



Expert Consultation on Agricultural Research for Development in Asia and the Pacific– the Way Ahead

30-31 October 2009
Bangkok, Thailand

PROCEEDINGS



Organizers

**Asia-Pacific Association of Agricultural Research Institutions (APAARI)
and
Asian Development Bank (ADB)**

In Collaboration with

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FOREWORD

The Asia-Pacific region accounts for 57% of the world's total and 73% of the agricultural population, with only 1/3rd of the global agricultural land. About 80% of the world's small and marginal farmers live in this region. More than 650 million people, half of the world's poor (income <US\$ 1/day), live here. The rural areas have much higher concentration of hunger and poverty. At the same time, the growth rate of food grain production has registered a steady decline. Thus, Asia and the Pacific region currently faces challenge of liberating itself from the clutches of hunger and poverty, which is the major objective of the Millennium Development Goals (MDGs).

One of the main causes of slow growth of agriculture is the slow development and infusion of new technologies. Technology and innovation systems in agriculture are changing rapidly and they need to be dynamically geared to meet the challenges of increasing resource scarcity and the structural transformation of the economic and social role of agriculture.

It is well recognized that with 'business as usual' approach, agriculture will not be able to play an effective role in the socio-economic development. Any further growth in agriculture can be achieved only with the enhanced application of new science (biotechnology, information and communication technology, and management science). The technology generation, verification and dissemination capacity of several national agriculture research systems and agricultural research for development (ARD) stakeholders has to be enhanced, for which necessary means and mechanisms need to be put in place.

It is, therefore, evident that a fresh examination is called for to reorient the role and necessary linkages for agricultural research to deliver development objectives and ensure large scale impact while addressing both hunger and poverty.

The Asia-Pacific Association of Agricultural Research Institutions (APAARI), a regional forum, is actively associated with the Global Forum on Agricultural Research (GFAR), in an on-going process of global consultation to reprioritize the agendas for agricultural research for development. This was done through a consultative mechanism involving wide range of stakeholders. The Asian Development Bank (ADB) provided the needed funding support for the entire consultation process and conduct of studies. The initiative will help in harmonizing the development efforts of all stakeholders by focusing on the specific needs of resource poor small farmers and poor consumers.

The consultation process was undertaken in three steps. First, an e-consultation from 4-24 September, 2009 that involved about a thousand individuals associated with ARD. Second, preparation of sub-regional and regional reports involving consultants. Finally, a multi-stakeholder Face to Face meeting was held on 30-31 October, 2009 at Bangkok. An important outcome of the consultation was a joint "Bangkok Declaration" that reflects a collective thinking of those stakeholders from the region who attended. The recommendations of this consultation will feed into the Global Conference on Agricultural Research for Development (GCARD), scheduled to be held in Montpellier, France from 28-31 March, 2010.

The APAARI and ADB feel privileged to be associated with these important regional initiatives and we would like to express our appreciation to GFAR and also APAARI members and stakeholders for their support and cooperation for the success of the above mentioned consultative process. It resulted

to valuable insight for reorienting agricultural and natural resource research agenda for the region. In this context, immediate attention of all concerned is called for to make a real difference in addressing the MDGs.



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ACRONYMS AND ABBREVIATIONS

AARINENA	Association of Agricultural Research Institutions in the Near East and North Africa
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
AgGDP	Agricultural Gross Domestic Product
ANRR	Agriculture and Natural Resource Research
APAARI	Asia Pacific Association of Agricultural Research Institutions
AR4D	Agricultural Research for Development
ARD	Agricultural Research and Development
ARIs	Agricultural Research Institutions
ASEAN	Association of South East Asian Nations
BRRl	Bangladesh Rice Research Institute
CAADP	Comprehensive Africa Agriculture Development Programme
CAAS	Chinese Academy of Agricultural Sciences
CARP	Council for Agricultural Research Policy
CG	Consultative Group
CGIAR	Consultative Group on International Agricultural Research
CSOs	Civil Society Organizations
DBT	Department of Biotechnology
DDG	Deputy Director General
F2F	Face to Face
FAO	Food and Agriculture Organization
FSR	Farming Systems Research
GCARD	Global Conference on Agricultural Research and Development
GDP	Gross Domestic Product
GFAR	Global Forum on Agricultural Research
GMO	Genetically Modified Organism
GVA	Gross Value Added
HRD	Human Resource Development
IARCs	International Agricultural Research Centres
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
ICT-KM	Information and Communication Technology- Knowledge Management

