APAARI Participation in Workshops/Expert Consultations/Meetings organized by Other Organizations/Fora**

As is evident from the details given above, APAARI has established a strong collaboration and partnership with a large number of international, regional and national organizations in order to move forward the agenda for agricultural research for development (AR4D) to address the emerging challenges of food, nutrition and environmental security for the wellbeing of the people in the Asia-Pacific region. The details of such workshops/conferences/expert consultations/meetings attended by APAARI are given in Annexure VIII.

## 10 Policy Advocacy

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Policy advocacy had been one of the strategic thrusts of APAARI and it had been emphasizing on the importance of AR4D priority setting and organized several meetings at the national, sub-regional and regional level involving various stakeholders such as NARS, CGIAR Centers, Advanced Research Institutions (ARIs), International Agricultural Research Centres (IARCs), FAO, GFAR and other stakeholders in order to identify research and development priorities. APAARI had collaborated with Bioversity International in developing South-Southeast-East Asia (SSEEA) Regional Conservation Strategy for Plant Genetic Resources and implementation of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). APAARI also collaborated with international Food Policy Research Institute (IFPRI) for studying the investment trends as well as monitoring the investments, capacities and institutional changes. APAARI in collaboration with IFPRI organized policy dialogues at the national and regional level for prioritizing AR4D needs in the region. APAARI in collaboration with CG centers and other relevant research institutions and stakeholders had been instrumental in putting forth Tsukuba Declaration on Adapting Agriculture to Climate Change, Bangkok Declaration on Re-orienting Agricultural research for Development and Suwon Agrobiodiversity Framework for conservation and use of sustainable agriculture in Asia-Pacific region. APAARI efforts on policy advocacy are enumerated in the ensuing pages.

### Priority Setting for AR4D

APAARI had been organizing meetings/policy dialogues in collaboration with NARS, CGIAR Centers, ARIs, IARCs, FAO, GFAR and other stakeholders to undertake priority setting exercises for agricultural research for development at the national, sub-regional and regional levels. During 2001, APAARI organized ARD priority setting meeting for West and South Asia in India, for Southeast and East Asia in the Philippines and for the Pacific in Fiji. Subsequently, a meeting was held for South and West Asia in India in 2004 and for other sub-regions in 2005 to assess regional needs and priorities. A workshop on 'Regional Synthesis of Research Needs in Asia-Pacific' was organized in Bangkok in 2006. In 2010, AR4D priorities including thematic priorities for South Asia, Southeast Asia and Pacific sub-regions were assessed through e-consultation, regional/sub-regional reviews, reports and literature review and face-to-face consultation. The outcomes of these efforts were presented in a synthesis report for Asia-Pacific region in the first Global Conference on Agricultural Research for Development (GCARD1) at Montpellier, France in 2010. National policy dialogues on prioritizing demand-driven

agricultural research were organized in collaboration with IFPRI and country NARS in Bangladesh, India and Nepal in 2012. These were followed by joint discussion involving participants from the three countries and a synthesis report was prepared. The report embraced the main concerns/issues, major research priorities and the way forward and was presented in the second Global Conference on Agricultural Research for Development (GCARD2) at Punta del, Uruguay in October, 2012. The details of these efforts made by APAARI are given in Chapter 5 on “Strategies and Priorities for AR4D”.

## **Investment Trends in Agricultural Research in Asia and the Pacific - An IFPRI-APAARI Initiative**

### **Agricultural Science and Technology Indicators (ASTI) Survey**

During 2003-2005, IFPRI in close collaboration with APAARI conducted an Agricultural Science and Technology Indicators (ASTI) survey in 15 Asian and Pacific countries. APAARI assisted in providing contact information of the various national partnering research agencies. It also assisted in setting up the in-country collaboration. The findings for the nine Asia-Pacific countries sampled (Bangladesh, Laos, Malaysia, Nepal, Pakistan, Papua New Guinea, the Philippines, Sri Lanka, and Vietnam) showed that:

- During the 1990’s, total agricultural R&D spending grew at an average of 3.2 per cent per year. This was considerably higher than experienced in other regions in the world such as Sub-Saharan Africa (0.8%), Latin America and the Caribbean (2.0%), and OECD countries combined (1.2%) during the same period. But, this average growth rate showed considerable variances among the nine countries which comprised only about half of the agricultural R&D investments in the region (excluding China and India).
- Agricultural research conducted by the government agencies in Asia is mainly funded through contributions by the government, whereas investments by the private sector are quite limited. In most countries, these funds were provided through direct budget allocations, but some countries received additional government funding through competitive funding mechanisms.

The findings of the complete ASTI survey in all the 15 Asia-Pacific countries was published and made available through both the ASTI and APAARI websites. APAARI also worked with ASTI to disseminate the country briefs, regional reports and datasets within the region.

During 1996-2008, agricultural R&D spending in Asia-pacific, increased by 50 per cent, from \$8.16 billion to \$12.27 billion in 2005 PPP prices (Table 1). The main driving countries of this regionwide growth were China and India. China’s agricultural R&D spending rose from 1.58 to 4.05 billion over this period, largely as a result of government reforms that promoted innovation in agricultural science and technology



**Table 1.** R&D investments in Asia-Pacific (1996-2008)

Region/ Country	Total spending (in million \$)		
	1996	2002	2008
<b>East Asia</b>			
China	1,584	2,540	4,048
Japan	2,746	3,004	3,112
<b>Southeast Asia</b>			
Indonesia	359	266	379
Laos	NA	12	NA
Malaysia	280	436	381
Philippines	129	139	133
Vietnam	23	55	86
<b>South Asia</b>			
Bangladesh	83	110	131
India	929	1,441	2,121
Nepal	18	30	24
Pakistan	201	147	188
Sri Lanka	40	44	39
Asia-Pacific (Total)	8,160	9,865	12,270

<sup>1</sup>Sources: Beintema et al. 2012, ASTI 2012, Eurostat 2012, OECD 2012, and various country-level secondary resources (see data sources at <http://asti.cgiar.org/pdf/CountrySourcesEstimations.pdf> and notes below).

(S&T) and which opened new funding opportunities. India's level of investment also increased substantially during this time due to increased government commitment to agricultural R&D. However, at \$2.12 billion in 2008, India's agricultural R&D spending levels remained about half those of China's.

Various other low and middle income countries in the region reported increased expenditure levels. Agricultural R&D spending in Vietnam quadrupled between 1996 and 2008, and Bangladesh and Malaysia also reported significant increase. The region's high-income countries maintained relatively high levels of public agricultural R&D spending; however, yearly growth in expenditure levels among high-income countries was significantly lower compared with the region's low and middle income countries. As a result, the high-income countries' overall share of regional public agricultural R&D spending dropped from 52 per cent in 1996 to 37 per cent in 2008. In 2008, China outspent the rest of the region, accounting for one-third of total regional expenditures, followed by Japan (25 per cent) and India (17 per cent). Governments in both China and India have strongly supported public agricultural R&D, acknowledging its important role in driving agricultural growth.

The ASTI initiative involved a network of various national, regional and international partners. It had been the most authentic source of internationally comparable data and analyses, which are required by the policy makers to make informed decisions to improve the efficiency and impact of agricultural research. For the Asia round of survey, a schedule of activities was framed and an endorsement of ASTI-APAARI MoU to implement survey in more than 20 Asian countries was solicited.

### **Workshop on Agricultural R&D in the Asia-Pacific Region: The Need to Monitor Investments, Capacities and Institutional Changes**

The Agricultural Science and Technology Indicators (ASTI) initiative, which is facilitated by the International Food Policy Research Institute (IFPRI) and the Asia-Pacific Association of Agricultural Research Institutions (APAARI), organized Workshop on “Agricultural R&D in the Asia-Pacific Region: The Need to Monitor Investments, Capacities and Institutional Changes” at Bangkok on 16-17 February, 2012. The objectives of the workshop were to present preliminary results of the survey work in the Asia-Pacific region, to elicit feedback from national collaborators on their experiences in implementing ASTI’s national survey rounds, and to explore ways as to continuously monitor and benchmark agricultural research and development (R&D) investment and capacity trends in the region. A total of 24 representatives of national partner organizations and regional organizations participated in this workshop.

### **South-Southeast-East Asia (SSEEA) Regional Conservation Strategy**

A regional Crop Diversity Conservation Strategy for South, Southeast and East Asia (SSEEA), developed by IPGRI (now Bioversity International) was endorsed by APAARI. The strategy aimed to promote and assist in the development of an effective and efficient arrangement for the conservation of the most important crop diversity collections in the SSEEA region, those identified in Annex I of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), an activity funded by ‘The Global Crop Diversity Trust’ (GCDT), which was established in 2003 as an independent and internationally funded body.

The SSEEA regional conservation strategy which was favourably endorsed by APAARI was developed by Bioversity International, (formerly, IPGRI) through a consultative process which started in October, 2004 in Beijing, China. This was followed by second consultation held in Kuala Lumpur, Malaysia during September, 2005. In between these two major consultations, IPGRI-APO facilitated the inputs of the national programs through the three PGR sub-regional networks and consolidated the outputs into a SSEEA Strategy document. The process involved the participation of the major stakeholders at the national, regional and international levels. APAARI, FAO RAP, Asia-Pacific Association of Forest Research Institutions (APAFRI) and CGIAR Centers (IRRI and ICRISAT) participated. A Steering Committee composed of representatives of the three sub-regional PGR networks, APAARI, FAO RAP, IPGRI, IRRI, and ICRISAT guides the development

and finalization of the SSEEA regional strategy. The most important aspects of the SSEEA strategy included:

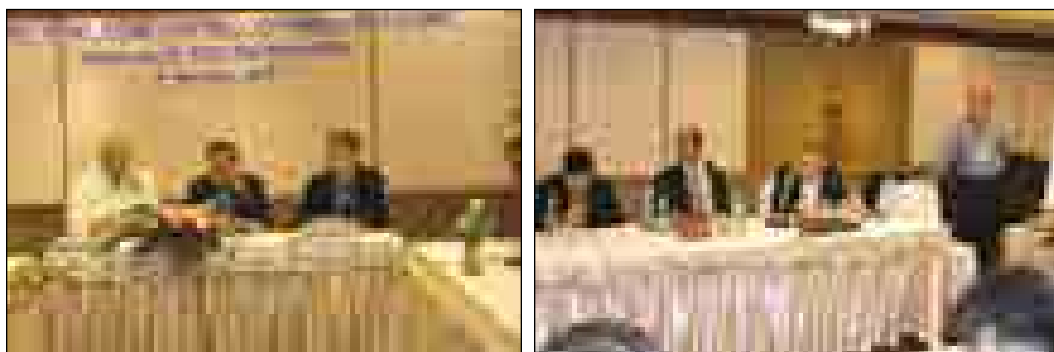
- Identification of the most important crops in the region, mostly the crops covered in Annex I of the ITPGRFA (rice, citrus, Asian beans/*Vigna* spp., eggplant, wheat, maize, banana, barley, sorghum, coconut, potato, sweet potato, cassava, and yams)
- Identification of collections of greatest importance deserving first priority for support
- Identification of the main areas of collaboration: i) documentation, ii) maintenance, iii) regeneration, iv) safety duplicates, v) quarantine, vi) distribution, and vii) characterization

The coordination and facilitation of the strategy at the national level in the countries/NARS in the SSEEA region is done by the Country Coordinators who deal with plant genetic resources in their respective countries. The coordination at the sub-regional level is done by the Chairs of the three PGR sub-regional networks to be assisted by the IPGRI-sub-regional secretariats.

For a regional system of conservation to be efficient and to ensure links to users, the system has to be under the aegis of a formal regional inter-governmental organization such as the ASEAN and FAO, or a regional forum such as APAARI, with existing crops/PGR networks. The CGIAR Centers with its base in the region or Centers which have the mandate for the priority crops such as IRRI, ICRISAT, CIMMYT, CIP, and others, will have to play both a lead and supportive role in these various collaborative activities.

## Implementation of ITPGRFA in the Asia-Pacific region

Biodiversity International (formerly, IPGRI) in collaboration with APAARI, held a roundtable meeting of NARS leaders and other stakeholders in Asia-Pacific on 10 November, 2005 in Bangkok, specifically to: (i) increase awareness among the participants



*Roundtable meeting on ITPGRFA at Bangkok*

of the Treaty implementation process at international and national levels, (ii) recommend activities to develop harmonized regional approaches to outstanding implementation issues, and (iii) identify modalities for the delivery of technical assistance to countries in the implementation of the International Treaty (IT). The participants represented APAARI member institutions (NARS and CGIAR Centers), FAO and NGOs.

The meeting emphasized the importance of countries' participation in the implementation of the Treaty. The Treaty provides a supportive framework for PGRFA related research and conservation efforts and ultimately to improving the livelihoods of the poor farmers. It was part of a larger package of complementary activities that should be pursued jointly, including the implementation of the Global Plan of Action (GPA), the finalization of the 'Regional Conservation Strategy' being developed for the Global Crop Diversity Trust and the strengthening of regional genetic resources and crop networks.

### **Key recommendations**

- National Agricultural Research System (NARS) representatives should push for more constructive engagement within their own organizations and countries concerning the ongoing processes of the implementation of the Treaty. Where appropriate, they should contact their national representatives for further implementation of the Treaty and the regional representatives attending the Contact Group meetings.
- The Asian Group of delegates to the Contact Group should meet before the next meeting of the Contact Group to discuss options and further define their positions on issues that are being addressed at the Contact Group meetings. It was further recommended that APAARI Secretariat should examine, with the Regional Chair of the Asian Group, the possibility of such a meeting with some financial support from IPGRI and possibly other sources.
- There is a need for national level technical legal assistance for the implementation of the Treaty. To that end, participants endorsed a joint FAO/IPGRI program for technical assistance to countries to implement the Treaty.

Following the recommendations of this roundtable meeting, APAARI in collaboration with IPGRI facilitated a meeting of the seven Asian representatives nominated by the Chairs of the FAO Regional Groups for the drafting of the Standard Material Transfer Agreement (SMTA) on 15-16 April, 2006 at Bangkok. The process led to common understanding to develop SMTA which would have greater implications on APAARI/NARS for dealing with exchange and benefit sharing of genetic resources in the future. The meeting resulted in preparing a well coordinated Asian position needed for negotiation during the SMTA Contact Group meeting held in Sweden from 24-28 April, 2006. Further, based on the outcome of the Sweden meeting, the first meeting of the Governing Body of the ITPGRFA held in the second week of June, 2006 finalized the Standard Material Transfer Agreement.

## **The Suwon Agrobiodiversity Framework: A Framework for Conservation and Use for Sustainable Agriculture in the Asia-Pacific Region**

APAARI organized an International Symposium on “Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region” in partnership with Rural Development Administration (RDA), Republic of Korea, Global Forum on Agricultural Research (GFAR), Bioversity International and other International Centers such as AVRDC, CIMMYT, FAO, ILRI, ICARDA, ICRISAT and IRRI on 13-15 October, 2010 at Suwon, Republic of Korea. More than 100 participants comprising heads and representatives of NARS, International Agricultural Research Institutions, Regional Fora, Civil Society Organizations and progressive farmers attended the Symposium. The Symposium provided an excellent opportunity to review, identify and redefine the role and directions of agricultural R&D, especially in the context of conservation through use of valuable agrobiodiversity for sustainable agricultural development. It also helped in deciding a ‘Way Forward’ for the access and benefit sharing of valuable genetic resources. The proposed agrobiodiversity research and development framework for the Asia-Pacific region, adopted during the Symposium aims to provide a strategic approach, towards both management and use of agro biodiversity through regional collaboration and partnerships among stakeholders. Brief details of the Suwon Agrobiodiversity Framework are given below:

### **Focus of Research and Development**

#### ***Studies to enhance use of genetic resources through subset approaches***

There are many methods/approaches to sample germplasm collections to create subsets that are manageable in size by the researchers to quickly evaluate/characterize (phenotypic/genotypic) genetic resources to select useful accessions for use in pre-breeding. These approaches include core, mini core, focus identification of germplasm strategy (FIGS), composite and reference collections and trait-specific subsets. Enhancing research efforts on certain underutilized crops and their wild relatives may also be necessary to cover gaps in existing knowledge concerning their benefits to the society.

#### ***Pre-breeding and participatory plant breeding to enhance utilization of genetic resources in crop improvement programmes***

There is a need to encourage the use of genetic resources especially underutilized species, their relatives and other useful species such as non-timber forest products (NTFPs), medicinal plants, etc. to exploit untapped genes, broaden the genetic base of existing cultivated varieties and develop the new ones. This will be essential for coping better with the challenges of increasing productivity, improving quality, managing new pests and diseases, and adapting to climate change and abiotic stresses. It will also be important to develop partnership with farmers and other stakeholders to explore alternative approaches for genetic improvement such as participatory plant breeding and community based conservation activities.

### **Strategies and technologies to enhance *in situ* and *ex situ* conservation through use**

The aim must be to generate and synthesize coherent messages with appropriate information and knowledge, evidence and tools which can contribute to the understanding of genetic diversity and its effective use, especially

- The incorporation of information/knowledge and new technologies (genomics) into integrated approaches can promote the understanding of the diversity distribution and identification of useful traits for adaptation to climate change, and other abiotic and biotic stresses.
- Research should explore the potential of consumer preferences, certification strategies, geographic indication, community and farmers' rights or payment systems for ecosystem services to secure agrobiodiversity for the future and exploit its direct values and uses. A market oriented approach is very important in enhancing the economic status of farmers involved in conservation and use of genetic resources.
- Efforts need to be made to empower traditional custodians of biodiversity in the region for *in situ* conservation on-farm to enhance conservation of landraces and wild relatives of cultivated crops and livestock, both *in situ* and on-farm together with its associated knowledge.
- Apply proven modalities for community based biodiversity conservation with partners especially the civil societies, such as supporting communities to sustainably use local genetic diversity to reduce vulnerability and crop loss and to sustain the resilience and ecosystem services of their production systems.
- Promote cost-effective complementary *ex situ* and *in situ* strategies for conservation of genetic resources.

### **Assessment of the agrobiodiversity richness and the status relative to economic, social and cultural (traditional knowledge) factors**

- Support studies related to the assessment of genetic erosion and restoration of lost diversity across the region jointly with various national and international partners including advance research organizations (to access new methodologies).
- Assessing the relationship of poverty and other socioeconomic factors that affect the genetic diversity for developing various livelihood options or for the payment for ecosystems services associated with conservation and use.
- Greater emphasis on documenting traditional knowledge (TK) and linking its use in both conservation and utilization of PGR in the context of benefit sharing as well as exchange of knowledge among communities.

***Interdisciplinary studies on the invaluable ecosystem services for agriculture that agricultural landscapes, forests and other mainly wild ecosystems provide (following CBD-COP 5 Ecosystems Approach)***

Degradation of wild ecosystems in the landscape has important implications to agriculture and food production. Compensating the lost ecosystem services with artificial irrigation systems, growth media, fertilizers or pesticides is potentially not only costly but probably not even viable in many resource-poor areas. There is a need to better understand the relationships between society and nature in the socio-ecological landscape (as those envisioned in the CBD-COP 10 Satoyama Initiative). It is, therefore, worth looking into the following aspects:

- The role of wild ecosystems in providing services for forest and other agricultural systems, the processes and interactions which maintain these services, and the threats that they are facing.
- Planning rehabilitation and maintenance of diverse landscape mosaics of agricultural lands and viable wild ecosystems including policies that support their creation and maintenance.
- Adaptation of wild ecosystems to changing environment as a prerequisite for the continued provision of the services as their demand increases.

***Information systems and tools for data exchange***

The aim is to develop or adapt an information facility for online access to a wide range of datasets on genetic resources. The rapidly changing ICTs open up new opportunities to collect, store and analyze genetic resource information, and facilitate its exchange among researchers, local communities and countries. The integration of geo-references as the primary key for all forms of data, capitalizing on social media, data-interchange protocols, electronic germplasm catalogues and directories, GENESYS, GRIN Global and others. Common descriptors with guidelines for recording and reporting information should be extended to increase comparability and usability among datasets.

***Supportive policies, laws and strategies to enable enhanced PGR exchange and use***

There is need to focus on assessing the impacts of international laws and policies on the use and conservation of genetic resources. Support is needed to assist countries that have signed the ITPGREFA to have the necessary regulatory/legislative mechanisms to implement the Treaty effectively. A well developed ABS framework must also be developed to provide legal mechanisms necessary to accelerate sharing of genetic resources.

**Areas of Regional Collaboration**

***Developing national agrobiodiversity plans and integrating them into regional and global collaborative frameworks***

The development of national plans and integrating them into regional collaborative

frameworks are important to enhance both food security and sustainable agricultural development. In the absence of such national agrobiodiversity plans and regional collaborative frameworks, it is difficult to advocate the importance of agrobiodiversity to the policy makers and other stakeholders. This will require assessment of national and regional priorities for agrobiodiversity in view of the emerging challenges. To achieve this, the facilitation role of regional fora such as APAARI, CGIAR centres, FAO, etc. is necessary and must be promoted.