IFAP	International Federation of Agricultural Producers
IFFCO	Indian Farmers and Fertilizers Cooperative
INM	Integrated Nutrient Management
INRM	Integrated Natural Resource Management
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
IRRI	International Rice Research Institute
ISCB	Indo-Swiss Collaboration in Biotechnology
JIRCAS	Japan International Research Centre for Agricultural Sciences
MARDI	Malaysian Agricultural Research and Development Institute
MDGs	Millennium Development Goals
MPs	Mega Programs
NARES	National Agricultural Research and Extension System
NARI	National Agricultural Research Institute
NARS	National Agricultural Research System
NCDs	Non-communicable Diseases
NGOs	Non Government Organizations
NRM	Natural Resource Management
PETRRA	Poverty Elimination through Rice Research Assistance Project
PNG	Papua New Guinea
PPPs	Public-Private Partnerships
PRC	Peoples' Republic of China
PVP	Plant Variety Protection
R&D	Research and Development
REE	Research, Education and Extension
RSDD	Regional and Sustainable Development Department
SA	South Asia
SDC	Swiss Agency for Development and Cooperation
SEA	Southeast Asia
SHGs	Self Help Groups
SPC	Secretariat of Pacific Community
SPS	Sanitary and Phytosanitary
SRF	Strategic Research Framework of the CGIAR
SSA	Sub-Saharan Africa
TFP	Total Factor Productivity
ToT	Transfer of Technology

Preamble

As per recent FAO projection, over one billion people around the world currently suffer from hunger and malnutrition. This clearly indicates that despite various on-going efforts, the target of the Millennium Development Goals (MDGs), to halve poverty by 2015, may not be achievable in many countries in view of slow pace of progress and low investments being made in agriculture. The recent food and financial crises, including global economic melt down, have sent shockwaves. During the last two years, the price of agricultural commodities has sharply risen resulting in a global food price hike, which has further complicated the task of feeding the ever growing global population, particularly the poor and hungry people. All these developments are forcing the national governments and their agricultural systems to take urgent action through much needed revitalization of the sector.

Agricultural development is also central to the modernization of economies, besides addressing the problems of poverty, hunger, malnutrition and livelihood security. However, the agricultural sector is currently facing numerous challenges: climate change, rising energy prices, subsidized biofuel production, low farm income, higher population growth, dietary changes, globalization and increasing trend towards urbanization. In addition, problems of increasing poverty, hunger, malnutrition, reduced and degraded natural resources, low literacy, poor infrastructure, recurring natural calamities, political instability, poor governance etc. persists. On the contrary, there are emerging strengths and opportunities such as rapid advances in frontier sciences, institutional innovations, new expressions of political will for change, greater interest and commitment of international community to address global poverty and hunger, besides existence of critical mass (competent scientists and farmers) with fast emerging private sector to engage in agriculture, national and international research infrastructure including regional or global research networks, global collections of genetic resources, knowledge of various success stories etc. Accordingly, the core strengths and opportunities will have to be set against emerging and anticipated challenges in order to revitalize the food and agriculture system for achieving the MDG as well as overall economic growth of developing countries in the Asia-Pacific. In this context, reshaping the global agricultural research agenda for inclusive development becomes imminent.

The Global Conference on Agricultural Research for Development (GCARD-2010) is intended to provide an action plan and strategy for improving agricultural research globally in order to make maximum impact on development, especially for the poor. The outcome of the conference is expected to initiate the process of change that will reshape agricultural research and innovation system and improve resource availability for research. It is expected that in the reshaped agricultural research system, the research outputs will also be more accessible and relevant to the needs of small and resource poor farmers in the developing countries; the research focus on knowledge generation through scientific research is embedded in the development thinking and practice, funding systems are aligned between research and development, effective innovation pathways are developed between diverse stakeholders, and international agricultural research systems are effectively integrated with regional and national partners.

The GCARD process involves regional reviews, regional electronic consultations, regional Face to Face workshops, global electronic consultations, draft action plan and strategy and finally GCARD-2010 in Montpellier, France. The GCARD-2010 will also be benefited from the CGIAR's Strategy and Results Framework along with proposed 7 mega programs.

In view of above background, the regional Face to Face Consultation was organized jointly by APAARI and ADB, in collaboration with GFAR in Bangkok on 30-31 October, 2009 which specifically addressed the following questions:

1. What are the priority research needs identified for the region that can have the most development impact benefiting the poor?
2. What changes are needed in the systems of agricultural research, innovation, extension and education so that they can contribute, through reorienting research to address the identified priorities, for inclusive development?