### ***Increasing R&D collaboration on agrobiodiversity conservation and use in the region***

Agrobiodiversity cuts across national boundaries and there are many common issues and concerns that need multi-country partnerships and sharing of experiences. Collaboration and support are very much needed in collecting, understanding and maintaining endangered crop, livestock and fisheries genetic resources. More R&D collaboration for underutilized crops in the region such as: small millets (finger millet, kodo millet, barnyard millet, foxtail millet, and little millet), minor but locally important legumes (black gram, rice bean, lablab bean, horsegram, etc.), cultivated minor and wild tropical fruits, and indigenous vegetables will ensure needed progress in improving these crops through plant breeding efforts.

### ***Increased sharing of information and data on genebank collections***

To further improve access and sharing of genetic resources in the region, the sharing of information on national genebank collections is a prerequisite. This could be on the model similar to that of CGIAR's SINGER or the European countries' EURISCO where data and information from different genebanks are available from a common searchable database. These databases are needed to accelerate the access to the collections held by the different genebanks. The national and international centers must ensure sharing of information being critical for enhanced use of genetic resources (i.e. GENESYS) following an open source system. The sustained use and maintenance of the GPA-NISM in many Asia-Pacific countries that have this database and its development in other countries should also be supported. The GPA-NISM provides the big picture of PGRFA in different countries beyond the genebanks.

### ***Strengthening agrobiodiversity capacity, education and public awareness***

Capacity development needs to be addressed at the individual, systemic and institutional levels. Continuing capacity development in national systems is needed since often well-trained staff are either promoted or transferred. This can be in the form of short-term as well as formal degree courses. The capacity of indigenous and local communities to assess, inventorize and monitor genetic resources and related TK will also have to be developed. At the institutional level, emphasis is needed for the administrative framework; funding and resource management; mechanisms for follow-up, monitoring and assessment; in addition to strengthening policy analysis and capacity. Public awareness and education on agrobiodiversity should start at an



early age with focus on the basic appreciation of genetic resources from their own locations, knowing their value for food, nutrition, health and to humanity. Other points to consider are as follows:

- Several universities in the region currently provide degree courses in plant and animal genetic resources but suffer from low enrolment. There is a need to make the curriculum more innovative and interesting (agrobiodiversity in food, nutrition, health and humanity) to young people and also make it relevant to supporting the extension workers. There is also a need to increase awareness and support through scholarship programs to these genetic resources related degrees and courses.
- The more advanced organizations in the region are currently offering short-term courses on PGR and AnGR management (e.g. RDA, South Korea; Japan NIAS Genebank, Japan; NBPGR, India; CAAS, China) to enhance the capacity of different genebanks in the region. Such courses should be expanded and be made more specialized to cover new tools (e.g. DNA fingerprinting, information technology), approaches (complementary and integrated approach) and strategies. Specific courses that will improve the access of researcher to donors and grant information including better skills to grant writing and producing effective publications are also needed.
- There is a need to lay greater emphasis on public awareness on agrobiodiversity targeting policy makers and consumers, especially in the context of importance of conservation. The importance of underutilized tropical fruit species, crops, vegetables, forages and medicinal plants for food security, nutrition and income generation also needs to be emphasized. The participation of rural communities, the private sector and CSOs in conservation can help in ensuring financial support for national genebanks.
- There is also an urgent need for policy advocacy on agrobiodiversity for the officials involved in developing national policies and international treaties and conventions such as ITPGRFA and CBD.

### ***Enhancing exchange and use of genetic resources***

- Through available options for the multilateral system for PGR exchange using SMTA, especially in those countries that have signed ITPGRFA.
- Empowering the farmers' organizations to participate in decision making related to implementation of farmers' rights as stipulated in the ITPGRFA.
- Enhanced cooperation on plant quarantine issues, including pest risk analysis (PRA) for safe movement and exchange of germplasm.
- Promoting the implementation of the GPA through specific actions at the national and regional levels through policy advocacy, strengthened R&D programmes and the use of NISM-GPA.
- More active facilitating role of APAARI on communications between the Treaty Secretariat and the NARS, and between NARS and policy makers.

### ***Role of stakeholders in strengthening agrobiodiversity conservation and use***

In view of limited funding resources in the region, enhanced collaboration between international and regional agencies, CSOs, the private sector, and regional networks will help in promoting genetic resource conservation and use.

- The proposed emphasis on research relating to genetic resources in the different Consortium Research Programmes should ensure better integration with national plans and regional and global strategies/collaborative frameworks.
- The sub-regional networks on genetic resources will have better sustainability if linked with regional/global organizations such as APAARI, GFAR and FAO with adequate financial support and active facilitation roles of CGIAR centres.
- Regional PGR and crop networks should emphasize on strengthening partnerships for the exchange of genetic resources that benefit users and germplasm providers directly (including wild relatives, neglected and underutilized crops, forest trees and NTFPs).
- Pursue partnership with CSOs and the private sector for more effective public awareness, education and advocacy. Civil society and the private sector can contribute to the development of a more holistic perspective to support agrobiodiversity initiatives in the region. The private sector can also help in generating additional resources, keeping in view corporate social responsibility.

### **Regional Workshop for Implementation of Suwon Agrobiodiversity Framework**

Following-up on the Suwon Agrobiodiversity Framework for Asia-Pacific region, APAARI and Bioversity International jointly organized a regional workshop on 4-6 November, 2011 at Kuala Lumpur, Malaysia. The workshop was supported by APAARI, Global Forum on Agricultural Research (GFAR), Food and Agriculture Organization of the United Nations (FAO), Asian Development Bank (ADB) and Bioversity International. A total of 44 representatives and experts from various NARS (Malaysia, India, Indonesia, the Philippines, Vietnam, Cambodia and China), non-government organizations (Local Initiatives for Biodiversity, Research and Development (LI-BIRD) and Asian NGO Coalition (ANGOC), and international organizations (FAO, International Rice Research Institute-IRRI, Bioversity, World Agroforestry Center-ICARAF, ICRISAT, Crops for the Future-CFF) actively participated in the workshop. APAARI was applauded for its efforts to mainstream regional agrobiodiversity related activities for improved income and food security while reiterating Malaysia's commitment towards developing a national action plan for agrobiodiversity conservation and management.

The program comprised thematic presentations followed by Working Groups discussions. Thematic presentation set the scene for the discussions and guided the participants on the important issues and concepts in the different thematic areas. The Working Group discussions resulted in identification of five areas for developing concept notes. Priority areas included germplasm utilization, crop wild relatives,



*Regional workshop for implementation of Suwon Framework at Kuala Lumpur*

enhancing the use of underutilized species, increased availability to agrobiodiversity and understanding and managing changes in diversity – all leading to the greater call of addressing issues related to gender, poverty, minorities, sustainable agriculture and climate change. These concept notes will be strategically targeted towards specific funding opportunities. The Suwon Agrobiodiversity Framework (Box 20) was adopted in 2010 during the ‘International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity’ held at Suwon, Republic of Korea. It provides a holistic guideline, encompassing the concerns and needs of stakeholders across Asia-Pacific. Reflecting the recognition from the national agricultural research extension systems (NARES) and regional and international organizations on the importance of collective efforts towards the conservation through use of the rapidly declining agricultural biodiversity in the region, the Suwon Agrobiodiversity Framework provides a strategic approach towards the sustainable management and use of agrobiodiversity. It also identifies the areas of research and development and regional collaboration that will help maximise resources and opportunities for more agile response to new and unforeseen developments in understanding diversity and promoting research, conservation, evaluation and documentation through use.

## **Global Consultation on Use and Management of Agrobiodiversity**

A Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security was organized jointly by ICAR and Bioversity International with support from ITPGREFA, FAO, ICRISAT, ICARDA, and APAARI at New Delhi on 12-14 February, 2013. The consultation was attended by 105 participants from 32 countries. The consultation deliberated on five themes: (i) genetic resource conservation strategies at global, regional and national level, (ii) documentation and sharing mechanism for effective use of genetic resources, (iii) collaborative research, capacity building and sharing of expertise, (iv) strategies for implementation of Second Global Plan of Action (GPA), ITPGRFA and Global Research initiative, and (v) conservation and use of animal, fish, micro-organisms and agriculturally important

### Box 20. Suwon Agrobiodiversity Framework

The Suwon Agrobiodiversity Framework aims to provide a strategic approach, towards both management and use through regional collaboration and partnerships among stakeholders. International and regional agencies, civil societies, private sector, and regional networks have a crucial role to play in strengthening agrobiodiversity conservation and use.

#### Focus of Research and Development

- Studies to enhance use of genetic resources through sub-set approach
- Pre-breeding and participatory breeding work to enhance utilization of genetic resources in crop improvement programs
- Strategies and technologies to enhance in situ and ex situ conservation through use
- Assessment of the agrobiodiversity richness and the status relative to economic, social and cultural (traditional knowledge) factors
- Interdisciplinary studies on the invaluable ecosystem services for agriculture that agricultural landscapes, forests and other mainly wild ecosystems provide (following Convention on Biological Diversity (CBD) COP5 Ecosystems Approach)
- Conference of Parties Information systems and tools for data exchange. with the aim to develop or adopt an information facility for online access to a wide range of datasets on

#### Areas of Regional Cooperation

- Developing national agrobiodiversity plans and integrating them into regional and global collaborative frameworks
- Increasing R&D collaboration on agrobiodiversity conservation and use in the region
- Increased sharing of information and data on genebank collections
- Strengthening agrobiodiversity capacity, education and public awareness
- Enhancing exchange and use of genetic resources
- Role of stakeholders in strengthening agro-biodiversity conservation and use genetic resources
- Supportive policies, laws and strategies to enable enhanced exchange and use of genetic resources

insects. The deliberations led to the need for enhancing the capacity and capabilities of national partners through South-South Cooperation and further strengthening of North-South partnership. More details are given in Chapter 8 on “Agricultural Research for Development (AR4D) Programs”.

## **Tsukuba Declaration on Adapting Agriculture to Climate Change**

APAARI and Japan International Research Centre for Agricultural Sciences (JIRCAS) jointly organized a Symposium on ‘Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific’ to develop required framework for reorientation of agricultural research to address specifically issues related to the climate change adaptation and mitigation in crops, livestock, fisheries and agroforestry. The Symposium was held in International Congress Center, Tsukuba, Japan on 21-22 October, 2008 and was co-sponsored by GFAR, CIMMYT, ICARDA, ICRISAT, and AVRDC and attended by 158 participants from 30 countries representing APAARI member NARS, CGIAR, IARCs, GFAR, ACIAR, JIRCAS, ARIs, universities, regional fora, NGOs, FOs, private sector and the donor organizations. The deliberations were conducted in four technical sessions that dealt with research strategies in national and international context, panel discussion on adaptation and mitigation options, followed by plenary session.

- We recognize that the Asia-Pacific region sustains almost half of the global people, with high rates of population growth and poverty. Agriculture continues to play a critical role in terms of employment and livelihood security in all countries of the region. At the same time, this region has the largest concentration of hungry and malnourished people in the world. Droughts, floods, heat waves and cyclones occur regularly. Climate change is likely to raise regional temperatures and lead to decline in fresh water availability, sea level rise, and glacial melting in the Himalayas. We recognize that the IPCC has considered the developing countries of the Asia-Pacific region, especially the megadeltas of Asia as very vulnerable to climate change.
- Attainment of Millennium Development Goals (MDGs), particularly alleviating poverty, assuring food security and environmental sustainability against the background of declining natural resources, together with a changing climate scenario, presents a major challenge to most of the countries in the Asia Pacific region during the 21st century.
- Water is a key constraint in the region for attaining food production targets and will remain so in future as well. Steps are, therefore, needed by all the stakeholders to prioritize enhancing water use efficiency. In addition, measures for water storage using proven approaches such as small on-farm ponds, large reservoirs, groundwater recharge and storage, and watershed approach managed by the farming communities require attention.
- We fully recognize that increasing food production locally will be the best option to reduce poor people’s vulnerability to climate change variations.

Available agricultural technologies can help increase the yield potential of crops that has not yet been tapped in many countries of the Asia-Pacific region. Hence, a concerted effort, backed by policy makers at the national level would be the key to enhance food security as well as ensuring agricultural sustainability.

- New genotypes tolerant to multiple stresses: drought, floods, heat, salinity, pests and diseases, will help further increase food production. This would require substantial breeding and biotechnology (including genetically modified varieties) related efforts based on collection, characterization, conservation and utilization of new genetic resources that have not been studied and used. CGIAR Centers, advanced research institutes (ARIs) and the National agricultural research systems (NARS) of the region have a major role to play in this context. This will require substantial support in terms of institutional infrastructure, human resource capacity and the required political will to take up associated agricultural reforms. We, therefore, fervently call upon the national policy makers, overseas development agency (ODA), other donor communities as well as the Private Sector to increase their funding support for agricultural research for development in the Asia-Pacific region.
- We also recognize that a reliable and timely early warning system of impending climatic risks could help determination of the potential food insecure areas and communities. Such a system could be based on using modern tools of information and space technologies and is especially critical for monitoring cyclones, floods, drought and the movements of insects and pathogens. Advanced research institutions, such as JIRCAS, could take the lead in establishing an 'Advance Center for Agricultural Research and Information on Global Climate Change' for serving the Asia-Pacific region.
- The increasing probability of floods and droughts and other climatic uncertainties may seriously increase the vulnerability of resource-poor farmers of the Asia-Pacific region to global climate change. Policies and institutions are needed that assist in spreading the risk and to provide protection against natural calamities, especially for the small farmers. Weather-crop/livestock insurance, coupled with standardized weather data collection, can greatly help in providing alternative options for adapting agriculture to increased climatic risks.
- Governments of the region should collaborate on priorities to secure effective adaptation and mitigation strategies and their effective implementation through creation of a regional fund for improving climatic services and for effective implementation of weather related risk management programs. Active participation of young professionals is also called for.
- We do recognize that there are several possible approaches to enhance carbon sequestration in the soils of the Asia-Pacific region such as greater adoption of scientific soil and crop management practices, improving degraded lands, enhanced fertilizer use efficiency, and large scale adoption of conservation

agriculture. To be effective, these would require simultaneously improved use of inputs such as fertilizers, crop residues, labour and time. This soil carbon sequestration has the added potential advantage of advancing food security at the national/regional level. We do urge the global community to ensure appropriate pricing of soil carbon and related ecosystem/environmental services in order to motivate the small farmers to adopt new management practices that are linked to proper incentives and rewards.

- APAARI has been instrumental in stimulating regional cooperation for agricultural research in the Asia-Pacific. Global climate change and its implications for agriculture underline the need for such an organization to become even more active at this juncture. APAARI, in collaboration with its stakeholders, especially CGIAR Centers, ARIs, GFAR and other regional fora, should continue facilitating regional collaboration in a Consortium mode and take advantage of new initiatives such as Challenge Program on Climate Change for building required capability to adapt and mitigate the effects of climate change and ensure future sustainability of all concerned in the region.

## **Workshop on Climate-Smart Agriculture in Asia**

A Workshop on Climate-Smart Agriculture in Asia: Research and Development Priorities was jointly organized by Asia-Pacific Association of Agricultural Research Institutions (APAARI), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), World Meteorological Organization (WMO) and the United Nations Development Programme (UNDP) at Bangkok on 11-12 April, 2012.

The workshop was attended by 77 participants, representing chiefs of agricultural research organizations of south and south-east Asian countries, negotiators from the south and south-east Asian countries responsible for discussion on adaptation and mitigation in agriculture in UNFCCC, chiefs of the meteorology departments of south and south-east Asian countries, regional and global agriculture and climate change experts, CGIAR climate change scientists and representatives of regional and global development organizations. The workshop was organized with the following objectives: i) review the best practices and technologies being used to make agriculture climate-smart, ii) review the latest knowledge of impacts of climate change on agriculture, iii) identify gaps in solutions available and prioritize research and development needed to fill these gaps, and iv) agree on a plan to address gaps and link knowledge with policy actions at the local/national/regional level to make agriculture climate-smart. The workshop was structured in different technical sessions: i) climate services to agriculture, adaptation to progressive climate change and mitigation in agriculture, ii) agriculture in UNFCCC, iii) adaptation to climate change, iv) mitigation in agriculture, v) country reports on current state of research and development on climate-smart agriculture, vi) adapting to current weather variability and knowledge to action and policies for climate smart agriculture, vii) adapting to current weather variability, and viii) knowledge to action and policies for climate-smart agriculture.

## Key priorities and recommendations

- Development of adaptation strategies to current weather variability and long-term climate change with co-benefits in mitigation including information and communication technologies, climate models and decision support systems for seasonal forecasts, refining existing technologies for insect-pest and disease management, and breeding multi-stress tolerant varieties of crops, livestock and fish. Renewed focus on conservation and management of resources including water, soil, nutrient, energy and germplasm (including microbial diversity).
- Promotion of regional cooperation including regional learning platforms for transfer of technologies and knowledge of climate-resilient agriculture. Identification of best practices for mitigation of greenhouse gases from agriculture at local, national and regional scales including alternative wetting and drying in rice, diversification, alternate feeding strategies for livestock, grazing land management, and water land use and crop residue management.
- Improvement in credibility, accuracy, timeliness, spatial resolution and relevance of weather forecast systems at short- and medium term time scales. This should be accompanied with improved coordination and knowledge sharing among climate services and agro-meteorological advisory providers including data sharing, and documenting and evaluating case studies of good practices.
- Investment in capacity building of agriculture sector to respond to advanced information about weather events and seasonal climate fluctuations through advisory systems, delivery mechanisms, training, and favourable policies. Strengthening extension services including addressing gender issues and opportunities, and building capacity of tomorrow's farmers through climate-smart field schools, participatory videos, social media and community radio featuring local content and demonstrations, roving seminars, training of trainers, field demonstrations, and private sector participation.
- Documenting innovative institutional arrangements that promote climate-smart agriculture such as pricing for environmental services, carbon payments, index-based insurance, and community management of resources and risks.
- Assessment and documentation of existing knowledge of climate smart agriculture including constraints to adoption, indigenous knowledge, impacts, benefits, costs and productivity gains, and lessons where collaborations (public-public and public-private) are working.
- Assessment of policies in support of climate-smart agriculture including water pricing, fertilizer pricing and subsidies, irrigation, seed, risk transfer (insurance) and disaster relief.



## Bangkok Declaration on Reorienting Agricultural Research for Development in Asia-Pacific Region

### Preamble

Agriculture remains important for economic growth, livelihood and sustenance for majority of the people in the Asia-Pacific region forming about 57 per cent and 73 per cent of the world's total and agricultural population, respectively. The land availability per person is only about one fifth of that in the rest of the world. Research in the agricultural sector led to remarkable achievements in the past to attain food security and reduction in poverty. Agricultural population is dominated by small farm holders, pastoralists, tribals, fishermen and agricultural labourers. However, about 63 per cent (640 million) of the world's hungry and malnourished, 50 per cent (over 660 million) of the world's extreme poor (living on less than US\$ 1/day), and 70 per cent of the world's undernourished children and women live in the Asia-Pacific region. Over the last two years, the number of hungry in the region has increased by about 11 per cent. The Millennium Development Goals, especially to reduce hunger and poverty to half by 2015, are no longer closer to be achieved despite all commitments and on-going efforts. The region is facing stagnation or slow down of productivity growth rates, soaring food prices, increasing energy costs, diversion of area for biofuel production, consequences of the climate change and economic shocks. The problems of the numerous and geographically dispersed small farm holders and other resource poor communities, who form the bulk of agricultural population, still persist: low yields, low returns from farming, and inadequate access to resources and markets. Natural resources, particularly land and water, are becoming scarcer and degraded. Addressing these complex challenges, with opportunities to harness many innovations, now require out of box solutions (technology, institutions, policies, and higher investment). Previous analyses have unequivocally shown that investments in agricultural research had high rates of return both in terms of growth and poverty reduction in the region.



*Regional consultation on AR4D at Bangkok*

A regional consultation process, jointly initiated by the Asia-Pacific Association of Agricultural Research Institutions (APAARI) and Asian Development Bank (ADB), in collaboration with the Global Forum on Agricultural Research (GFAR), to identify priority directions for research in agriculture and natural resource for development in Asia-Pacific has just been completed. The bottom up process involved e-consultations, studies of priority research needs in South Asia, Southeast Asia, China and the Pacific countries, and finally a Face-to-Face meeting of various stakeholders. The Consultation on Agricultural Research for Development (AR4D) in Asia-Pacific was held in Bangkok on 30-31 October, 2009. The outcome of this consultation provided an input to the Global Conference on Agricultural Research for Development (GCARD) to be held in March, 2010 in Montpellier, France. It also contributed to the change management initiative of the Consultative Group on International Agricultural Research (CGIAR). The process as a whole provided a clear focus on the development objectives that contributed to the reform and renewal of agricultural research as well as innovation systems in the region.

The discussions held in the Bangkok meeting involved 75 stakeholders from 17 countries representing APAARI member NARS, CGIAR, GFAR, advanced research institutions (ARIs), universities, non-governmental organizations (NGOs), farmers' organizations, the private sector and the donor organizations. They deliberated on refocusing agricultural research for a development agenda for Asia and the Pacific. The outcome of deliberations led to the adoption of "Bangkok Declaration", which recognizes the urgent need for increasing investments in research, innovative thinking and action for reorientation of our research agenda for achieving sustainable agriculture in the region.