The consultation was attended by 73 participants representing diverse agricultural research for development stakeholders: APAARI member NARS, CGIAR, IARCs, FAO, GFAR, ARIs, Universities, NGOs, farmers/farmer organizations, the private sector and donor organizations from 17 countries. The program of Consultation and the list of participants are provided in Annexure-I and II, respectively.

The consultation process was specifically designed to answer above questions, in general, and address specifically important issues relating to three sub-regions (South Asia, Southeast Asia and the Pacific). The program covered the opening session to welcome and explain the GCARD process, CGIAR's draft Strategic Results Framework (SRF) and to provide an overview of the agriculture in Asia Pacific region, including the key issues that emerged from e-consultation (summary of the feedback received from e-consultation is provided in Annexure-III), the purpose and expected outcomes from the consultation. Separate working groups were formed to discuss sub-regional and thematic issues and plenary sessions were organized to discuss the outcomes of each working group. The concluding session was meant to consolidate the final outcome, including the adoption of Bangkok Declaration.

Opening Session

The opening session was chaired by Dr. Raj Paroda, Executive Secretary, APAARI. Welcome statements were made by Dr. Abd Shukor Abd Rahman, Chairman, APAARI and Dr. Katsuji Matsunami, Advisor and Practice Leader (Agriculture, Rural Development and Food Security), RSDD, ADB, as co-organizers of the workshop. Dr. Abd Rahman was pleased to welcome all stakeholders representing NARS leaders, policy makers and the representatives of NGOs, farmers, private sector, CGIAR system, IARCs etc. He emphasized that the meeting is based on a bottom-up initiative for identification of researchable themes and priorities. He stated that in pursuance of its mandate, APAARI had so far organized over 20 consultations/workshops on important regional issues, and launched two main regional programs on Information and Communication Technology and Agricultural Biotechnology, besides a number of research networks. He also apprised about the publication of over 20 success stories from the region as a knowledge sharing mechanism. Dr. Abd Rahman expected that present consultation will contribute to the GCARD process, besides reorienting the agricultural research for development agenda in the region. He particularly thanked ADB for the co-sponsorship of this important consultation and was pleased that the various organizations such as GFAR, CGIAR Centers, FAO and other stakeholders were all active partners in this initiative.

Dr. Katsuji Matsunami welcomed the participants and expressed his pleasure over having diverse representation in sharing a common platform to solve the existing problems of food, fodder, fibre, fuel and reducing poverty, hunger and malnutrition in the region. He stated that we need to work towards knowledge empowerment of farmers. ADB supports global initiatives to bring in synergy

among partners, objectives and resources. He said that Asia-Pacific region should receive more attention than Africa as it is a major producer and consumer of agricultural products and is projected to suffer most owing to global climate change. He suggested to strengthen agriculture, in general, and agricultural research, in particular by increasing investments through allocation of at least 10% of agricultural GDP. He specifically cited the example of Comprehensive Africa Agriculture Development Programme (CAADP) wherein, all participating countries have agreed to allocate at least 10% of funds for ARD. He expressed the hope to see similar debate and decision in the Asia-Pacific region. According to him, Asia can be a leader in agriculture as it has good potential for growth, enlightened policy makers, strong institutions, donors and the hard working farmers.

Dr. Ajit Maru welcomed on behalf of GFAR and briefed the participants about the Global Conference on Agricultural Research for Development (GCARD), its objectives, process involved for the regional consultations, and the organization of the upcoming conference in Montpellier, France. He also briefed about CGIAR initiative to finalize Strategic Research Framework (SRF) and formulation of 7 mega programs. He told that besides reshaping the global agricultural research agenda for serving the poor, we have to ensure mobilizing additional resources for agricultural research for development. He suggested that the focus of the Face to Face Consultation should be on poor, besides strengthening AR4D in the region.

Dr. David Hoisington, DDG (Research), ICRISAT presented an account of the CGIAR initiative to develop new SRF and mega programs which can have impact on reduction of hunger, improvement in production and sustainable use of natural resources. He mentioned that the ongoing change management process is aimed towards better organization, higher efficiency and effectiveness. It involves development of a suitable system architecture and definition of roles, mechanisms for attaining better vision for food for people, environment for people and policy for people. It is expected to have a change for greater impact. The strategy team has developed a science based strategy document using analytical models. It now needs debate, judgment and feed back on priorities of different regions. The strategy aims at assessment, monitoring, evaluation and effective delivery of ARD output. It was clarified that changing the CG system is indeed a complex issue and, therefore, CGIAR is open to the feedback from all stakeholders across the globe.