## **Declaration**

- We, the stakeholders of agricultural research for development (AR4D), recognize that the Asia-Pacific region is home to almost half of the global population and has high rates of population growth, poverty, hunger and malnutrition. We also believe that agriculture will continue to play a critical role in terms of employment and livelihood security of small farm holders, pastoralists, tribals, fishermen, landless labourers and all those involved in agricultural value chain. The region is not only rich in diverse natural and genetic resources but also important in being a major supplier of food and agriculture commodities. A profitable, dynamic, sustainable science based agriculture in the region can, therefore, alleviate hunger and poverty and contribute significantly to food and nutrition security.
- While we are determined to free the region from the twin scourges of hunger and poverty, we do realize that along with application of science in agriculture, enabling policies and increased investments in infrastructure will foster new partnerships through innovative institutional arrangements leading to large scale impacts.

- It is evident that invariably governance systems are weak, political commitment is inadequate and a coordinated approach to development addressing the needs of the poor and vulnerable is lacking. In this regard, NARS will need to effectively establish dialogues as well as linkages, and work closely with all other development partners and policy makers to ensure synergy and the desired impact. NARS would, therefore, benefit much from the improved research planning and management, while ensuring the much needed partnership with the small farm holders, private sector and the related civil society organizations (CSOs). In this context, the governments must embrace AR4D as an integral component of national agricultural policy.
- In this Expert Consultation, priority AR4D needs were identified which require increased resources urgently. New investments are essential for integrated natural resource management with focus on land and water issues; socioeconomic and policy research to empower small farm holders to concentrate on productivity enhancement of major food crops as well as lesser-known crops of high economic potential; post-harvest management and value addition; energy security (without compromise on food security); and capacity building, especially skills development including that for research planning, prioritization, impact assessment and poverty mapping. Addressing these needs will ensure resilience to cope with economic shocks and natural disasters, including climate change. The needs and prospects for Atoll Islands in the Pacific are unique and hence be addressed accordingly.
- We also recognize that new approaches are necessary to achieve impact in the priority research areas. These approaches will effectively address the needs of small farm holders, pastoralists, tribals, fishermen and agricultural labourers, and particularly benefit the more vulnerable groups. The new approaches include: farming systems research in the ecosystem framework through need based diversification (livestock, horticulture, fisheries, post-harvest processing and value addition); increased participation involving farmers, NGOs, women and youth; value chain; blending traditional knowledge with modern technologies; community based resource management; extensive use of information and communication technology (ICT) and the establishment of rural knowledge and communication centres for generation, assessment and transfer of new technologies/innovations. Strong public-private-civil society partnerships for providing and delivering transfer of technology (ToT) services and for linking farmers/farmer groups to markets are needed much in the present context.
- Promotion, organization, and strengthening of local, national and regional networks ensuring south-south collaboration is essential to make efficient and effective use of individual country strengths, human capacity, donor support and other available resources.

- We strongly recommend that in order to meet the challenge of hunger and poverty in the region, the current investments in agricultural research in the Asia and Pacific region need to be at least doubled from its current level of about US\$ 10 billion. To attract the required funding from international development community/organizations and the private sector, a firm commitment from every government is needed to raise the level of agricultural GDP from around 0.3 per cent to at least 1.0 per cent. There is an urgency to ensure both long-term (core) funding for continuity, and short-term quick funding by the donor community to meet the new challenges. Business as usual with the current level of investments without clear expected benefits for the resource poor should no longer be acceptable.
- For an effective and efficient use of research funds, there is a clear need for reorientation of agricultural research for a development agenda by the NARS that is demand driven, enhances food and nutrition security, improves livelihoods and takes into account the expected direct benefits to the small farm holders and the poor consumers, and that addresses the key emerging challenges. In order to ensure this, active participation and involvement of resource poor farmers, NGOs and the private sector is called for.
- It is our expectation that the renewed priorities for agricultural research with focus on small farm holders, the poor producers and consumers, with new mechanisms and partnerships elaborated in this declaration, will not only ensure inclusive development at the national and regional level for continuous supply of food and other agricultural commodities, but will also hasten the pace towards achieving the Millennium Development Goals in the Asia- Pacific region.
- We are confident that Asia-Pacific agriculture will liberate the region from hunger, malnutrition and poverty and bridge the widening income divide between farmers and nonfarmers. It must continue to supply its region and the world with food and agricultural commodities. Given the declining land, water and agro-biodiversity resources and the intensifying environmental footprint of agriculture, the task is difficult, but certainly not insurmountable.

## Women and Youth in Agriculture

Women play an important role in agriculture in many parts of the Asia-Pacific region but they are not the part of the mainstream in the development programs. There is, thus, an urgent need for policy reforms, institutional changes and capacity building to empower women in agriculture. Such changes are required to address gender inequalities in the household. Similarly, there is a growing trend that youth are running away from agriculture due to various adverse factors. However, the involvement of youth in agriculture is extremely important to make it vibrant and more responsive to the needs of the people who depend on agriculture. There is a

great need to retain the youth in agriculture through enabling policies providing conducive work environment for the youth.

### **Global Conference on Women in Agriculture**

The first Global Conference on Women in Agriculture (GCWA) was organized on 13-15 March, 2012 by APAARI and ICAR with support from GFAR and co-sponsored by CGIAR, USAID, ACIAR, ADB, World Bank, IDRC, UK Aid, BMFG, TAAS and RAGA. The Conference was attended by 760 participants from 50 countries. The overarching goal of the conference was ‘Empowering Women for Inclusive Growth in Agriculture’ and several useful recommendations emerged. The details of Conference and the recommendations are given in Chapter 8 on “Agricultural Research for Development (AR4D) Programs”.

### **Workshop on Foresight and Future Pathways of Agricultural Research through Involvement of Youth**

The challenges of retaining youth in agriculture are being well recognized globally. During the second Global Conference on Agricultural Research for Development (GCARD2) organized by Global Forum on Agricultural Research (GFAR) at Punta del Este, Uruguay in 2012, the “Youth and Agriculture” was one of the focal discussion points. Empowering youth, developing their capacity, creating awareness on new opportunities in agriculture and involving them in policy planning is the way forward for transitioning rural youth from ‘Job Seekers’ to ‘Job Providers’. The Chair GCARD2 quoted “globally agriculture is an ageing and undervalued profession and youth needs special encouragement in all aspects of AR4D”. As a follow-up action of GCARD2, APAARI, ICAR and Trust for Advancement of Agricultural Sciences (TAAS) jointly organized a national workshop on “Foresight and Future Pathways of Agricultural Research Through Involvement of Youth in India” on 1-2 March, 2013 at NASC Complex, New Delhi. The details of the Workshop and the recommendations are given in Chapter 8 on “Agriculture Research for Development (AR4D) Programs”.

### **Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region**

A Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region was jointly organized by APAARI and PARC, Pakistan on 23-24 October, 2013 at Islamabad. The workshop was co-sponsored by CIMMYT, ICARDA, and ICRISAT. About 150 participants from different countries of Asia-Pacific Region, CGIAR institutes, private sector, farmers and students attended. Of these, over 50 per cent participants were young professionals. The details of the Workshop and major recommendations are given in Chapter 8 on “Agricultural Research for Development (AR4D) Programs”.

## **11** Human Resource Development/ Capacity Building

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**H**uman resource development (HRD)/capacity building is one of the major thrusts of APAARI. Since its inception APAARI has conducted several training programs in different countries in collaboration with national partners on various aspects relating to agricultural research for development including agricultural information management and agricultural biotechnology. The details of training programs organized are given below:

### **Trainings under APCoAB Program**

#### **Training Workshop on Low-cost Gene-based Technologies for MAS Application in Rice and Maize**

A Training Workshop on Low-cost Gene-based Technologies for MAS Application in Rice and Maize was organized in collaboration with IRRI, Generation Challenge Program, CIMMYT and Barwale Foundation at Barwale Knowledge and Study Center, Jalna, India on 25-27 April, 2007. The three-day program comprised lectures and laboratory exercises on PCR-ELISA, Dot Blot, FRET and Microarray-based Genotyping. Special lectures



*Training workshop on low-cost gene-based technologies at Jalna, India*

were delivered by experts on Marker Assisted Plant Breeding: from Publication to Practice, Single Seed-based MAS, Abiotic Stress, Bacterial Blight, and Allele Mining.

#### **International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources**

An International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources, was organized in collaboration with Indian Council of Agricultural Research and Bioversity International at the National Bureau of Plant Genetic Resources, New Delhi from 17-29 November, 2008. The program

comprised lectures and on-hand laboratory exercises on: i) importance of *in vitro* conservation and cryopreservation techniques, ii) methods of *in vitro* clonal propagation, iii) methods of *in vitro* conservation. iv) cryopreservation principles and prospects, v) techniques of cryopreservation, vi) applications of cryopreservation, vii) cryobanking of plant germplasm, and viii) molecular marker techniques for PGR management. The trainees were also introduced to international issues on plant genetic resources during an interactive session with Dr. Raj Paroda, Executive Secretary, Asia-Pacific Association of Agricultural research Institutions (APAARI).

### **Training on Technology for Production and Indexing of Pathogen-Free Citrus Seedlings**

The training program on ‘Technology for Production and Indexing of Pathogen-Free Citrus Seedlings’ was organized in collaboration with Council of Agriculture (COA), Chinese Taipei, at National Taiwan University, Taipei from 18-29 November, 2008. The training comprised lectures, practical demonstrations and field trips on: i) citrus greening and virus diseases, ii) detection and indexing through bioassay, iii) biochemical and molecular methods, iv) shoot-tip Micrografting, and v) plantation and health management of pathogen-free seedlings in orchard.



*Laboratory demonstration on production and indexing of pathogen-free seedlings at Taipei*

### **Training on Molecular Methodologies for Assessing and Applying Genetic Diversity in Crop Plants**

A Training Program on Molecular Methodologies for Assessing and Applying Genetic Diversity in Crop Plants was organized at ICRISAT, Patancheru from 17-28 November, 2008. APAARI nominated trainees participated in this program organized by ICRISAT. The topics comprised: i) introduction to laboratory techniques, ii) molecular markers (SSRs, SNPs, DArTs), iii) diversity array technology (DArT): development and applications, iv) experimental design: concepts and applications, v) decision support system-iMA, iMAS practicals, vi) molecular diversity: diversity analysis in populations, power marker, darwin, introduction to STRUCTURE analysis, vii) phenotyping, viii) molecular breeding, ix) application of molecular markers in public sector, and x) 0. LD mapping and TASSEL software for association mapping.

### **Introductory course in Bioinformatics**

An Introductory Course in Bioinformatics was organized by Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA) and held at Agricultural Genetic Engineering Research Institute, Egypt from 23 November-2 December, 2009. APAARI nominated trainees to this course. The topics of training comprised: i) information databases, ii) sequence alignment, iii) sequence similarity search, iv) multiple sequence alignment, v) structural bioinformatics, and vi) functional genomics.

### **Training Course on Assisted Reproductive Technologies for Livestock Genetic Improvement**

A Training Course on Assisted Reproductive Technologies for Livestock Genetic Improvement was organized at Livestock Research Institute, Tainan, Chinese Taipei, from 24-26 October, 2010. The training comprised lectures by local and international experts on

principles and applications of artificial insemination (AI) in mammalian species, poultry, ducks and geese; embryo transfer and *in vitro* fertilization; nuclear transfer and somatic cell cloning; livestock and poultry genetic diversity; genomic breeding technology; and utilization of animal genetic resources



*Training course on assisted reproductive technologies at Taiwan*

for biomedical research. Demonstrations were held on AI, including equipment and procedures; preparation technology for frozen semen; *in vitro* fertilization; and somatic cell manipulation. The trainees visited local livestock and poultry cooperative farms for gaining firsthand experience on practical application of improvement and rearing practices.

### **International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources: Current Methods and Techniques**

International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources: Current Methods and Techniques, was organized by APAARI, ICAR and Bioversity International at the National Bureau of Plant Genetic Resources, New Delhi from 15-27 November, 2010. The course was attended by 14 participants from eleven countries. Out of these, four participants from Sri Lanka, Chinese Taipei and Iran were sponsored by APAARI/APCoAB. The faculty was drawn from NBPGR and other local organizations, Bioversity International,



APCoAB and Royal Botanic Garden, Kew. The course was organized into 28 lectures and practicals on topics related to *in vitro* conservation and cryopreservation of germplasm of vegetatively propagated and non-orthodox seed species, and use of molecular tools for management and conservation of plant genetic resources. Hands-on training was provided on cryopreservation of non-orthodox seeds like citrus, buds of mulberry and pollen.

### **Training workshop on Edible Mushroom Production for Asian Farmers and Entrepreneurs**

Training Workshop on Edible Mushroom Production for Asian Farmers and Entrepreneurs was organized jointly by APCoAB, Taiwan Agriculture Research Institute (TARI), Taichung, Chinese Taipei, Food and Fertilizer Technology Centre (FFTC), Chinese Taipei and Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) at Taiwan Agricultural Research Institute, Chinese Taipei from 21-27 November, 2010

The training workshop was aimed to equip researchers, government officers and extension workers in the Asia-Pacific region with a working knowledge and share experiences on improved technologies for mushroom production. The curriculum was particularly focused on the importance of eco-friendly resource recycling of agricultural wastes. The course comprised



*Training workshop on edible mushroom production in Chinese Taipei*

lectures on edible and medicinal mushrooms, their cultivation technology, production, nutritional and medicinal value, and market prospects. Practical demonstrations were given on preparation of substrates, tissue isolation and sub-culture, and preservation of cultures. The participants were exposed to on-farm mushroom cultivation and management practices through visits to mushroom farms and interaction with large and small scale growers. The participants also observed cultivation of mushroom as value-added products.

### **Training Course on Rapid Bioassay of Pesticide Residues (RBPR) in Fruits and Vegetables for Market Inspection and Farm Education**

Training course on Rapid Bioassay of Pesticide Residues (RBPR) in Fruits and Vegetables for Market Inspection and Farm Education was organized at Taiwan Agricultural Research Institute, Taichung from 27 June - 1 July, 2011. The course comprised lectures, laboratory demonstrations on qualitative and quantitative RBPR



*Training course on rapid bioassay of pesticide residues at Taichung*

analysis of insecticide residues. Visits to farmer cooperatives and vegetable markets provided first-hand experience of the application of RBPR technology at the field level. The participants also visited the museum of Miaoli District Agricultural Research and Extension Station where they had a glimpse of the history and development of agriculture in the country.

### **International Training Course on *In Vitro* and Cryopreservation for Conservation of Plant Genetic Resources: Current Methods and Techniques**

International Training Course on *In Vitro* and Cryopreservation for Conservation of Plant Genetic Resources: Current Methods and Techniques was organized at National Bureau of Plant Genetic Resources, New Delhi from 14-26 November, 2011. The 13 day training program organized jointly with ICAR and Bioversity International opened with introductory lectures on management of plant genetic resources (PGR), and details of national and international organizations involved in PGR collection and conservation. Lectures on principles and methods of *in vitro* conservation and cryopreservation, genetic stability testing and transboundary movement of vegetative germplasm were delivered by national and international experts. A significant portion of the training period was devoted to hands-on laboratory training on biotechnological techniques of conservation and molecular characterization of germplasm. The trainees were also provided opportunity to present their ongoing research programs and seek suggestions of experts on specific technical issues.

### **International Training Course on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources**

The training course was organized from 17-28 February, 2014 at National Bureau of Plant Genetic Resources (NBPGR), New Delhi in collaboration with Indian Council of Agricultural Research and Bioversity International. Nominees from MARDI, Malaysia; SLCARP, Sri Lanka and DOA, Thailand, besides 13 other national and international trainees,



*International training course on in vitro and cryopreservation techniques at New Delhi*

participated in the course. The course comprised lectures and practical exercises which were conducted by experts from India, United Kingdom and Belgium. The topics included: *in vitro* conservation and cryopreservation of germplasm of vegetatively propagated and non-orthodox seed species and use of molecular tools for plant genetic resources management and conservation of plant genomic resources. Visits to other agricultural research, development and extension centers in Delhi were organized towards the end of training course.

### **Training Program on Analytical Techniques in Nutrition, Food Safety and Biosafety**

APCoAB in collaboration with ICRISAT organized the training program on 1-14 September, 2014 at ICRISAT, India. Eighteen nominees from APAARI member countries and from Africa participated in the program. The training was aimed to enhance knowledge and skills of scientific and senior technical staff from NARS systems on food safety and food safety related issues of genetic modification technology. The program comprised ten modules of classroom lectures and hands-on laboratory exercises, visits to a reputed food testing laboratory and food processing plant in India.



*Training program on analytical technique at Pattancheru, India*

### **Trainings under APARIS Program**

#### **Training workshop on capacity building for developing National Agricultural Information Systems (NAIS) of countries in Asia region**

APAARI organized a training workshop on capacity building for developing National Agricultural Information Systems (NAIS) of Cambodia, Laos, Myanmar, Bhutan, East Timor, Mongolia and Vietnam at AIT, Bangkok from 3-13 August, 2004 in collaboration with GFAR, AIT, FAO, UNESCAP-CAPSA, SDLEARN and JIRCAS/NARO to assist NARS of the above mentioned countries by training their appropriate officers in ICM and building NAIS. There were nine trainee participants



*ICT training workshop for developing NAIS at AIT, Bangkok*

representing the information divisions of their respective NARS. The training was facilitated by fourteen resource speakers from APAARI, FAO RAP, AIT, JIRCAS/NARO, UN-ESCAP, SDLEARN and AgriWatch. During the workshop, trainees were assisted in defining their respective NAIS and in developing prototype websites of their respective NARS as a delivery medium for NAIS. Significant amount of training material, including video-recorded lectures on key topics, were collected and organized in web-based and CD-based formats. This training material will be further developed as an e-Learning tool in collaboration with AAACU, SDLEARN and others for future sub-regional and national training programs under APARIS. Possibilities of using internet-based video conferencing tools to deliver training modules are also being explored as more and more countries are joining APAN (Asia-Pacific Advanced Network). The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), an APAARI initiative, will develop training modules covering subject areas such as agricultural biotechnology and biosafety. Such modules as well as educational materials developed in collaboration with AAACU could also be delivered through APARIS.

### **Training Workshop on Integrating NAIS**

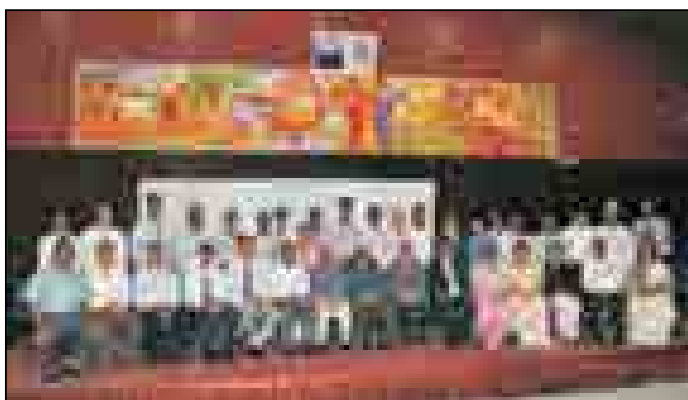
In continuation of APAARI's efforts to build further capacity for improved information exchange and communication in agricultural research in the region, APAARI/APARIS organized a training workshop on Integrating National Agricultural Information Systems (NAIS) at AIT, Bangkok from 1-5 November, 2005. The workshop recommended further development of APARIS integration tools through Regional Agricultural Expert Locators (RAEL) and Regional Agricultural Information Gateway (RAIG) and also developing some success stories on ICT.



*ICT training workshop for developing NAIS*

### **Training Workshop on Coherence in Information for Agricultural Research for Development (CIARD) and Strengthening RAIS in the SAARC Countries**

A three-day training workshop on Coherence in Information for Agricultural Research for Development (CIARD) and Strengthening RAIS in the SAARC Countries was organized jointly by APAARI, SAARC Agriculture Center (SAC), Bangladesh Agricultural Research Council (BARC), FAO and GFAR at Dhaka, Bangladesh on 10-12 May, 2011. The workshop focused on improving capacities for information and communication management among national systems for agricultural research and innovation using concepts, pathways, tools and applications developed and made accessible under the CIARD initiative. Thirty two delegates from SAARC member states, viz., Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and Iran (observer) attended the workshop to share country experiences and actively participated in the group work, hands-on sessions and discussion. A very



*Training workshop on coherence in information at Dhaka, Bangladesh*

important issue that emerged during the workshop was that there is a significant awareness gap in understanding how new Social Media and Web 2.0 tools can be used by the national system in agricultural research, education and extension. A strong need was felt for increased advocacy to policy makers, research managers, and ICM specialists as well as users in the use of these tools and applications.

### **Training Workshop on Open Access Publishing Using Open Journal Systems**

In order to pursue the collective actions identified in the Consultation in Bhutan, the training workshop on Open Access Publishing Using Open Journal Systems was jointly organized by FAO RAP, APAARI and GFAR with technical supports from the International Telecommunication Union (ITU) in Nonthaburi, Thailand on 26-30 August, 2013. Thirteen

participants who involved in editorial/publishing of agricultural research journals from Sri Lanka, Bangladesh, Bhutan and Pakistan attended this hand-on training workshop which aimed to equip the professionals with skills needed to publish agricultural scientific research journals on Open Journal System platform and to improve availability, accessibility, applicability and effective use of research results by wider agricultural community in most cost effective and efficient



*Training program on open access publishing at Nonthaburi, Thailand*

manner with the use of latest information and communication management systems. Recommendations emerged during the plenary session were that there is an urgent need for capacity development of all those involved in editing/publishing a journal so as to manage and operate effectively the available open-source software in order to launch a new generation of journals committed to open access. It is also necessary to promote and have advocacy at the institutional level to have a policy and invest on open access journal.

## **12** Information Dissemination

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APAARI has been quite proactive in its information dissemination program and has already received wide appreciation for its diverse and quality publications. APAARI publications including newsletter, proceedings of conferences/workshops/expert consultations, success stories and status reports are widely circulated, facilitating free flow of information dissemination among member NARS, CG Centers, IARCs, NGOs and other partners including donors. Likewise, specific publications are made available to concerned partners and interested scientists, policy makers, etc. APAARI through its publications promotes public awareness on diverse activities/issues of common national, regional and global interest. The mailing list of about 500 addressees is being maintained with the Secretariat that also keeps APARIS database for information communication technology (ICT), and for agricultural biotechnology, such specific database is being maintained by APCoAB at its New Delhi office and information dissemination through its publications is a part of its regular activity as APAARI program. The details of publications brought out by APAARI are given below:

### **Proceedings of Expert Consultations/Conferences/Workshops**

So far, APAARI has published the proceedings of the 68 expert consultations/conferences/workshops/stakeholder dialogues/meetings. These proceedings provide details of the events including objectives, program structure and major recommendations. These publications are given in chronological order in Annexure VIII.

### **Success Stories on Agriculture and Related Fields**

Over 50 Success Stories on significant agricultural breakthroughs in the Asia-Pacific region have been published, and widely distributed among members and other partners/collaborators. These success stories cover diverse topics and lay emphasis on inter-institutional collaboration in sharing available expertise and technology among member NARS, to boost their agricultural production and development.

#### ***Crops and commodities***

Baby Corn Production in Thailand; Hybrid Rice in China; Hybrid Cotton in India; Palm Oil Industry in Malaysia; Cotton Production in Pakistan; Wheat Production in Iran; Direct-Seeded Rice in Malaysia; Groundnut in China; Oilseeds in India; Lentil Improvement in Bangladesh; Rainbow Trout Culture in Himalayan Kingdom of Nepal; Bt Corn in the Philippines; Bt Cotton in India; Micro-propagation for Production of Quality Potato Seed; Taro Improvement and Development in Papua New Guinea;

Short Duration Mungbean: A New Success in South Asia, Micro-propagation for Production of Quality Banana Planting Material in Asia-Pacific; Jackfruit Improvement in the Asia-Pacific Region; Strengthening of Plant Genetic Resources for Food and Agriculture: Conservation and Utilization in the Pacific, and Wax Apple Industry in Taiwan, etc.

### ***Farming systems***

Transformation in Korean Farming; Tilapia Farming in the Philippines; Bivalve Mariculture in India; Farming of Carrageenophytes in the Philippines; Resource Conservation Technologies: Transforming the Rice-Wheat Systems in the Indo-Gangetic Plains; Cotton-Wheat Production System in South Asia.

### ***Disease / pest management***

Integrated Pest Management in Rice in Indonesia; Classical Biological Control of Agricultural Pests in India; New Cattle Disease in Village Chickens; Production and Cultivation of Virus-free Citrus Saplings for Citrus Rehabilitation in Taiwan.

### ***Other topics***

Dairying in India; Sustaining the Green Revolution in India; Orchids in Thailand; Agro-Tourism in Australia; Linking Farmers to Market: Some Success Stories from Asia-Pacific Region; Biosafety Regulations of Asia-Pacific Countries; Diversity in Agricultural Research Resources in the Asia-Pacific Region: Agricultural Science and Technology Indicators Initiative; Success Stories on ICT/ICM in AR4D in Asia and the Pacific Region; Information and Communication Technologies / Management in Agricultural Research for Development in the Asia-Pacific Region; Biofuel Growers Market Network and Agricultural Information and Knowledge for All, and ITC e-Choupal: Innovation for Large Scale Rural Transformation - A Success Story etc.

## **Status Reports**

- Two sub-regional reports on South and South-East Asia were brought out. These present case studies reflecting organization and management, and growth and development of NARS.
- Regional Synthesis Report on PGR conservation and use undertaken on behalf of the FAO, provides a good synthesis of information on plant genetic resources utilization and conservation in Asia and the Pacific. Also, APAARI has been associated in organizing the Asia-Pacific Regional Consultation on PGR in New Delhi in 1996 and publication of its proceedings which were brought out jointly by IPGRI, FAO and APAARI.
- APAARI published in 1999 a synthesis report on NARS' organization and management vis-à-vis agricultural R&D scenario in the Asia-Pacific, including the collaborative efforts of the regional networks. It still serves as an information-base on APAARI member NARS, their set-up and R&D activities.



## APAARI Newsletter

Two issues of APAARI newsletter are published during June and December each year, providing information on research and development related matters in agriculture. Institutes' profiles etc. (Annexure IX) in national, regional and global context; highlighting salient activities of NARS, APAARI and other partners. The Newsletter is disseminated widely and serves as an excellent institutional and public awareness material. Starting 1992, a total of 45 issues have been published till date and widely disseminated for the benefit of the diverse stakeholders.

## Directories of NARS institutions

Two regional directories for South and South-East Asia have been published. Those for East Asia and the Pacific and Oceania are in progress. Also, such information is being synthesized for regional agricultural information system and institutes/centers on agricultural biotechnology. These database documents provide to member NARS, useful contacts for exchange of information. Further information on CD on the NARS through APARIS has been updated.

The types of publications and the detailed list of publications brought out by APAARI are given in Box 21 and Annexure, respectively.

### Box 21. APAARI Publications

- Newsletter
- Success Stories
- Proceedings: Expert Consultations/Workshop/Conferences
- Case Studies: Agricultural Research Systems
- Regional Directories: NARS Institutions
- Perspective Plan
- APAARI Vision 2025
- Special Publications/Synthesis on Thematic Topics
- Agricultural Research Priorities for the Asia-Pacific Region
- ICT in ARD: Status and Progress in the Asia-Pacific Region
- Specific Case Studies in Agricultural Biotechnology
- Micro-propagation Techniques, GM Technology Applications
- Biotechnology Case Studies in the Pacific
- APAARI Brochure; APCoAB Flyer
- APAARI on CD, APAARI/APARIS/APCoAB Posters

## APAARI on CD

All APAARI publications and reports have been put in electronic format on a user-friendly interactive CD (named APAARI on CD) and updated and distributed to APAARI members and other international organizations and participants of various meetings organized by APAARI.

## APAARI Website

APAARI launched its new website ([www.apaari.org](http://www.apaari.org)) in August, 2009 with a new design user friendly informations and navigational options. The website is being regularly updated with APAARI's news and activities, and general events of specific interest on agricultural research and development in Asia-Pacific region. APAARI reports and proceedings have all been uploaded on the website for free access. Other contents and database were also updated regularly. Besides, APAARI's account on Facebook has also been created to widen communication channels and to capture the views of young professionals.



APAARI Website provides access to more than 50 success stories and status reports, 45 issues of APAARI Newsletter, and more than 60 proceedings of expert consultations/conferences/workshops/dialogues.

The website provides links to NARS in Asia and the Pacific region, partners like ACIAR, FAO, CGIAR, GFAR, AARINENA, FARA, CACAARI and directories such as research networks, projects database, ASTI databases, regional research networks etc. The website is being updated on regular basis with upcoming events, activities completed and latest publications with introduction of discussion forum, RSS feed Web 2.0 and social networking tools for dissemination of agricultural research information efficiently.

To improve effective dissemination of information, APAARI has been implementing a communication strategy in phased manner.

## APAARI Website Usage

APAARI website <http://www.apaari.org> was set up to provide access to information on several in-house activities and internet information resources for APAARI stakeholders and AR4D professionals. Besides access to all APAARI publications; for

example, expert consultations, success stories and reports, the website was developed with linkages to various national, regional and international institutions, networks and other relevant organizations. The month-wise summary of usage of website during April, 2013 - March, 2014 is given in Table 2.

The statistics report on the website usage showed that, the website was receiving more than 1.6 million hits from April 2013 to March 2014. It's very interesting to see that among total number of visits for 109,366 times; more than a half were unique visitors. It indicates that while there were regular visitors, the website also attracted new users. On average, the number of pages that visitors accessed while visiting the site were 7 pages per visit.

**Table 2.** Summary by month (April 2013-March 2014)

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Apr 2013	2,739	4,323	20,931	53,821	7.08 GB
May 2013	6,369	10,606	118,107	192,832	18.00 GB
Jun 2013	8,545	13,886	111,755	191,708	18.04 GB
Jul 2013	5,615	10,043	101,846	185,562	19.74 GB
Aug 2013	5,762	9,824	60,739	133,453	17.83 GB
Sep 2013	5,128	8,460	41,648	115,993	21.83 GB
Oct 2013	4,307	7,448	41,075	114,607	28.32 GB
Nov 2013	6,091	9,719	51,379	119,098	17.77 GB
Dec 2013	5,368	9,159	54,462	115,843	15.23 GB
Jan 2014	4,896	8,618	69,995	134,033	15.66 GB
Feb 2014	4,999	8,359	75,808	140,329	13.71 GB
Mar 2014	5,029	8,921	35,126	116,325	16.86 GB
<b>Total</b>	<b>64,848</b>	<b>109,366</b>	<b>782,871</b>	<b>1,613,604</b>	<b>210.07 GB</b>

The website usage during 2012-2014 is given in Fig. 3. The statistics report on the website usage during January 2012 to October 2014, exhibited that APAARI website gets higher traffic yearly. Number of page hits increases from 1.01 million hits in 2012 to 1.38 million hits in 2014 (as at 14 October, 2014). The highest traffic period is at middle of the year when APAARI activities are usually organized and announcement on upcoming event/new publications are updated on the website.

APAARI website attracted visitors from many countries, mainly the countries from Russian Federation, Europe and Asia as shown in Table 3. Top ten downloads on the website is presented in the Table 4. It was found that Success Stories which

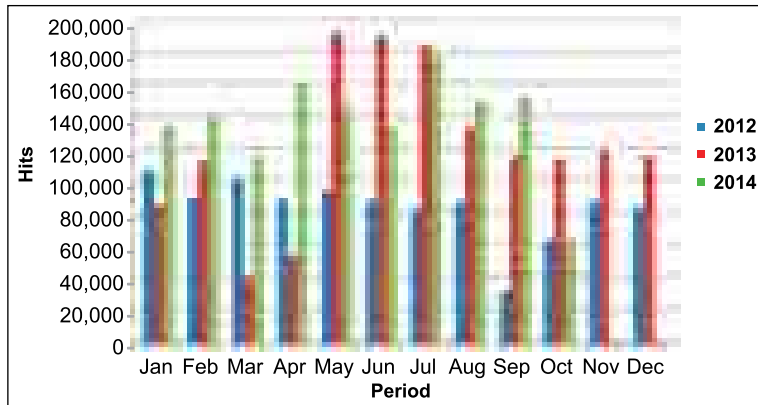


Fig. 3. APAARI website usage 2012-2014

Table 3. Top 25 website user countries

Country	2012	2013	2014
Russian Federation	110,000	120,000	150,000
Turkey	85,000	80,000	80,000
China Republic	80,000	87,000	240,000
United States	80,000	130,000	10,000
France	70,000	40,000	1,000
Germany	70,000	20,000	70,000
India	20,000	200,000	20,000
Thailand	20,000	60,000	20,000
Canada	20,000	20,000	2,000
China	15,000	30,000	2,000
Germany	10,000	10,000	20,000
Japan	8,000	10,000	1,000
South Korea	8,000	10,000	20,000
Republic of Serbia	8,000	8,000	10,000
Poland	8,000	10,000	1,000
Colombia	8,000	8,000	10,000
Great Britain	8,000	20,000	1,000
USA	8,000	8,000	40,000
Spain	8,000	8,000	20,000
Indonesia	8,000	8,000	20,000
Malaysia	8,000	8,000	20,000
South Africa	8,000	8,000	20,000
Italy	8,000	8,000	20,000
China	8,000	8,000	20,000
France	8,000	8,000	20,000

**Table 4.** Top ten publications downloaded

No.	Downloaded publications	Hits	206 Hits	Bandwidth	Average size
1.	Jackfruit Improvement in the Asia-Pacific Region: A Status Report	4,043	29,183	15.14 GB	477.87 KB
2.	Linking Farmers to Market: Some Success Stories from Asia-Pacific Region	2,922	15,735	5.99 GB	336.88 KB
3.	Sustaining The Green Revolution In India: A Success Story of Wheat	2,352	28,562	5.94 GB	201.54 KB
4.	Some Success Stories in Classical Biological Control of Agricultural Pests in India	2,020	19,849	3.26 GB	156.54 KB
5.	Towards a Food Secure India and South Asia: Making Hunger History	1,530	6,861	733.34 MB	89.49 KB
6.	Selected Success Stories on Agricultural Information Systems	1,521	10,108	1.50 GB	135.65 KB
7.	Bt Cotton in India: A status report	1,473	2,706	3.05 GB	765.67 KB
8.	Short Duration Mungbean: A New Success in South Asia	1,039	2,670	5.76 GB	1.59 MB
9.	Biosafety Regulations of Asia-Pacific Countries	965	2,759	714.25 MB	196.40 KB
10.	Improving Wheat Productivity in Asia	912	15,431	2.97 GB	190.68 KB

highlight the best practices of agricultural development in many countries from the Asia Pacific region and status reports received high interests. Besides, collections of APAARI publications were uploaded on the website for free access.

## APAARI Contact Database

Under the implementation of APAARI Communication Strategy 2010-2015, APAARI launched Contact Database on its website. It helps to search contact details of APAARI Members by sub-region, country, category, area of activity etc., and allows downloading of contact information. NARS and National Information Nodal Points (NINPs) are welcome to register



in this platform and add contacts of their constituencies. The design of databases on ARD Experts and ARD Projects was also completed and it was demonstrated in the Eleventh Meeting of APARIS Steering Committee held on 13 October, 2012. The database platforms are available at APAARI website: <http://www.apaari.org/ard-database/> The database development is progressing by adding more information on experts and projects.

APCoAB website ([www.apcoab.org](http://www.apcoab.org)) provides information on APCoAB organization, objectives, activities, and news and events on agricultural biotechnology. It provides access to APCoAB publications comprising success stories, status reports and proceedings of expert consultation and other group meetings. Databases of agricultural biotechnology institutions in Asia-Pacific and biosafety regulations of Asia-Pacific countries are also available at this website. These resources are updated on regular basis and all stakeholders are being kept fully apprised of new developments.

## 13 Future Thrusts

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The foregoing account highlights the growth and development of APAARI and its role as a neutral forum. The progress achieved during the past 22 years since its establishment has been synthesized under different activities as per its 'Perspective Plan', 'Vision 2025' and 'Bangkok Declaration' priorities assigned focusing on agricultural research for development in the Asia-Pacific region. Keeping in view the achievements made and concerns exhibited through the strengths, weaknesses, opportunities and threats (SWOT) analysis of AR4D in the region and also of APAARI, and research gaps identified in the consultations subsequently organized to deliberate on these issues, APAARI activities were diversified accordingly. The emerging needs also necessitate some flexibility to address such concerns while implementing its vision/action plan. The future AR4D thrusts by APAARI will focus on further strengthening its activities as follows:

### **Strengthening NARS**

There is wide disparity across countries in the size, strength and capability of NARS, which seemed to have grown rapidly over the past two decades. Some efforts have been made to reflect this on conceptual basis (Box 14). APAARI needs to continue its efforts in partnership with NARS to assess and prioritize their needs keeping in view emerging challenges. Some of these priorities are: (i) there is an urgent need to Addressing needs of the weaker NARS. The weaker NARS invariably suffer from inadequate institutional support, manpower, and financial resources. An in-depth analysis will be required further using sub-regional status reports/documents, as for them the needs would vary. APAARI will continue to play an active facilitator's role to build their scientific and technical capabilities. (ii) there is a need to identify/strengthen Centers of Excellence for capacity building among developed NARS. The stronger and well developed NARS as well as CG Centers and some Advanced Research Institutions can serve as knowledge-base centers to facilitate capacity development activities at sub-regional/regional level. The resource capacity and training/teaching facilities will need to be upgraded further to serve better technical and scientific manpower. This can be facilitated by APAARI through existing collaboration and additional donor support. The regional directory of agricultural institutions with their database, should list such specific institutions, particularly those specializing in ICT / ICM, post-harvest technology (PHT), agricultural biotechnology, molecular biology, genebank management, livestock management, aquaculture, conservation agriculture, etc.

### **Strengthening regional cooperation/partnership.**

APAARI has been instrumental in providing thrust to R&D activities of NARS through increased linkages with national, international and regional organizations/ fora, etc. The focus has been to make accessible to NARS, the technological advances / research innovations achieved by CGIAR centers/ARI's/IARCs, etc. As APAARI activities and programs get further diversified due to changing needs, research partnerships and collaboration has to be strengthened, while keeping in view the need for strengthening both APARIS and APCoAB. The partnership with CGIAR Centers, FAO, GFAR, ACIAR, CoA, etc. has proved quite effective in implementing APAARI Vision 2025 in a collaborative mode, particularly in areas of biotechnology, information management, capacity building and policy advocacy. There is specific need for promoting post-harvest technology and linking farmers to market. Also, APAARI has to be proactive in meeting the concerns of CGIAR Research Programs (CRPs) to meet the MDGs. Further, APAARI has a pivotal role to play in advocating and facilitating technical and organizational support from IARCs and explore possibilities of funding support from FAO, IFAD, UNDP, UNEP, IDRC, CABI, GEF, World Bank, Global Crop Diversity Trust, ADB, JIRCAS, SDC, BMZ/ GTZ, USAID, Aus-AID, DFID, and also that from the private sector.

### **Enlarging membership base**

APAARI strength has significantly grown during the past decade, increasing its membership to 56 including Regular NARS members (20), Associate members - CGIAR Centers/IARC's, ARCs (16), Affiliate members (10), and Reciprocal members (10). There are some small and large countries as well as some regional and international organizations who are still not members of APAARI. APAARI will strive to approach these countries/organizations for membership: (i) NARS from the region as members: New Zealand, China, Vanuatu, Solomon Islands, Indonesia, Cambodia, Laos, Myanmar (ii) International/regional organizations as associate/affiliate/reciprocal members: CIRAD, ISAAA, SPC, ASEAN, GCHERA, SEARCA, APIRAS, AFA, BRAC, etc.

### **Strengthening AR4D agenda**

In pursuance of its goals, APAARI's activities/programs will focus on ICT/ICM through APARIS and for agricultural biotechnology through APCoAB. Similar thrust for additional regional programs such as 'Linking Farmers to Markets (LFM)', possibly in collaboration with GFAR, IFPRI and FAO will be needed. More focus will have to be laid on policy issues related to WTO aspects, IPR, CBD, ITPGRFA, and biodiversity conservation and use, and genebank management with increased collaboration with Bioversity International, IFPRI and other regional organizations like ASEAN, SAARC etc. Further cooperation with CGIAR Centers/IARCs, FAO, GFAR, and ACIAR is envisaged, as also support of ADB, and GEF. APAARI's overall emphasis is on AR4D for regional needs, keeping in view the special concerns of implementing GCARD Road Map, CGIAR SRF and CRPs and regional priorities of NARS to achieve food, nutrition and environmental security in Asia-Pacific.



### **Strengthening collaboration with regional/sub-regional fora**

Greater concern has been exhibited in strengthening linkages with other regional fora/associations to discuss both sub-regional and regional activities through networking. APAARI has already made a headway in promoting strong inter-regional collaboration with AARINENA, CACAARI, EFARD, FARA, FORAGRO. Seeking interface with such fora will be beneficial as problem faced and benefits of experiences gained can be shared for mutual benefit as many of the national / regional AR4D concerns are common. APAARI plans to develop activities with APAFRI, NACA and APHCA to cover the sectors of forestry, fisheries and livestock. Also, strengthening collaboration and linkages with sub-regional organizations like SPC, SAARC, ASEAN, SEARCA, CAPSA, TAP, APIRAS and APAEON will be pursued more seriously.

### **Revitalizing the research networks**

APAARI is much concerned with the sustainability of regional and crop networks such as CLAN, RWC, GOFAR, UTFANET, SANPGR, EA-PGR, RESEA-PGR, PAPGREN, COGENT, BAPNET, TAMNET, INCANA, TFNet, etc. Most of these networks have become non-functional due to lack of resources and commitment of network partners. Since these networks served a very useful purpose, there is a strong need to revitalize them for the benefit of NARS and other stakeholders. APAARI proposes to frame some guidelines on which networks can be supported in future. A comprehensive database on networks in which APARIS is engaged, as an ongoing activity, would assist in information dissemination, thereby promoting research and development. Periodic assessment on various agricultural R&D networks in the region and their impact would be useful for future planning. New Networks on LFM, NRM, Livestock, Agroforestry need to be established.

### **HRD/capacity building**

This aspect still needs high priority to meet the increasing needs of NARS at sub-regional/regional level, in view of advanced research and technological development in diverse fields. Besides sharing of information, imparting practical knowledge is much more necessary, for which the training requirements would vary for weaker NARS, and even for further capacity building of stronger NARS. Some priority areas requiring HRD/capacity building are ICT, agricultural biotechnology, aquaculture, molecular biology, post-harvest technology, conservation biology and seed/plant health care. APAARI needs to facilitate/support such programs in collaboration with international and regional centers, and for such activities there is need to identify nodal NARS/specialized Institutes/Centers of Excellence.

### **Partnership with private sector**

In order to achieve the foregoing AR4D programs, particularly to plan activities in promoting applications of agricultural biotechnology in the Asia-Pacific countries, a much bigger role of the private sector is envisaged. APAARI will further facilitate

establishing links between R&D institutions in the public and the private sector and the NGOs. Increased public-private sector involvement will help in faster outscaling of innovations and joint collaboration in research as well as capacity building. APAARI could successfully initiate Public-Private Partnership (PPP) through APCoAB initiative. These partnerships need to be extended to areas such as natural resource management, integrated pest management, molecular biology, advanced plant breeding, and post-harvest technology.

### **Information and communication technology (ICT)**

Application of new information and communication technologies is being facilitated by APAARI on high priority. Further, strengthening will be needed for knowledge dissemination through faster information flows among the stakeholders having access to ICT. Considering the existing gaps and NARS needs, APARIS will further endeavour to facilitate the establishment/ improvement of homepages and link them with the APAARI website. Upgrading of the current APAARI website to function as a regional portal assumes priority as a continuing activity. Also, e-Conferences (or even video conferencing) could be hosted at the APAARI website to promote policy awareness on IPR, CBD, biodiversity, biotechnology, and related new areas. APAARI has also to get linked to global information systems (EGFAR, CIRAD ring, WAICENT). Also, directories of agricultural research institutions in the Asia-Pacific region should be updated and maintained on the web preferably in a decentralized manner with responsibility of each NARS to update its own directory. There are a number of such directories already present on the web such as AROW, WISARD, to which APAARI could link and its member NARS could feed the database. This would be more effective in its linkage to the global knowledge system. Further, networking through e-mail and internet connectivity would enable APAARI members to have access to the best possible knowledge, information and technologies. APAARI has so far published over 50 Success Stories based on significant achievements of different NARS in the region. More such success stories will be published for the benefit of other NARS/Stakeholders. APAARI through APARIS eventually needs to establish some sub-regional NARS centers to be identified as ICT Regional Centers of Excellence where, apart from the above, HRD activity could be initiated, as also, specialized institutions for capacity building of NARS in the application of GIS technology. Finally, ICT may even be used to address community development activities in order to meet the needs of the rural poor/smallholder farmers.

APAARI, since its establishment, had very effective partnership and continued support of several international organizations such as FAO/FAO RAP, ACIAR, GFAR, CGIAR/IARCs and JIRCAS. More recently, for several of APAARI activities, particularly in promoting new sciences, co-funding was diversified to include private sector as well. Thus, international support to NARS is critical in areas such as ICT/ICM, agricultural biotechnology, natural resource management (including NRM and IPM approaches), post-harvest technology and social science. It is also important to

recognize the changing scenario between the public and private research, participatory research, the increasing role of information in technology transfer to farmers with stronger research/agri-business/extension/farmer to market links. These areas require substantial institutional strengthening and capacity building. APAARI has a pivotal role for coordinating emerging needs of NARS and in advocating and facilitating technical and organizational support from IARCs, FAO, GFAR and donor support from IFAD, World Bank, ADB, UNDP, several bilateral donors and the private sector. In this context, APAARI is equally concerned about raising its professional staff strength to match its program-activities, and to prepare specific proposals for consideration of donors to support AR4D activities in the region.

Sustainable agriculture and rural development will remain crucial in the region in the foreseeable future. Modern science should provide a stimulus to agricultural transformation and socio-economic development. This challenge has to be effectively addressed by the NARS in the region with much stronger commitment.

Overall, APAARI's achievements as a neutral forum have been very impressive. Its impact and visibility at the national, regional and global level is well recognized. The future strategy as enumerated above, is to implement plans embraced in APAARI Vision 2025 and Bangkok Declaration (2010) to harness agricultural research for development for NARS' benefit vis-à-vis general welfare of the farmers. APAARI shall continue to serve its member NARS as it strives for more meaningful partnership with its stakeholders.

## 14 Epilogue

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APAARI established in 1990 has emerged as a vibrant, self-sustaining, proactive and dynamic regional forum that fosters closer linkages among NARS, CGIAR Centers, FAO, GFAR, ACIAR, JIRCAS and other regional and international organizations, and several NGOs in the Asia-Pacific region. APAARI's activities as per its mission and objectives are based on its strategies for implementing Vision 2025 and Bangkok Declaration. It has periodically refined its priorities at national, sub-regional and regional level, and diversified its activities considerably to meet the emerging needs of NARS. APAARI has achieved significant milestones during the past 22 years and continues to play an important facilitator's role in moving forward the AR4D agenda in the region.

This publication presents a synthesis of APAARI activities – a retrospective of its achievements over the past more than two decades tracing its growth and development. APAARI has made significant contributions. It has played the role of a trust-builder among NARS and enhanced partnership and cooperation for agricultural research for development. Its overall emphasis on strengthening collaboration through research networks, policy advocacy, capacity building and knowledge sharing (through publication of success stories) has indeed been commendable. Further, its new initiatives on Asia-Pacific Agricultural Research Information System (APARIS) and Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) have also contributed significantly in accelerating the pace of ICT/ICM activities and promoting application of agricultural biotechnology, respectively.

APAARI has always kept track of recent developments in agricultural science vis-à-vis changed agricultural scenario, and based on NARS and regional needs, has been organizing expert consultations, conferences, workshops, brainstorming sessions and dialogues on thematic issues, and coming out with suitable recommendations and solutions to address emerging problems. It has further strengthened inter-NARS and NARS-CG Centers/IRCs collaboration and developed stronger partnerships with private sector, particularly in the field of seed technology and agricultural biotechnology.

APAARI has a very impressive record of bringing out diverse publications, of which, its success stories on different topics for technology dissemination and adoption among NARS, need special mention. So far, more than 50 such success stories have been published. Its six-monthly newsletter and proceedings of conferences/workshops/expert consultations had been extremely useful in sharing knowledge

with NARS partners and other stakeholders on diverse emerging issues. Other publications relate to regional directories, special status reports providing regional perspective on regional agricultural research systems, ICT/ICM, and plant genetic resources. All these publications have effectively catalyzed NARS in strengthening their AR4D programs.

APAARI, through its strategies/priorities and action plan, has focused on promoting NARS capability through collaboration and networking (facilitating/promoting crop commodity networks) involving diverse stakeholders.

Based on its Strategic Plan, Vision 2025 and Bangkok Declaration, APAARI envisages promoting additional programs on climate change, post-harvest technology/linking farmers to markets (LFM), livestock development, and natural resource management. It is also concerned about the increasing needs of less developed and weaker NARS for human resource development. Its growing membership and diversification among its partners provides collective knowledge-base. APAARI is quite aware of utilizing these regional assets to harness agricultural science for a better future, in conformity with the Millennium Development Goals (MDGs), to address poverty reduction, food and nutrition security, and thereby contributing to better livelihood of resource poor farmers in Asia-Pacific region.

## APAARI Executive Committees (1991-2014)

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### Executive Committee for 1991-1992

Chairman	: Dr. Md. Yusof bin Hashim	MARDI	Malaysia
Vice-Chairman	: Dr. Keith W. Steele	MOPI	New Zealand
Members	: Prof. W. Lianzheng	CAAS	China
	Mr. C.R. Mahapatra	ICAR	India
	Dr. Maripaz I. Perez	PCARRD	Philippines
	Mr. Tubuola Tavita	MCFF	Western Samoa
Executive Secretary	: Dr. R.B. Singh	APAARI	Bangkok

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### Executive Committee for 1993-1994

Chairman	: Dr. Young Sang Kim	RDA	Korea
Vice-Chairman	: Mr. Balthasar M. Wayi	NARI	PNG
Members	: Prof. Wang Lianzheng	CAAS	China
	Dr. Zafar Altaf	PARC	Pakistan
	Dr. William D. Dar	PCARRD	Philippines
	Mr. Montri Rumakom	DoA	Thailand
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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### Executive Committee for 1995-1996

Chairman	: Dr. William D. Dar	PCAARRD	Philippines
Vice-Chairman	: Mr. Abbas Keshavarz	AREEO	Iran
Members	: Dr. Md. Sharif Bin Ahmad	MARDI	Malaysia
	Dr. Shiva Bahadur Nepali	NARC	Nepal
	Dr. Young Sang Kim	RDA	Rep. of Korea
	Dr. S.T. Semisi	MCFF	Western Samoa
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 1997-1998**

Chairman	: Dr. M. Akbar	PARC	Pakistan
Vice-Chairman	: Dr. Nobuyoshi Maeno	JIRCAS	Japan
Members	: Dr. Z. Karim	BARC	Bangladesh
	Dr. Ananta Doladom	DoA	Thailand
	Mr. J. Kumar	MoA&PI	Fiji
	Dr. William D. Dar	PCARRD	Philippines
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 1999-2000**

Chairman	: Dr. Ian Bevege	ACIAR	Australia
Vice-Chairman	: Dr. Ananta Dalodom	DoA	Thailand
Members	: Dr. Seong-Hee Lee	RDA	Rep. of Korea
	Dr. K.A. Malik	PARC	Pakistan
	Dr. R.D. Ghodake	NARI	PNG
	Dr. D. Kirtisinghe	CARP	Sri Lanka
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2001-2002**

Chairman	: Dr. Dhruv Joshi	NARC	Nepal
	Dr. R.P. Sapkota	NARC	Nepal
Vice-Chairman	: Mr. J. Kumar	MoA&PI	Fiji
Members	: Dr. M. Nurul Alam	BARC	Bangladesh
	Dr. Patricio S. Faylon	PCARRD	Philippines
	Dr. S.H. Anang	MARDI	Malaysia
	Dr. Ian Bevege	ACIAR	Australia
	Dr. Robert Clements	ACIAR	Australia
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2003-2004**

Chairman	: Dr. Mutsuo Iwamoto	JIRCAS	Japan
	Dr. Shinobu Inanaga	JIRCAS	Japan
Vice-Chairman	: Dr. M. Nurul Alam	BARC	Bangladesh
Members	: Dr. R.P. Sapkota	NARC	Nepal
	Mr. S. Charnnarongkul	DOA	Thailand
	Dr. T. Mennesson	IAC	New Caledonia
	Dr. Nguyen Van Bo	VAAS	Vietnam
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2005-2006**

Chairman	: Dr. H.P.M. Gunasena	CARP	Sri Lanka
Vice-Chairman	: Dr. T. Mennesson	IAC	New Caledonia
Members	: Dr. Shinobu Inanaga	JIRCAS	Japan
	Dr. Badaruddin Soomro	PARC	Pakistan
	Dr. M.E. Tusneem	PARC	Pakistan
	Mr. Nicomedes P. Eleazar	BAR	Philippines
	Mr. Luke Ratuvuki	MoA&PI	Fiji
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2007-2008**

Chairman	: Dr. Raghunath Ghodake	NARI	PNG
Vice-Chairman	: Dr. Abdul Shukor Abd Rahman	MARDI	Malaysia
Members	: Prof. Rohan Rajapakse	CARP	Sri Lanka
	Mr. Philip Tuivavalagai	MAF	Samoa
	Dr. Mangala Rai	ICAR	India
	Dr. Wen-Deh Chen	CoA	Chinese Taipei
	Mr. Raul Montemayor	IFAP	Philippines
	Dr. William Dar	CGIAR	India
	Dr. Mark Holderness	GFAR	Italy
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2009-2010**

Chairman	: Dr. Abdul Shukor Abd Rahman	MARDI	Malaysia
Vice-Chairman	: Dr. S. Ayyappan	ICAR	India
Members	: Dr. Raghunath Ghodake	NARI	PNG
	Mr. Mason Smith	MoA & PI	Fiji
	Mr. Somchai Charnnarongkul	DOA	Thailand
	Dr. Wais Kabir	BARC	Bangladesh
	Mr. Raul Montemayor	IFAP	Philippines
	Dr. Robert S. Zeigler	CGIAR-IRRI	Philippines
	Fr. Antonio Francisco Lucas	NAARAP-ANGOC	Philippines
	Dr. Mark Holderness	GFAR	Italy
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2011-2012**

Chairman	: Dr. S. Ayyappan	ICAR	India
Vice-Chairman	: Mr. Mason Smith	MoA & PI	Fiji
Members	: Dr. Abdul Shukor Abd Rahman	MARDI	Malaysia
	Dr. Simon Hearn	ACIAR	Australia
	Ms. Susan Chang	CoA	Chinese Taipei
	Dr. Tashi Samdup	CoRRB	Bhutan
	Mr. Raul Montemayor	IFAP	Philippines
	Dr. Colin Chartres	IWMI	Sri Lanka
	Fr. Francisco Lucas	NAARAP	Philippines
	Dr. Mark Holderness	GFAR	Italy
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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**Executive Committee for 2013-2014**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chairman	: Dr. Masa Iwanaga	JIRCAS	Japan
Members	: Dr. S. Ayyappan	ICAR	India
	Dr. Iftikhar Ahmad	PARC	Pakistan
	Dr. Cho Myoung-rae	RDA	Rep. of Korea
	Mr. Misa Konelio	MAFFM	Samoa
	Dr. Mark Holderness	GFAR	Italy
	Dr. Thomas Lumpkin	CIMMYT	Mexico
	Ms. Esther Penunia	AFA	Philippines
	Dr. Mahabub Hossain	BRAC	Bangladesh
Executive Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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## **APAARI Membership Representing Diverse Partners - National, Regional, International Members**

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### **NARS Members**

#### ***West Asia***

- Agricultural Research and Education Organization (AREO), Tehran, Iran

#### ***South Asia***

- Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh
- Indian Council of Agricultural Research (ICAR), New Delhi, India
- Nepal Agricultural Research Council (NARC), Kathmandu, Nepal
- Pakistan Agricultural Research Council (PARC), Islamabad, Pakistan
- Sri Lanka Council for Agricultural Research Policy (SLCARP), Colombo, Sri Lanka
- Council for RNR Research of Bhutan (CoRRB), Ministry of Agriculture and Forests, Thimpu, Bhutan

#### ***South-East Asia***

- Malaysian Agricultural Research and Development Institute (MARDI), Kuala Lumpur, Malaysia
- Department of Agriculture (DoA), Bangkok, Thailand
- Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), Los Baños, the Philippines
- Bureau of Agricultural Research (BAR), Diliman, Quezon City, the Philippines
- Ministry of Agriculture and Rural Development (MARD), Hanoi, Vietnam

### ***East Asia***

- Japan International Research Center for Agricultural Sciences (JIRCAS), Tsukuba, Japan
- Rural Development Administration (RDA), Suwon, Republic of Korea
- Council of Agriculture (CoA), Executive Yuan, Chinese Taipei

### ***Pacific Island Countries & Oceania***

- Australian Center for International Agricultural Research (ACIAR), Canberra, Australia
- National Agricultural Research Institute (NARI), Lae Morobe, Papua New Guinea
- Koroniva Research Station, Ministry of Agriculture, Forestry and Fisheries (MAFF), Suva, Fiji
- Ministry of Commerce, Forests and Fisheries (MCFF), Apia, Samoa
- Institut Agronomique Neo-Caledonien (IAC), Paita Nouvelle- Caledonie, New Caledonia

### **Associate Members**

- SAARC Agriculture Centre (SAC), BARC Complex, Farm Gate, Dhaka, Bangladesh
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India
- World Agroforestry Centre, United Nations Avenue, Nairobi, Kenya
- Indian Agricultural Universities Association (IAUA) New Delhi, India\
- Bioversity International, Rome, Italy
- International Livestock Research Institute (ILRI), Nairobi, Kenya
- The World Fish Center, Penang, Malaysia
- International Maize and Wheat Improvement Center (CIMMYT), Mexico
- International Rice Research Institute (IRRI), Los Banos, Philippines
- University of Technology, Department of Agriculture, Lae Morobe, Papua New Guinea
- International Water Management Institute (IWMI), Colombo, Sri Lanka
- International Centre for Agricultural Research in the Dry Areas (ICARDA), Beirut, Lebanon
- AVRDC- The World Vegetable Center, Tainan, Chinese Taipei
- CABI, Oxfordshire, London, United Kingdom
- International Food Policy Research Institute (IFPRI), Washington, USA
- Sam Higginbottom Institute of Agriculture, Technology and Sciences (formerly Allahabad Agricultural Institute), Allahabad, India

## Affiliate Members

- Agriculture Research Institute of Afghanistan (ARIA), Ministry of Agriculture, Irrigation & Livestock, Kabul, Afghanistan
- Anand Agricultural University, Anand, Gujarat, India
- Navsari Agricultural University, Navsari, Gujarat, India
- Central Agricultural University, Imphal, Arunachal Pradesh, India
- CSK Himachal Pradesh Krishi Vishvavidyalaya, Kangra, Himachal Pradesh, India
- Universiti Putra Malaysia, Selangor, Kuala Lumpur, Malaysia
- The University of Nottingham Malaysia, Kuala Lumpur, Malaysia
- Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA); Bogor, Indonesia
- University of Agricultural Sciences, Bangalore, Karnataka, India
- Birsa Agricultural University, Ranchi, Jharkhand, India

## Reciprocal Members

- Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA), Amman, Jordan
- Asia-Pacific Association of Forestry Research Institutions (APAFRI), Selangor, Malaysia
- Asian Institute of Technology (AIT), Bangkok, Thailand
- The Asia & Pacific Seed Association (APSA), Bangkok, Thailand
- Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI), Tashkent, Uzbekistan
- Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, Thailand
- Secretariat of the Pacific Community (SPC), Suva, Fiji
- Forum for Agricultural Research in Africa (FARA), Accra, Ghana
- Asian Farmers' Association for Sustainable Rural Development (AFA), Quezon City, Philippines
- Bangladesh Rural Advisory Council (BRAC), Dhaka, Bangladesh

## APARIS Steering Committees (2004-2014)

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### Steering Committee for 2002

Vice-Chairman

Chairman	: Dr. Heather Briggs	ACIAR	Australia
Vice-Chairman	: Dr. Anwar Ali Chaudhry	PARC	Pakistan
Member	: Ms. Delia P.A. Delfino	PCAARD	Philippines

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### Steering Committee for 2003

Chairman	: Dr. Raj Paroda	APAARI	India
Vice-Chairman	: Dr. A. Tanvir	PARC	Pakistan
Members	: Dr. P. Faylon	PCAARD	Philippines
	Dr. J. Giovannetti	GFAR	Rome
	Dr. M. Hazelman	FAO	Rome
	Dr. Gajendra Singh	AIT	Bangkok
	Dr. A. Maru	ISNAR	Amsterdam
	Dr. A.K. Jain	ICAR	India
	Mr. B.S. Basnet	NARC	Nepal
Member Secretary	: Dr. Sahdev Singh	APAARI	Bangkok

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### Steering Committee for 2004

Chairman	: Dr. Seishi Ninomiya	JIRCAS	Japan
Vice-Chairman	: Dr. Ashraf Tanvir	PARC	Pakistan
Members	: Dr. Malcolm Hazelman	FAO	Rome
	Dr. Ajit Maru	GFAR	Rome
	Dr. Raj Paroda	APAARI	Bangkok
Member Secretary	: Dr. Sahdev Singh	APAARI	Bangkok

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**Steering Committee for 2008**


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Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chairman	: Dr. Ajit Maru	GFAR	Rome
Members	: Dr. Raghunath Ghodake	NARI	Papua New Guinea
	Dr. Nanda Pd Shrestha	NARC	Nepal
	Ms. Luz Fimalino	PCARRD	Philippines
	Dr. Malcolm Hazelman	FAO	Rome
	Dr. Raj Paroda	APAARI	Bangkok
Member Secretary	: Dr. Sahdev Singh	APAARI	Bangkok

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**Steering Committee for 2009**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chairman	: Dr. Ajit Maru	GFAR	Rome
Members	: Dr. Abd Shukor bin Abd Rahman	MARDI	Malaysia
	Dr. Bhartendu Mishra	NARC	Nepal
	Ms. Luz Fimalino	PCARRD	Philippines
	Dr. Fifrtik Fr Blrrdvhsuert	FAO	Rome
	Dr. Jonathan Shaw	AIT	Bangkok
	Dr. Raj Paroda	APAARI	Bangkok
	Dr. P.K. Saha	APAARI	Bangkok
Member Secretary	: Dr. S. Attaluri	APAARI	Bangkok

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**Steering Committee for 2010**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chairman	: Dr. Ajit Maru	GFAR	Rome
Members	: Dr. Malcolm Hazelman	FAO	Rome
	Dr. Bhartendu Mishra	NARC	Nepal
	Ms. Fazle Karim	AIT	Bangkok
	Dr. Raj Paroda	APAARI	Bangkok
	Dr. P.K. Saha	APAARI	Bangkok
Member Secretary	: Dr. S. Attaluri	APAARI	Bangkok

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### **Steering Committee for 2011**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chairman	: Dr. Ajit Maru	GFAR	Rome
Members	: Dr. Malcolm Hazelman	FAO	Rome
	Mrs. Rosna Amir	MARDI	Malaysia
	Ms. Fazle Karim	AIT	Bangkok
	Mr. Ricaredo V. Manzanilla	PCAARRD	Philippines
	Dr. Raj Paroda	APAARI	Bangkok
Member Secretary	: Dr. S. Attaluri	APAARI	Bangkok

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### **Steering Committee for 2012-13**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Vice-Chair	: Dr. Ajit Maru	GFAR	Rome
Members	: Dr. Malcolm Hazelman	FAO	Rome
	Dr. Raj Paroda	APAARI	Bangkok
Member Secretary	: Dr. S. Attaluri	APAARI	Bangkok

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### **Steering Committee for 2014**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Members	: Dr. Dr. Raghunath Ghodake	NARI	Papua New Guinea
	Dr. Jonathan Shaw	AIT	Bangkok
	Dr. Kevin Gallagher	FAO	Rome
	Dr. Raj Paroda	APAARI	Bangkok
Member Secretary	: Ms. Chanerin Maneechansook	APAARI	Bangkok

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## APCoAB Steering Committees (2004-2014)

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### Steering Committee for 2004

Chairman	: Dr. Matsuo Iwamoto	JIRCAS	Japan
Members	: Dr. Somchai Channarongkul	DOA	Thailand
	Dr. Mangala Rai	ICAR	India
	Dr. Malcolm Hazelman	FAO-RAP	Thailand
	Dr. William D. Dar	ICRISAT	India
	Dr. Ola Smith	GFAR	Italy
	Dr. Rendy Hautea	ISAAA	Philippines
	Dr. Eric Johnson	Monsanto	Singapore
	Mr. Roel Ravanera	ANGOC	Philippines
Secretary	: Dr. Raj Paroda	APAARI	Bangkok

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### Steering Committee for 2005 -2006

Chairman	: Prof. H.P.M. Gunasena	APAARI	Sri Lanka
Members	Dr. William D. Dar	ICRISAT	India
	Dr. Mangala Rai	ICAR	India
	Dr. Somchai Channarongkul	DOA	Thailand
	Dr. Ola Smith	GFAR	Italy
	Dr. Malcom Hazelman	FAO-RAP	Thailand
	Dr Eric Johnson	Monsanto	Singapore
	Dr Randy A. Hautea	ISAAA	Philippines
	Dr. Raj Paroda	APAARI	Bangkok
Secretary	: Dr. R.K. Arora	APCoAB	India

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### Steering Committee for 2007-2008

Chairman	: Dr. Raghunath Ghodake	APAARI	PNG
Members	: Dr. Raj Paroda	APAARI	Bangkok
	Dr. Mangala Rai	ICAR	India
	Dr. William D. Dar	ICRISAT	India
	Dr. Adisak Sreesunpagit	DOA	Thailand
	Mr. Malcolm Hazelman	FAO-RAP	Thailand
	Dr. Raju Barwale	Mahyco	India
	Dr. Abdelmajid Slama	GFAR	Italy
	Dr. Randy A. Hautea	ISAAA	Philippines
Secretary	: Dr. J.L. Karihaloo	APCoAB	India

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### Steering Committee for 2009-2010

Chairman	: Dr. Abd Shukor Abd. Rahman	APAARI & MARDI	Malaysia
Members	: Mr. Thierry Mennesson	IANC	New Caledonia
	Mr. Malcolm Hazelman	FAO-RAP	Thailand
	Dr. Randy A. Hautea	ISAAA	Philippines
	Dr. Raj Paroda	APAARI	Bangkok
	Mr. Md. Harun-ur-Rashid	BARC	Bangladesh
	Dr. Mark Holderness	GFAR	Italy
	Dr. William D. Dar	ICRISAT	India
	Mr. Raju Barwale	Mahyco	India
Secretary	: Dr. J.L. Karihaloo	APCoAB	India

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### Steering Committee for 2011-2012

Chairman	: Dr. S. Ayyappan	ICAR	India
Members	: Dr. Simon Hearn	ACIAR	Australia
	Dr. Su-San Chang	COA	Chinese Taipei
	Dr. William D. Dar	ICRISAT	India
	Dr. Malcolm Hazelman	FAO RAP	Thailand
	Mr. Raju Barwale	MAHYCO	India
	Dr. Raj Paroda	APAARI	Bangkok
Secretary	: Dr. J.L. Karihaloo	APCoAB	India

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**Steering Committee for 2013-2014**

Chairman	: Dr. Simon Hearn	ACIAR	Australia
Members	: Dr. Masa Iwanaga	JIRCAS	Japan
	Dr. Su-San Chang/	COA	Chinese Taipei
	Dr. Kuei-son Sheu	COA	Chinese Taipei
	Dr. William D. Dar	ICRISAT	India
	Dr. Iftikhar Ahmad	PARC	Pakistan
	Dr. Raj Paroda	APAARI	Bangkok
Secretary	: Dr. J.L. Karihaloo	APCoAB	India

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## Workshops/Conferences/Expert Consultations Organized in Collaboration with CGIAR Centers and Other International Organizations

<b>S. No.</b>	<b>Name of the Event</b>	<b>Place/Date</b>	<b>Organized/ Co-sponsored by</b>
1.	Asia-Pacific Global Partnership Program on Linking Farmers to Markets	6-7 June, 2006	GFAR, FAO, JIRCAS, Nuhem Seeds
2.	Workshop on 'Biosafety Regulations for Transgenic Crops and the Need for Harmonizing them in the Asia-Pacific Region	Patancheru, India, 31 July - 2 August 2006	APCoAB, ICRISAT
3.	Sensitization and Awareness Building Workshop on Information and Communication Technologies and Management (ICT/ICM)	Manila, Philippines, 30 August, 2007	GFAR, PCARRD
4.	Expert Consultation to Review Progress of Agricultural Research Networks and Consortia in Asia-Pacific	Hyderabad, India, 8-9 October 2007	ICAR, ICRISAT
5.	Symposium on Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific	Tsukuba, Japan, 21-22 October 2008	GFAR, CIMMYT, ICARDA, ICRISAT, AVRDC
6.	Technical Workshop on Development and De-centralized Management of ARD Information Resources	Bangkok, Thailand, 19-20 April 2008	GFAR, ACIAR

Workshops Organized in Collaboration with International Organizations

<b>S. No.</b>	<b>Name of the Event</b>	<b>Place/Date</b>	<b>Organized/ Co-sponsored by</b>
7.	Five-day Workshop on “International Consultation on Agricultural Research for Development and Innovation: Addressing Emerging Challenges and Exploiting Opportunities through Information and Communication Technologies”	7-11 December, 2009	GFAR, FAO and ICRISAT
8.	Workshop on ICT/ICM got National Agricultural Research Information Systems	AIT, Thailand, 14-16 September, 2010	AIT, FAO, GFAR
9.	International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region	Suwon, Republic of Korea, 13-15 October, 2010	Biodiversity International, RDA, IRRI, ICRISAT, CIMMYT, ICARDA, GFAR, FAO, ILRI
10.	Regional Consultation Workshop on Supporting Southern-European Alliances/ Platforms on ARD	16-17 March, 2011	AIT, SEARCA
11.	Workshop on Information and Communications Management for Agricultural Innovation in Southeast Asia	Bangkok, Thailand, 27-29 September, 2011	FAO, GFAR and AIT
12.	Regional Dialogue on Conservation Agriculture	New Delhi, India, 1-2 November, 2011	CIMMYT, ICAR
13.	Regional Workshop for Implementation of Suwon Agrobiodiversity	Kuala Lumpur, Malaysia, 4-6 November, 2011	Bioersity International, GFAR, FAO, ADB,
14.	Special Session on “Openness in Agricultural Information and Knowledge Sharing	New Delhi, India, 10 November 2011	ISEE, ICAR, GFAR, FAO, TAAS, MSEE, NAAS, Alcorn State University, Iowa State University

<b>S. No.</b>	<b>Name of the Event</b>	<b>Place/Date</b>	<b>Organized/ Co-sponsored by</b>
15.	Workshop on Moving Beyond Strategy to Improve Information and Knowledge Management for Agricultural Development in the Pacific Islands Countries and Territories	Nadi, Fiji Islands, 21-24 November, 2011	FAO, GFAR, ACIAR, SPC
16.	Workshop on Agricultural R&D in the Asia-Pacific Region: The Need to Monitor Investments, Capacities and Institutional Changes	Bangkok, Thailand, 16-17 February, 2012	ASTI, IFPRI
17.	First Global Conference on Women in Agriculture (GCWA)	New Delhi, India, 13-15 March, 2012	ICAR, GFAR, CGIAR, USAID, ACIAR, ADB, World Bank, IDRC, BMGF, UK Aid, TAAS and RAGA
18.	Workshop on Climate-Smart Agriculture in Asia: Research and Development Priorities	Bangkok, Thailand, 11-12 April, 2012	CCAFS, WMO, UNDP
19.	Regional Consultation on “Collective Actions for Opening Access to Agricultural Information and Knowledge in the Asia-Pacific Region”	Thimpu, Bhutan, 13-15 December, 2012	FAO, GFAR, CoRRB, ICS and SAARC Agriculture Center
20.	Regional Consultation on Improving Wheat Productivity in Asia	Bangkok, Thailand, 26-27 April, 2012	FAO, CIMMYT, ICARDA and JIRCAS
21.	Stakeholders’ Dialogue on Biosafety Regulations in the Asia-Pacific Region	Bangkok, Thailand, 16-17 April, 2013	FAO
22.	Global Consultation on Use and Management of Agrobiodiversity for Sustainable Food Security	New Delhi, India, 12-14 February, 2013	ICAR, Bioversity International, ITPGREFA, FAO, ICRISAT, ICARDA

Workshops Organized in Collaboration with International Organizations

S. No.	Name of the Event	Place/Date	Organized/ Co-sponsored by
23.	Regional Workshop on Youth and Agriculture: Challenges and Opportunities in Asia-Pacific Region	Islamabad, Pakistan, 23-24 October, 2013	PARC, CIMMYT, ICARDA, ICRISAT
24.	NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia	Islamabad, Pakistan, 22 October, 2013	PARC, CIMMYT, ICARDA, ICRISAT
25.	Expert Consultation on Promotion of Medicinal and Aromatic Plants	Bangkok, Thailand, 2-3 December, 2013	FAO

## Workshops/Conferences/Expert Consultations Organized in Collaboration with NARS

S. No.	Name of the Event	Place/Date	Organized/ co-sponsored by
1.	Expert Consultation on Agricultural Innovations: Linking Farmers to Markets	New Delhi, India, 6-7 November, 2006	ICAR
2.	National Dialogue on Farmer-led Innovations towards Plant Variety Improvement and Conservation : Protecting Farmers' Rights	New Delhi, India, 12-13 November, 2006	ICAR, TAAS, PPVFRA, APEDA
3.	Brainstorming Session on Models of Public-Private Partnership	New Delhi, India, 7 April, 2007	TAAS
4.	Expert Consultation on Agricultural Biotechnology for Promoting Food Security in Developing Countries	Kuala Lumpur, Malaysia, 20-22 August 2008	MARDI
5.	Sensitization and Awareness Building Workshop on Information and Communication Technologies and Management (ICT/ICM)	Manila, Philippines, 30 August, 2007	PCARRD, GFAR
6.	Expert Consultation on Biopesticides and Biofertilizers	Taichung, Chinese Taipei, 27-29 October, 2009	CoA
7.	Expert Consultation Meeting on Post-harvest and Value Addition of Horticultural Produce	Kuala Lumpur, Malaysia, 29 November- 2 December, 2010	MARDI
8.	Regional Consultation Workshop on Supporting Southern-European Alliances/ Platforms on ARD	16-17 March 2011	AIT, SEARCA

<b>S. No.</b>	<b>Name of the Event</b>	<b>Place/Date</b>	<b>Organized/ co-sponsored by</b>
9.	Stakeholders' Interface on GM Food Crops	New Delhi, India, 19 May, 2011	TAAS
10.	Workshop on Information and Communications Management for Agricultural Innovation in Southeast Asia	Bangkok, Thailand, 27-29 September, 2011	AIT, FAO, GFAR
11.	Expert Consultation on Agricultural Biotechnology, Biosafety and Biosecurity	Taichung, Chinese Taipei, 27-28 October 2011	TARI
12.	Special Session on "Openness in Agricultural Information and Knowledge Sharing	New Delhi, India, 10 November 2011	ICAR, ISEE, GFAR, FAO, TAAS, MSEE, NAAS, Alcorn State University, Iowa State University
13.	Stakeholders' Interface on Genetically Modified Crops	Manila, the Philippines, 27 September, 2012	PCAARRD
14.	Expert Consultation on Managing Trans-Boundary Diseases of Agricultural Importance	New Delhi, India, 10-12 October 2012	ICAR
15.	National Workshop on Foresight and Future Pathways of Agricultural Research Through Involvement of Youth in India	New Delhi, India, 1-2 March, 2013	ICAR, TAAS
16.	Asian Food and Agribusiness Conference 2013: Biotechnology and Global Competitiveness	Taipei, Chinese Taipei, 15-18 July, 2013	APCoAB, CoA
17.	National Workshop on Outscaling Farm Innovation	New Delhi, India, 3-5 September, 2013	TAAS, ICAR, GFAR, HKA, BKS, PPV&FRA, NRAA
18.	Asia-Pacific Symposium on Molecular Breeding	Tainan, Chinese Taipei, 1-3 October, 2013	APCoAB, CoA, AVRDC
19.	Brainstorming Session on 'Enabling Regulatory Framework and Procedures for Promoting Agricultural Biotechnology in the Philippines	Los Baños, Philippines, 19 November 2003	PCARRD



## CSOs Participation in APAARI Workshops/Expert Consultations/Meetings (2002-2014)

Topic	Place/Date	Participating Organization
Expert Consultation on the Status of Biotechnology	Bangkok, Thailand, 21-23 March, 2002	ANGOC-SEA (Philippines), Gene Campaign (India), Forum on Biotechnology and Food Security (India)
Expert Consultation on Strengthening Regional Information Systems and Regional Networks	Bangkok, Thailand, 1-4 December, 2003	Indian Society of Agribusiness Professionals (ISAP/AgriWatch (India)
Research Needs Assessment and Agricultural Research Priorities for South and West Asia	Hyderabad, India, 7-8 October, 2004	Perumahan Tanjung Mas Raya (Indonesia), Federation of Free Farmers Coops. Inc. (Philippines), Federation of Farmers Association (India), BAIF Development Research Foundation (India), M.S. Swaminathan Research Foundation (India), INREM Foundation (India), Biostadt M.S. Seeds Ltd. (India)
Expert Consultation on Post-harvest Technologies	Bangkok, Thailand, 1-3 December, 2004	ITDG (Bangladesh), ASFARNET (Indonesia), Federation of Free Farmers (Philippines), ANGOC (Philippines)
Research Needs Assessment in South-East Asia	Los Baños, Laguna, Philippines, 27-28 October, 2005	ANGOC-SEA (Philippines), Biotechnology Coalition of the Philippines (BCP), ANGAT Farmers Association (Philippines)
High Level Policy Dialogue on Biotechnology	Bangkok, Thailand, 7-9 November, 2005	Farmers Forum in India, South Asia Rural Reconstruction Association (SARRA, India)

<b>Topic</b>	<b>Place/Date</b>	<b>Participating Organization</b>
Roundtable Meeting on the Implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)	Bangkok, Thailand, 10 November, 2005	South Asia Rural Reconstruction Association (SARRA, India)
Meeting of Regional Ad hoc Working Group on Linking Farmers to Markets	Bangkok, Thailand, 6-7 June, 2006	Federation of Free Farmers Coops, Inc. (FFF-Philippines), IFAP Asian Committee, Cooperative League of Thailand (CLT), VREDESEI-LANDEN- VECO (Indonesia)
Regional Synthesis of Research Needs	Bangkok, Thailand, 18-19 August, 2006	Federation of Free Farmers Coops, Inc (FFF-Philippines), IFAP Asian Committee, Cooperative League of Thailand (CLT), Agricultural Cooperative Federation of Thailand (ACFT), ANGOC-SEA (Philippines), Sakeaw Organic Association (Thailand)
Expert Consultation on Agricultural Innovations: Linking Farmers to Market	New Delhi, India, 6-7 November, 2006	Prolinnova Coordinator, (Cambodia), Farmers' Forum (India), Indonesian Farmers Society Organization (WAMTI) (Indonesia), Sakeaw Organic Association (Thailand), Maharlika Farmers Cooperative (Philippines)
Symposium on Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific	Tsukuba, Japan, 21-22 October, 2008	Krishi Gobeshona Foundation (Bangladesh)
Expert Consultation on Agricultural Research for Development in Asia and the Pacific - The Way Forward	Bangkok, Thailand, 30-31 October, 2009	Farmer (India), Devarao Shivaram Trust (India), South Asia Rural Reconstruction Association (SARRA), (India), IFAP Asian Farmer's Committee (India), IFFCO Foundation (India), NGO Federation of Nepal (Nepal), Asian NGO Coalition for Agrarian Reform & Rural Development (Philippines), Samoa Farmers's Association (Samoa)

<b>Topic</b>	<b>Place/Date</b>	<b>Participating Organization</b>
International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region	Suwon, Republic of Korea, 13-15 October, 2010	Navara Eco Farm (India) NGO Federation of Nepal (Nepal)
Expert Consultation on Agricultural Biotechnology, Biosafety and Biosecurity	Chinese Taipei, 27-28 October, 2011	Gene Campaign (India)
Fifth World Congress on Conservation Agriculture	Brisbane, Australia 26-29 September, 2011	Society for Conservation of Natural Resources and Empowering Rural Youth
Regional Dialogue on Conservation Agriculture in South Asia	New Delhi, India, 1-2 November, 2011	Farmers (India), Institute of Himalayan Research and Education (India), Dasmesh Mechanical Works (India), Seed Grower Association (India)
Global Conference on Women in Agriculture	New Delhi, India 13-15 March, 2012	AFA (Philippines), African Agricultural Technology Foundation (AATF) (Kenya), MS Swaminathan Research Foundation (MSSRF) (India), Food Basket Foundation (Nigeria), Self Employed Women's Association (SEWA) (India), NGO Federation of Nepal (Nepal), Gene Campaign (India), Dhan Foundation (India)
Regional Consultation on Improving Wheat Productivity in Asia	Bangkok, Thailand, 26-27 April, 2012	Institute of Himalayan Wheat Research and Education (India), Farmer (Bangladesh), Farmer (Nepal), Society for Conservation of Natural Resource and Empowering Rural Youth (India), Bangladesh Rural Advancement Committee (BRAC), Bangladesh
National Workshop on Outscaling Farm Innovations	New Delhi, India, 3-5 September, 2013	Farmer (India), Navara Eco Farm (India), JSS Rural Development Foundation (India), Bharat Krishak Samaj (India)

CSOs Participation in APAARI Workshops/Expert Consultations

<b>Topic</b>	<b>Place/Date</b>	<b>Participating Organization</b>
Regional Workshop on Youth and Agriculture: Challenges and Opportunities	Islamabad, Pakistan, 23-24 October, 2013	Society for Conservation of Natural Resources and Empowering Rural Youth (India), Bharat Krishak Samaj (India), Bangladesh Rural Advancement Committee (BRAC), Bangladesh
Expert Consultation on Strengthening Linkages between Research and Extension	Bangkok, Thailand, 11-12 December, 2013	Institute of Himalayan Wheat Research and Education (India) Farmer (India), Bangladesh Rural Advancement Committee (BRAC), Bangladesh

## **APAARI Participation in Workshops/Expert Consultations/Meetings Organized by Other Organizations/Fora**

- Expert Consultation on the Sustainability of Rice-Wheat Production System in Different Aroo-Ecological Setting in Asia at Bangkok, Thailand on 6-9 July 1993
- Regional Expert Consultation on the Asian Soybean Network at Bangkok, Thailand on 20-26 February 1994
- Expert Consultation on the Research Priority-Setting by the National Agricultural Research Systems (NARS) in the Asia-Pacific Region at New Delhi, India on 25-26 November 1996
- Expert Consultation on Management and Strengthening of Regional Research Networks in the Asia-Pacific Region at Tehran, Iran on 19-21 October 1997
- International Training Course on Management and Utilization of Fodder Trees/Shrubs in Subtropical and Temperate Himalaya at Jhansi on 22-30 September 1997
- Workshop on National Concern for Agrobiodiversity at Shimla on 15-16 October 1997
- India-CIMMYT Day at New delhi, India on 12-14 April 1998
- The 4th Steering Committee Meeting of the Network on Underutilized Tropical Fruites in Asia (UTFANET) at Bangkok, Thailand on 23-24 April 1998
- South Asia Network on Plant Genetic Resources (SANPGR) Meeting at NARC, Nepal on 1-3 September 1998
- The 4th Indian Agricultural Science Congress Deliberates on Sustainable Agricultural export at Jaipur, India on 21-24 February 1999
- The 2nd Annual Meeting of the CORRA at Suwon, Republic of Korea on 16 October 1998
- GFAR Conference on Agricultural Research for Development at Dresden, Germany on 21-23 May 2000
- International Conference on Managing Natural Resources for Sustainable Agricultural Production in the 21st Century at New Delhi, India on 14-18 February 2000

- The 5th Annual Meeting of the Council for Partnership on Rice Research in Asia (CORRA) at Bangkok, Thailand on 10-11 November 2001
- The International Conference on the Development of Agricultural Information Management, Technology and Markets in the 21st Century at Beijing, China on 4-6 November 2001.
- The 2nd International Workshop on Lentil Improvement in South Asia at Kathmandu on 24-28 February 2003
- The 2nd Regional Fora Executive Secretaries Meeting on 15-16 May, 2004
- The Second Meeting of Interregional Cotton Network for Central Asia and North Africa (INCANA) at Tashkent, Uzbekistan on 6-8 September 2004.
- National Workshop on Role of Information Communication Technology in Taking Scientific Knowledge/Technologies to the End Users at IARI, New Delhi on 10-11 January 2005,
- Meeting of the Global Consortium for Higher Education and Research in Agriculture (GCHERA) on 12-15 September 2005 in Hangzhou, the People Republic of China
- The Eighth Cereals and Legumes Asia Network (CLAN) Steering Committee Meeting at the Central Luzon State University (CLSU), Science City of Munoz, Nueva Ecija, Philippines on 4-6 November 2005
- The 17th Governing Council Meeting of the Network of Aquaculture Centers in Asia-Pacific (NACA) at Tehran on 25 to 28 February 2006
- GFAR Steering Committee meeting and AARINENA General Conference on 23- 27 June 2006 in Sana'a Yemen
- The 28th FAO Regional Conference for Asia and the Pacific at Jakarta, Indonesia on 15-19 May 2006
- The second meeting of Central Asia and Caucasus (CAC) on Regional Agricultural Information System (RAIS) at Tashkent, Uzbekistan on January 15-16-2007
- The 9th Steering Committee of Cereals and Legumes Asia Network (CLAN) at ICRISAT, Patancheru on 10th October 2007
- The 4th Steering Committee meeting of the European Research Area – Agricultural Research for Development (ERA ARD) at Maribor Slovenia on October 2-3, 2007
- GFAR Steering Committee Meeting at Montvedio, Uruguay on 31 July 2008
- Stakeholders Consultation at Los Banos, Philippines on 7-9 September 2008
- The 10th Anniversary Celebrations at Tashkent on 16th October, 2008
- GFAR Steering Committee Meeting at Maputo on 27-29th November 2008
- The 6th meeting of the Board of Directors of the Global Horticultural Initiative (GlobalHort) on 12-13 November, 2009 at Bangkok

- The first Global Conference on Agricultural Research for Development (GCARD) on 28-31 March, 2010 at Montpellier, France
- ICARDA Regional Coordination Meeting for South Asia & China at New Delhi on 12-14 December, 2009
- International Conference on Food Security and Climate Change in Dry Areas at Amman, Jordan on 1-4 February, 2010
- International Workshop on Fast Growing Economies' Role in Global Agricultural Research for Development at Beijing, People's Republic of China on 8-10 February, 2010
- FAO International Technical Conference on "Agricultural Biotechnologies in Developing Countries: Options and Opportunities in Crops, Forestry, Livestock, Fisheries and Agro-industry to face the Challenges of Food Insecurity and Climate Change" at Guadalajara, Mexico on 1-4 March, 2010
- The Sixth Coordination Meeting of Convention on Biological Diversity (CBD) on Biosafety Capacity Building at Siem Reap, Cambodia on 1-3 February, 2010
- Implementation Workshop on Measuring and Analyzing Agricultural R&D Investment and Capacity Trends in South Asia at Bangkok, Thailand on 29-30 April, 2010
- ADB-FAO-IFAD Investment Forum for Food Security in Asia and the Pacific at Manila, Philippines on 7-9 July, 2010
- Workshop to Develop CGIAR Megaprogram 4 on Agriculture for Improved Nutrition and Health at Addis Ababa, Ethiopia on 29-30 July, 2010
- Management Team Meeting of GFAR at Rome on 28 March, 2011
- Brainstorming Session on Biosafety Assurance for GM Foods in India organized by National Academy of Agricultural Sciences at New Delhi on 22 June, 2011
- International Roundtable Conference on Biotech Crops organized by The Energy and Research Institute, New Delhi on 4-5 July 2011.
- Regional Consultation Workshop on Supporting Southern-European Alliances/ Platforms on ARD organized at Asian Institute of Technology, Bangkok on 16-17 March 2011.
- GFAR Organizing Committee Meeting at Rome, Italy on 21-22 July 2011
- 4th Global South-South Development Expo 2011 at Rome, Italy on 5-9 December, 2011
- Workshop on Understanding BCH as an Effective Tool for Global Information on LMOs/GMOs at New Delhi on 13 September 2011.
- Consultative Workshop to discuss "Second National Report on the Implementation of the Cartagena Protocol of Biosafety" at New Delhi on 8 December 2011.

- Meeting of the Regional Forum on Strengthening Rural Advisory Services in Asia-Pacific Islands (APIRAS), at SEARCA, Laguna, Philippines 14-15 Sept., 2011
- International Conference on Climate Change, Sustainable Agriculture and Public Leadership at New Delhi on 7-9 February, 2012.
- Priority Setting Workshop for the Asia-Pacific Region – CGIAR Research Program on Policies, Institutions and Markets at New Delhi on 3 July, 2012.
- Agriculture and Rural Development Day (ARDD), organized by CGIAR at Sul America Convention Center, Rio de Janeiro, Brazil on 18 June, 2012.
- Program Advisory Committee (Food Biotechnology) Meeting and Foundation Day Celebration of National Agri-Food Biotechnology Institute, Mohali, India, 18-19 February, 2012.
- Brainstorming Session on Prioritizing Development Initiatives for Higher, Inclusive and Sustainable Agricultural Growth. International Food Policy Research Institute (IFPRI), New Delhi, 21 February, 2012.
- Conference on Sustainable Practices to Meet Challenges in Indian Agriculture. The Energy and Resources Institute (TERI), New Delhi on 2 June, 2012.
- Stakeholder Workshop on Tracking Investments in Agricultural Research for Development at Berlin on 20 January, 2012
- 31st FAO Regional Conference for Asia and the Pacific at Hanoi, Vietnam on 12-16 March 2012.
- Workshop on Mobile Technologies for Food Security, Agriculture and Rural Development organized by FAO RAP and the National Electronics and Computer Technology Center (NECTEC) at Bangkok, Thailand on 3-4 April, 2012.
- Workshop on Development Opportunity Crops Network for the Promotion of Agrobiodiversity” at FAO, Rome, Italy on 10-11 January, 2012
- International Conference on Innovative Approaches for Agricultural Knowledge Management, at New Delhi, India on 9 November, 2012
- Global Conference on Agricultural Research for Development 2012, at Punta del Este, Uruguay on 28 October - 1 November, 2012
- FAO Regional Workshop on Strengthening Regional Cooperation and National Capacity Building on Biosafety in Asia at Bangkok, Thailand on 17-20 June, 2013.
- 28th Meeting of GFAR Steering Committee at Istanbul on 28-30 April, 2013.
- Workshop on “Application of Molecular Tools for Farmers’ Prosperity”, organized by Sardar Vallabhai Patel University of Agriculture & Technology at Meerut, Uttar Pradesh on 19 March, 2013.



- The First Regional Steering Committee meeting for Asia and the Pacific of the Global Strategy to Improve Agricultural and Rural Statistics held at ORAP, Bangkok, Thailand on 9-10 April, 2013.
- CIARD Global Consultation at ILRI, Addis Ababa, Ethiopia on 6-8 May, 2013.
- Expert Consultation on Livestock Research for Food Security and Poverty Reduction-ILRI Strategy 2013-2022: Implications for Southeast Asia held by ILRI at Bangkok, Thailand on 31 May, 2013.
- Steering Committee Meeting of ERA-ARD II Project at Brussels, Belgium on 4 June, 2013
- International Conference on Better Linkages between Agricultural Research and Development for Greater Impact on Global Challenge at Brussels, Belgium on 5 June, 2013.
- Second meeting of the Regional Steering Committee for Asia and the Pacific for the Global Strategy to Improve Agricultural and Rural Statistics at Bangkok, Thailand on 1 November 2013
- The 10th CGIAR Fund Council Meeting at Nairobi, Kenya on 6-7 November, 2013
- Expert Consultation on Strengthening Linkages between Research and Extension at Bangkok, Thailand on 11-12 December, 2013
- Application of genetic engineering in Grain Legumes and Its Translation on Hyderabad, India on 18-27 November, 2013
- Tropical Agriculture Platform (TAP) Inception Workshop at Hainan, People's Republic of China on 4-6 September, 2013
- Eleventh Fund Council meeting at Mexico on 7-8 May, 2014
- Borlaug Summit on Wheat for Food Security at Ciudad Obregón, Mexico on 25-28 March 2014
- Meeting on Strengthening Extension and Advisory Services in the Asia and the Pacific, 25 March, 2014 through Videoconferencing
- General Assembly Meeting of Asian Farmers Association (AFA) at Bali, Indonesia on 6-9 May, 2014
- Meeting of the TAP Global Task Force at Montpellier, France on 10-11 April 2014
- GFAR Workshop on M&E and Impact Assessment at Rome, Italy on 7-9 October, 2014.

## APAARI Publications

### Newsletter

1992-2014 23 Vols. /45 nos; 2 issues each year

### Success Stories

- 1994 • Baby Corn Production in Thailand by Dr. Chamnan Chutkaew and Dr. R.S. Paroda
- 1994 • Tilapia Farming in the Philippines by Dr. Rafael D. Guerrero III
- 1994 • Hybrid Rice in China by Mr. Lou Xizhi and Dr. C.X. Mao
- 1994 • Dairying in India by Dr. R.P. Aneja
- 1995 • Hybrid Cotton in India by Dr. A.K. Basu and Dr. R.S. Paroda
- 1995 • Palm Oil Industry in Malaysia by Dr. Y.B. Basiron
- 1996 • Transformation in Korean Farming by Dr. Chae Yun Cho
- 1996 • Cotton Production in Pakistan by Dr. Badaruddin Soomro and Dr. Parvez Khaliq
- 1997 • Orchids in Thailand by Dr. Kanchit Thammasiri
- 1997 • Wheat Production in Iran by Dr. Abbas Keshavarz and Dr. M.J. Mirhadi
- 1997 • Agro-Tourism in Australia by Dr. Tom Connors
- 1998 • Direct Seeded Rice in Malaysia by Dr. Cheong Ah Wah
- 1998 • Groundnut in China by Dr. Duan Shufen *et al.*
- 1999 • Oilseeds in India by Dr. Mangala Rai
- 1992 • Integrated Pest Management in Rice in Indonesia by Dr. Soejitno
- 2000 • Bivalve Mariculture in India by Dr. V.N. Pillai *et al.*
- 2001 • Farming of Carrageenophytes in the Philippines by Dr. Rafael D. Guerrero III
- 2002 • Resource Conserving Technologies: Transforming the Rice-Wheat Systems of the Indo-Gangetic Plains by Raj K. Gupta *et al.*
- 2003 • Success Story on Control of Newcastle Disease in Village Chickens by Dr. Robyn Elders

- 2004 • A Success Story on Lentil Improvement in Bangladesh by Dr. Ashutosh Sarker *et al.*
- 2004 • A Success Story on Sustaining Green Revolution in India by Dr. S. Nagarajan
- 2004 • A Success Story on Biological Pest Control in India by Dr. S.P. Singh
- 2004 • Information and Communication Technologies in Agricultural Research for Development in the Asia-Pacific Region: A Status Report
- 2005 • A Success Story on Trout Farming in Nepal by Dr. A.K. Rai.
- 2005 • Commercialization of Bt Corn in the Philippines: A Status Report by Dr. R.V. Eborá *et al.*
- 2006 • Bt Cotton in India: A Status Report
- 2006 • Selected Success Stories on Agricultural Information System, Dr. Sahdev Singh
- 2006 • Fifteen Years of APAARI – A Retrospective, Dr. R.S. Paroda and Dr. R.K. Arora
- 2006 • Progress Report on APAARI Activities, Dr. H.P.M. Gunasena
- 2007 • Micropropagation for Production of Quality Potato Seed in Asia-Pacific, Dr. P.S. Naik, and Dr. J.L. Karihaloo
- 2008 • Cotton-Wheat Production System in South Asia: A Success Story, Dr. C.D. Mayee *et al.*
- 2008 • Linking Farmers to Market: Some Success Stories from Asia-Pacific Region, Dr. Rosendo S. Rapusas
- 2008 • Production and Cultivation of Virus-free Citrus Saplings for Citrus Rehabilitation in Taiwan, Dr. H.J. Su
- 2008 • Biosafety Regulations of Asia-Pacific Countries, Dr. K. Gupta
- 2008 • Diversity in Agricultural Research Resources in the Asia-Pacific Region: Agricultural Science and Technology Indicators Initiative, Dr. Nienke M. Beintema and Dr. Gert-Jan Stads
- 2009 • Taro Improvement and Development in Papua New Guinea – A Success Story, Dr. Abner Yalu *et al.*
- 2009 • Bt Cotton in India: A Status Report (2nd edition), Dr. J.L. Karihaloo and Dr. P.A. Kumar
- 2009 • Revised APAARI Constitution
- 2010 • Millions Fed: Highlights of Proven Successes in Agricultural Development (Hindi), Dr. David J. Spielman and Dr. Rajul Pandya-Lorch
- 2010 • Short Duration Mungbean: A New Success in South Asia, Dr. M.L. Chadha
- 2010 • APAARI Communication Strategy 2010-2015
- 2011 • Success Stories on ICT/ICM in AR4D in Asia and the Pacific Region, Dr. Malcolm Hazelman and Dr. S. Attaluri

- 2011 • Micropropagation for Production of Quality Banana Planting Material in Asia-Pacific, Dr. H.P. Singh *et al.*
- 2011 • Strengthening of Plant Genetic Resources for Food and Agriculture: Conservation and Utilization in the Pacific – Status Report , Dr. Mary Taylor
- 2011 • Information and Communication Technologies / Management in Agricultural Research for Development in the Asia-Pacific Region: A Status Report
- 2012 • Biofuel Growers Market Network – A Success Story, Dr. K. Narayan Gowda
- 2012 • Linking Farmers to Market: A Success Story of Lettuce Export from Chinese Taipei, Min-Chi Hsu *et al.*
- 2012 • Jackfruit Improvement in the Asia-Pacific Region– A Status Report, Dr. Amrik Singh Sidhu
- 2013 • Agricultural Information and Knowledge for All: Success Stories on ICT/ ICM in AR4D in Asia and the Pacific Region, Dr. S. Attaluri *et al.*
- 2014 • Wax Apple Industry in Taiwan: A Success Story, Chi Cho Huang *et al.*
- 2014 • ITC e-Chaupal : Innovation for Large Scale Rural Transformation – A Success Story, Jyoti Chaliha and Shoma Bhattacharya

### **Reports/Proceedings of Expert Consultations Workshops, Meetings**

- 1991 Report of the First General Assembly of APAARI, Bangkok, 11-14 December 1990
- 1992 Report of the Second General Assembly of APAARI, Kuala Lumpur, 17 December 1992
- 1995 Report of the Third General Assembly of APAARI and Expert Consultation of NARS Vision towards Future Challenges and Opportunities for Sustained and Enhanced Productivity and Food Security in the Asia-Pacific Region, PCARRD, Los Baños, Philippines, 22-25 November 1994
- 1996 Consultation on NARS-CGIAR Partnership (co-sponsored by ICAR, FAO, IFAD and ISNAR), 1-2 February 1996, New Delhi
- 1996 Report on the Expert Consultation on Research Priority Setting by NARS in the Asia-Pacific Region and the 4<sup>th</sup> General Assembly of APAARI, 25-26 November 1996, New Delhi
- 1997 Agricultural Research Priorities in the Asia-Pacific Region – An APAARI Overview; 13 October 1997
- 1998 Fourth Executive Committee Meeting of APAARI and Expert Consultation on Management and Strengthening of Regional Research Networks in the Asia-Pacific Region, 19-21 October 1997, Tehran, Iran
- 1999 Fifth General Assembly of APAARI and the Expert Consultation on Research Management Mechanisms of NARS, 13-15 October 1998, Suwon, Republic of Korea

- 2000 Expert Consultation to develop APAARI Vision 2025 and Fifth Executive Committee meeting of APAARI, 29 November – 1 December 1999, FAO-RAP, Bangkok, Thailand
- 2001 Expert Consultation on the Development of an Asia-Pacific Agricultural Research Information System, 6-7 November 2000, Chiang Rai, Thailand
- 2001 Sixth General Assembly of APAARI and the Expert Consultation on Strategies for Implementing APAARI Vision 2025; Agricultural Research for Development in the Asia-Pacific Region, 8-10 November 2000, Chiang Rai, Thailand
- 2001 Regional Priority Setting for Agricultural Research and Development, 12-14 November 2001, Bangkok, Thailand.
- 2002 Agricultural Research Priorities in the Asia-Pacific Region – A Synthesis
- 2002 Status of Biotechnology in Agriculture in Asia and the Pacific, 21-23 March 2002
- 2002 ICT Consultation on Development of Second Phase of APARIS, 24-25 October 2002
- 2002 Strengthening Research Partnerships through Networks and Consortia, 2-4 December 2002
- 2003 Establishment of Asia-Pacific Consortium on Agricultural Biotechnology
- 2003 Strengthening Regional Agricultural Information System and Regional Research Networks, 2-4 December 2002
- 2004 Workshop on Capacity Building for Developing National Agricultural Information Systems (NAIS) of Bhutan, Cambodia, Laos, Mongolia, Myanmar, Timor-Leste and Vietnam, 3-12 August 2004, AIT Conference Center, AIT, Pathumthani, Thailand
- 2004 Expert Consultation on Post-harvest Technologies for Ensuring Food Security and Value Addition for Enhanced Income and The Eighth General Assembly Meeting of APAARI, 1-3 December 2004, Bangkok, Thailand.
- 2004 Strengthening Regional Agricultural Information Systems: Role of ICT in ARD, 1-4 December 2003, Bangkok, Thailand.
- 2005 Brain Storming Session on Public-Private Partnership in Agricultural Biotechnology: Highlights and Recommendations, 14 March 2005, New Delhi, India
- 2005 High Level Policy Dialogues on Biotechnology for Food Security and Poverty Alleviation: Opportunities and Challenges, 7-9 November 2005, Bangkok, Thailand
- 2006 Ninth General Assembly Meeting (GAM), 7 November 2006, New Delhi, India
- 2006 Expert Consultation on Agricultural Innovations: Linking Farmers to Market, 6-7 November 2006, New Delhi, India
- 2006 Workshop on Biosafety Regulations for Transgenic Crops and the Need for Harmonizing them in the Asia-Pacific Region, 31 July – 2 August 2006, Patancheru, Andhra Pradesh, India

- 2006 Workshop on Advocacy and Inter-regional Cooperation for Information & Communication Technologies/Management in Agricultural Research for Development, 3-4 July 2006, Thailand
- 2006 Meeting of the Regional Ad Hoc Working Group on Linking Farmers to Markets 6-7 June 2006, Bangkok, Thailand
- 2007 Brainstorming Session on Models of Public-Private Partnership in Agricultural Biotechnology, 7 April 2007, New Delhi, India
- 2007 Expert Consultation on Biofuels, IRRI, 27-29 August 2007, Los Banos, Philippines
- 2007 ICT/ICM Sensitization and Awareness Building Workshop for NARS Leaders and Senior Managers 30 August 2007, PCARRD, Philippines
- 2007 Expert Consultation to Review Progress of Agricultural Research Networks and Consortia in Asia-Pacific, 8-9 October 2007, Hyderabad, India
- 2008 Technical Workshop on Development and De-centralized Management of ARD Information Resources and APARIS Steering Committee Meeting, 19-20 April 2008, Bangkok, Thailand
- 2008 Asia-Pacific Regional Workshop on Agricultural Research for Development, 17-18 April 2008, Bangkok, Thailand
- 2008 Proceedings of 10th General Assembly Meeting, 20 October 2008, Tsukuba, Japan
- 2008 Symposium on 'Global Climate Change: Imperatives for Agricultural Research in Asia-Pacific' at Tsukuba, Japan on 21-22 October 2008, Tsukuba, Japan
- 2009 Expert Consultation on Agricultural Biotechnology for Promoting Food Security in Developing Countries, 20-22 August 2009, Kuala Lumpur, Malaysia
- 2009 Workshop on ICT/ICM for National Agricultural Research Information Systems in the Asia-Pacific Region, 14-16 September 2010, Bangkok, Thailand
- 2009 Expert Consultation on Biopesticides and Biofertilizers for Sustainable Agriculture, 27-29 October 2009, Taichung, Chinese Taipei
- 2009 Expert Consultation on Agricultural Research for Development in Asia and the Pacific– the Way Ahead, 30-31 October 2009, Bangkok, Thailand
- 2010 The Eleventh APAARI General Assembly Meeting (GAM), 12 October 2010, Suwon, Republic of Korea
- 2010 International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region, 13-15 October 2010, Suwon, Republic of Korea
- 2010 Expert Consultation Meeting on Postharvest and Value Addition of Horticultural Produce – Strengthening Technologies for Linking Farmers to Market: Proceedings and Recommendations, 29 November – 2 December 2010, Kuala Lumpur, Malaysia
- 2011 The Suwon Agrobiodiversity Framework: The Way Forward for Managing Agrobiodiversity for Sustainable Agriculture in the Asia-Pacific Region

- 2011 Workshop on Coherence in Information for Agricultural Research for Development (CIARD) and Strengthening RAIS in the SAARC Countries: Proceedings, 10-12 May 2011, Dhaka, Bangladesh
- 2011 Stakeholders' Interface on GM Food Crops" on 19 May 2011, New Delhi, India
- 2011 Workshop on Information and Communications Management for Agricultural Innovation in Southeast Asia: Proceedings, 27-29 September 2011, AIT Campus, Bangkok, Thailand
- 2011 Expert Consultation on Agricultural Biotechnology, Biosafety and Biosecurity" in Taichung on 27-28 October 2011, Chinese Taipei
- 2011 Workshop on Moving Beyond Strategy to Improve Information and Knowledge Management for Agricultural Development in the Pacific Islands Countries and Territories: Proceedings, 1-24 November 2011, Nadi, Fiji Islands
- 2011 Regional Dialogue on Conservation Agriculture in South Asia, 1-2 November 2011, New Delhi, India
- 2011 Regional Workshop on Implementation of Suwon Agrobiodiversity Framework, 4-6 November 2011, Kuala Lumpur, Malaysia
- 2011 Session on "Openness in Agricultural Information and Knowledge Sharing" in the "International Conference on Innovative Approaches for Agricultural Knowledge Management: Global Extension Experiences, on 10 November 2011, New Delhi, India
- 2012 The First Global Conference on Women in Agriculture (GCWA), 13-15 March 2012, New Delhi, India
- 2012 Workshop on Climate-Smart Agriculture in Asia: Research and Development Priorities: Proceedings and Recommendations, 11-12 April 2012, Bangkok, Thailand
- 2012 Regional Consultation on Improving Wheat Productivity in Asia: Proceedings and Recommendations, 26-27 April 2012, Bangkok, Thailand
- 2012 Expert Consultation on Managing Trans-boundary Diseases of Agricultural Importance in the Asia-Pacific: Proceedings and Recommendations, 10-12 October 2012, New Delhi, India
- 2012 Regional Consultation on Collective Actions for Opening Access to Agricultural Information and Knowledge in the Asia-Pacific Region, 13-15 December 2012, Thimphu, Bhutan
- 2013 Foresight and Future Pathways of Agricultural Research through Youth: Proceedings, 1-2 March 2013, New Delhi, India
- 2013 Improving Wheat Productivity in Asia, 2013, Country Reports and Proceedings of Regional Consultation on Improving Wheat Productivity in Asia, 26-27 April 2012, Bangkok, Thailand

- 2013 Priorities for Agricultural Research for Development in South Asia – Synthesis Report
- 2013 Report on Public Agricultural R&D in South Asia: Greater Government Commitment, Yet Underinvestment Persists
- 2013 Training workshop on “Open Access Publishing Using Open Journal Systems” 26-30 August 2013, Nonthaburi, Thailand.
- 2013 National Workshop on Outscaling Farm Innovation: Proceedings and Recommendations, 3-5 September 2013, New Delhi, India
- 2013 Report on Expert Consultation on Strengthening Linkages between Research and extension to Promote Food and Nutrition Security, 11-12 December 2013, Bangkok, Thailand
- 2013 NARS-CGIAR Interactive Session for Strengthening Partnership in South Asia: Proceedings and Recommendations, 22 October 2013, Islamabad, Pakistan
- 2013 Regional Workshop on Youth and Agriculture: Challenges and Opportunities: Proceedings and Recommendations, 23-24 October 2013, Islamabad, Pakistan
- 2014 Asia-Pacific Symposium on Molecular Breeding, 1-3 October 2013, Shanhua, Taiwan
- 2014 Expert Consultation on Promotion of Medicinal and Aromatic Plants in the Asia-Pacific Region, 2-3 December 2013, Bangkok, Thailand

## **Directories of Agricultural Research Institutions**

- 1995 Directory of Agricultural Research Institutions in the Asia-Pacific Region: South Asia
- 1997 Directory of Agricultural Research Institutions in the Asia-Pacific Region: South-East Asia

## **Agricultural Research Systems – Case Studies**

- 1995 Agricultural Research Systems in South Asia – Organization and Management by Dr. H.K. Jain
- 1995 Support for Agricultural Research Systems in South-East Asia – Impacts on Growth and Development by Dr. William D. Dar
- 2009 Prioritization of Demand-driven Agricultural Research for Development in South-Asia, Dr. Mruthyunjaya
- 2012 Report on Prioritizing Demand-Driven Agricultural Research for Development in India, Dr. Mruthyunjaya
- 2012 Report on Prioritizing Demand-driven Agricultural Research for Development in Nepal. Dr. Mruthyunjaya
- 2012 Report on Prioritizing Demand-driven Agricultural Research for Development in Bangladesh, Dr. Mruthyunjaya



- 2012 Prioritization of Demand-driven Agricultural Research for Development in South-Asia: A Synthesis Report, Dr. Mruthyunjaya

### **Regional Synthesis on Agricultural R&D/Management**

- 1999 National Agricultural Research Systems in the Asia-Pacific Region – A Perspective.
- 2000 Status of Plant Genetic Resources Conservation and Utilization in Asia-Pacific Region: Regional Synthesis Report, Dr. K.P.S. Chandel and Dr. R.S. Paroda
- 2001 APAARI – A Decade of Progress
- 2006 Fifteen Years of APAARI – A Retrospective

### **Medium-Term and Long-Term Plans**

- 1995 APAARI Perspective Plan
- 2000 APAARI Vision 2025
- 2009 Bangkok Declaration

### **Publications with Partners/Associate Members**

- 1998 Proceedings of the Asia-Pacific Regional Consultation on Plant Genetic Resources, 27-29 November 1996, IARI, New Delhi (eds. R.K. Arora and K.W. Riley), IPGRI Office for South Asia, New Delhi.
- 2005 Research Need Assessment and Agricultural Research Priorities for South and West Asia: Proceedings of the Workshop, 7-8 October 2004. ICRISAT, Patancheru (eds., M.C.S. Bantilan, Mruthyunjaya, C.L.L. Gowda and G.V. Anupama), International Crops Research Institute for the Semi-Arid Tropics, Patancheru.
- 2013 Benchmarking Agricultural Research Indicators Across Asia-Pacific. ASTI Regional Synthesis Report (eds., Kathleen Flaherty, Gert-Jan Stads and Attaluri Srinivasacharyulu). IFPRI, Washington, DC; APAARI, Bangkok, Thailand.

## Institutes' Profiles/Information Published in APAARI Newsletters: 1992-2014

APAARI Newsletter	Institute/Center–Profile/Information	Year of establishment
1992 Vol. 1 (1)	• Indian Agricultural Research Institute (IARI) New Delhi (earlier Imperial Agricultural Research Institute)	1936
1992 Vol. 1 (2)	• Department of Agriculture (DoA), Bangkok, Thailand	1972
1993 Vol. 2 (1)	• Malaysian Agricultural Research Institute (MARDI), Kuala Lumpur, Malaysia	1969
1993 Vol. 2 (2)	• The Rural Development Administration (RDA), Suwon, Republic of Korea (earlier office of RDA, 1962)	1985
1994 Vol. 3 (1)	• The Philippine Council For Agriculture, Forestry and Natural Resources Research and Development (PCARRD), Los Baños, Philippines (earlier Philippine Council for Agricultural Research)	1972
1994 Vol. 3 (2)	• Pakistan Agricultural Research Council (PARC), Islamabad, Pakistan	1981
1995 Vol. 4 (2)	• Japan International Research Center for Agricultural Sciences (JIRCAS), earlier Tropical Agriculture Research Center	1993
1996 Vol. 5 (1)	• National Bureau of Plant Genetic Resources (NBPGR), New Delhi, India (earlier Plant Introduction Division, Indian Agricultural Research Institute, New Delhi, 1961)	1976
1996 Vol. 5 (2)	• Australian Center for International Agricultural Research (ACIAR), Canberra, Australia	1982
1997 Vol. 6 (1)	• Nepal Agricultural Research Council (NARC), Kathmandu, Nepal	1991

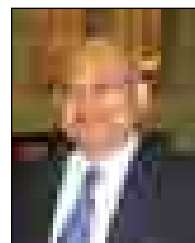
<b>APAARI Newsletter</b>	<b>Institute/Center–Profile/Information</b>	<b>Year of establishment</b>
1997 Vol. 6 (2)	<ul style="list-style-type: none"> <li>• Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh</li> <li>• CGIAR at a glance</li> </ul>	1973 1971
1998 Vol. 7 (1)	<ul style="list-style-type: none"> <li>• National Agricultural Research Institute (NARI), Lae, Papua New Guinea</li> </ul>	1996/97
1998 Vol. 7 (2)	<ul style="list-style-type: none"> <li>• Asian Institute of Technology (AIT), Bangkok, Thailand</li> <li>• Global Forum on Agricultural Research (GFAR)</li> </ul>	1959 1996
1999 Vol. 8 (1)	<ul style="list-style-type: none"> <li>• University of the South Pacific (USP), Apia, Western Samoa</li> <li>• Agricultural Research Planning for the 3<sup>rd</sup> Socio-economic Plan of Iran 2002-2004 - Some Recent Activities at AREO</li> </ul>	1968
1999 Vol. 8 (2)	<ul style="list-style-type: none"> <li>• The M.S. Swaminathan Research Foundation (MSSRF), Chennai, Tamil Nadu, India</li> </ul>	1988
2000 Vol. 9 (1)	<ul style="list-style-type: none"> <li>• Achievements in Agricultural Research Technology and Development: Council of Agriculture (CoA), Chinese Taipei</li> <li>• ACIAR - An Institutional Update</li> <li>• CARP promotes Agricultural Research and Training activities in Sri Lanka</li> </ul>	
2000 Vol. 9 (2)	<ul style="list-style-type: none"> <li>• CIRAD activities in Asia and the Pacific</li> <li>• Recent activities at AREO, Iran</li> <li>• Recent activities at CARP, Sri Lanka</li> <li>• ICUC (International Center for Underutilized Crops) activities in Asia</li> <li>• Recent activities at JIRCAS</li> </ul>	1984
2001 Vol. 10 (1)	<ul style="list-style-type: none"> <li>• Recent activities at CARP, Sri Lanka</li> <li>• Recent agricultural research and development activities at NARC, Nepal</li> <li>• The International Center for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal</li> </ul>	1981
2001 Vol. 10 (2)	<ul style="list-style-type: none"> <li>• Japan International Research Center for Agricultural Sciences (JIRCAS): Structural reorganization</li> </ul>	

APAARI Newsletter	Institute/Center–Profile/Information	Year of establishment
	<ul style="list-style-type: none"> <li>Seed and Plant Improvement Institute, AREO, Tehran, Iran</li> <li>Strengthening Agricultural Research and Development in the Pacific: NARI's activities</li> </ul>	
2002 Vol. 11 (1)	<ul style="list-style-type: none"> <li>ICBA: An International Research Center devoted to growing plants with salty water on marginal lands</li> <li>Recent activities in agricultural research and development by RDA, Korea</li> </ul>	1999
2002 Vol. 11 (2)	<ul style="list-style-type: none"> <li>Indonesian Agency for Agricultural Research and Development (IAARD), Jakarta, Indonesia</li> <li>JIRCAS-Recent activities</li> <li>PCARRD-Research activities</li> </ul>	
2003 Vol. 12 (1)	<ul style="list-style-type: none"> <li>Institut Agronomique nao Caladonien – IAC (New Caledonia): A profile</li> <li>Asia-Pacific Association of Forestry Research Institutions (APAFRI): Recent activities</li> </ul>	
2005 Vol. 14 (1)	<ul style="list-style-type: none"> <li>ICARDA–An International Center for Agricultural Research in the Dry Areas, Aleppo, Syria</li> </ul>	1977
2005 Vol. 14 (2)	<ul style="list-style-type: none"> <li>Papua New Guinea, University of Technology, Lae, Papua New Guinea (earlier PNG Institute of Higher Education, 1965)</li> </ul>	1973
2006 Vol. 15 (1)	<ul style="list-style-type: none"> <li>Indian Council of Agricultural Research (ICAR), New Delhi, India (earlier Imperial Council of Agricultural Research)</li> </ul>	1929
2006 Vol. 15 (2)	<ul style="list-style-type: none"> <li>Bureau of Agricultural Research, Philippines: A Profile</li> </ul>	1987
2008 Vol. 17 (1)	<ul style="list-style-type: none"> <li>National Agriculture Research Institute, PNG</li> </ul>	1996
2008 Vol. 17 (2)	<ul style="list-style-type: none"> <li>Agricultural Research and Development in Fiji</li> </ul>	1942
2009 Vol. 18 (1)	<ul style="list-style-type: none"> <li>Activities of the International Center for Tropical Agriculture (CIAT) in Asia-Pacific</li> <li>Activities of the Land Resources Division, SPC, Fiji</li> </ul>	
2009 Vol. 18 (2)	<ul style="list-style-type: none"> <li>NGO Association for Agricultural Research in Asia-Pacific – A Report</li> </ul>	2008

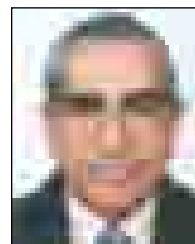
<b>APAARI Newsletter</b>	<b>Institute/Center–Profile/Information</b>	<b>Year of establishment</b>
2010 Vol. 19 (1)	• Helping South Asian Farmers through Resource Conserving Technologies: An Update on Rice-Wheat Consortium (RWC)	
2010 Vol. 19 (2)	• Profile of the Council for RNR Research of Bhutan (CoRRB)	
2011 Vol. 20 (1)	• Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA)	1981
	• Bangladesh Agricultural Research Institute	1906
2011 Vol. 20 (2)	• Profile of Central Agricultural University, Imphal	1993
2012 Vol. 21 (1)	• Profile : University of Agricultural Sciences (UAS) Bangalore, India	1965
2013 Vol. 22 (2)	• Asian Farmers' Association for Sustainable Rural Development	2002
	• Bangladesh Rural Advancement Committee	1972
2014 Vol. 23 (1)	• Kesetsart University Library, Bangkok	1943
2014 Vol. 23 (1)	• Borlaug Institute of South Asia (BISA), New Delhi	2013

## About the Authors

**Dr. Raj. Paroda**, former Director General, Indian Council of Agricultural Research (ICAR) & Secretary, Department of Agricultural Research and Education (DARE), Government of India, is an accomplished plant breeder and geneticist by profession and an able research administrator. He has made significant contributions in the field of crop science research. He is known for modernization and strengthening of the National Agricultural Research System (NARS) in India as well as in Central Asia and the Caucasus. He has the unique distinction of being the main architect of one of the world's largest and most modern National Gene Bank in New Delhi. He has received numerous awards and recognitions, including Padam Bhushan, had been the founder chairman of Global Forum on Agricultural Research (GFAR). He was President of the Indian Science Congress in 2001 and President of National Academy of Agricultural Sciences, beside many scientific societies in agriculture. Thirteen universities have awarded him D.Sc. (Honoris Causa) degree including Ohio State University and Indian Agricultural Research Institute. Since 1992, he is serving as Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI). Currently, he is Chairman, Haryana Farmers' Commission as well as Chairman, Trust for Advancement of Agricultural Sciences (TAAS).

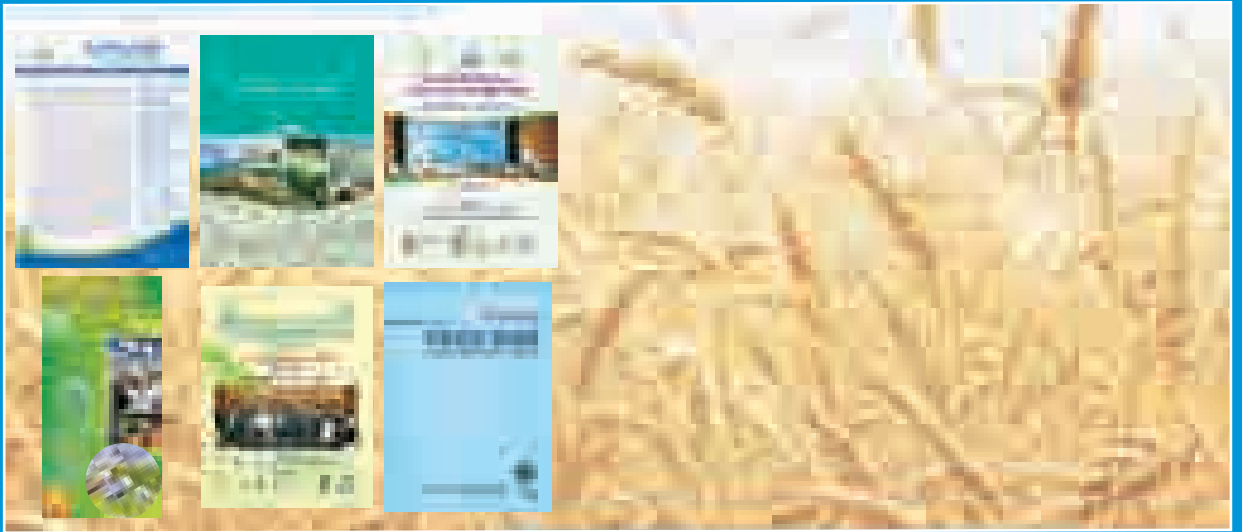


**Dr. Bhag Mal**, a distinguished plant breeder, has a wide research experience and served as National Coordinator for Underutilized Crops Program at NBPGR, New Delhi; ADG (Food Crops & Seeds), ICAR, New Delhi; and Director, Indian Grassland & Fodder Research Institute, Jhansi; South Asia Coordinator, Bioversity International and later as its Honorary Research Fellow and currently working as Senior Consultant, APAARI. He had been the President, Indian Society of Range Management and Agroforestry and Indian Society of Plant Genetic Resources, and Vice President of Indian Society of Genetics and Plant Breeding, Indian Society of Plant Genetic Resources and Indian Society of Plant Sciences. He developed 16 varieties of fodder crops, cereals and pulses, published 145 research papers, 14 books/monographs and 24 book chapters. He has been the recipient of Chancellor's Medal and Dr. H.B. Singh Memorial Award for his outstanding contributions. He was FAO Consultant; Session Chairman in 4 International Conferences; Member of Organizing Committee of 5 International Symposia/Conferences and also coordinated South Asia Network on Plant Genetic Resources (SANPGR).



**Dr. J.L. Karihaloo** Coordinator, Asia-Pacific Consortium on Agricultural Biotechnology, New Delhi (APCoAB), did his M.Sc. (Botany) and Ph. D. from Kashmir University, India, and post-doctoral research in molecular diversity at University of California, Davis. He joined Indian Council of Agricultural Research (ICAR) in 1978 as scientist in the discipline of Genetics & Cytogenetics and served the organization in different capacities including Director, National Research Centre on DNA Fingerprinting, New Delhi and Director, National Bureau of Plant Genetic Resources, New Delhi. In his present position as Coordinator, Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), Dr. Karihaloo is engaged in policy advocacy, capacity building and knowledge sharing for safe application of agricultural biotechnology for the benefit of stakeholders in the Asia-Pacific region. He has published over 110 research and review articles, chapters in books and books on cytogenetics, molecular diversity, genetic resources conservation, and biotechnology applications and adoption. He has been honoured by ICAR with Rafi Ahmed Kidwai Award for outstanding research and is a member of advisory committees on biotechnology and bioresources research and education.





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