Prof. R.B. Singh, Lead Consultant provided an overview of agriculture and agricultural research in the region, emerging trends and challenges of AR4D, outcome of e-consultation (voice of the stakeholders) and evolving of the ANRR agenda for reaching the unreached. He highlighted the main concern of wide spread poverty and hunger, which is currently on an increase despite on-going efforts to reduce them. He mentioned that Asia Pacific region has not only witnessed impressive agricultural growth but resulted in overall poverty reduction. He provided details concerning recently organized e-consultation in which more than 300 responses from various stakeholders were received and analyzed. The e-consultation mainly flagged the key drivers/issues of agricultural development and the number of specific challenges. These are: key issues were fighting stubbornly high hunger and poverty; synergizing productivity; sustainability and equity; crises of entitlement for small holder farmers; research as an engine of growth and development; huge technology transfer gaps; linking farmers with markets; value addition; policy support a must for science-led development; and building strong human capital. It highlighted that the needs of the resource poor are invariably not well addressed, their inability to adopt costly input based and relatively high risk technology, under investment in horticulture, livestock, fisheries, rainfed areas, socio-economic and natural resource management (NRM) research, maintenance research and human resource development. The emerging challenges highlighted were: climate change,

water scarcity, declining soil fertility, genetic erosion of biodiversity, specific gaps in institutional and human resource development, increasing biotic stresses and the lack of biosecurity measures.

Prof. Singh concluded that the main priorities concerning agricultural development should include focus on research concerning agricultural systems being practiced by the resource poor farmers, forging synergy among productivity, profitability, sustainability and biosecurity; managing climate change; balancing bioenergy and food needs; addressing volatile food prices; food security and political economy. Also, there is clear need for institutional reforms for providing an enabling environment for faster outscaling of innovations.

During the discussions, the participants expressed satisfaction that the issue of small and resource poor farmers has come back on the centre stage. It was mentioned that hungry and poor, rural and urban are 'cousins' and hence their needs have to be addressed together.

Session 1: Sub-Regional Discussions on Agriculture Research Priorities

A. Session on Sub-Regional Groups

The sub-regional reports on South Asia, Southeast Asia including PRC and Pacific were presented in three separate working group meetings facilitated by Drs. Mruthyunjaya, David Raitzer and Alan Quartermain, respectively. Each working group was chaired by an eminent person. Clear-cut roles and expectations from these working groups were specifically defined. The reports of each of these working groups were presented in the plenary for further discussion and adaptation by the participants.

Working Group on South Asia

This working group was chaired by Prof. Rohan Rajapakse, Executive Director, Council for Agricultural Research Policy (CARP), Sri Lanka. Dr. Mruthyunjaya, Consultant for South Asia sub-region acted as facilitator. He made a brief presentation on important issues relating to AR4D and highlighted the specific issues for consideration of the group, which comprised of 16 stakeholders.

Dr. Mruthyunjaya laid main focus on identified priorities for agricultural research for development. According to detailed analysis, the commodity priorities for the sub-region emerged to be rice and milk (livestock) and the commodity group priorities were cereals, horticulture, livestock and fishery. The overarching priorities based on consultant's review and e-consultation process were NRM; HRD; socio-economic and policy research; germplasm collection, conservation and improvement; strengthening NARS institutions; and strengthening basic and strategic research in the frontier areas of agricultural sciences. During the discussion, participants expressed specific concern about high concentration of poverty, hunger and malnutrition in South Asia and sought rapid solutions through comprehensive agricultural research for development programs which can have large scale impacts. The Executive Summary of his report on South Asia is given at Annexure-IV.

The participants also emphasized the importance of pulses and other legumes, wheat and local coarse cereals, besides rice in the existing cropping systems, involvement of women and youth, focus on dryland and mountain agriculture, farming systems approach in an eco-system framework, emphasis on rural non-farm/off-farm enterprises for employment and income generation, training and skill upgradation of the stakeholders involved, help of innovative/progressive farmers in the extension activities, participatory approach in research planning and prioritization, research to be based on resource availability of farmers, quality improvement of produce, minimization of post-harvest losses,

undertaking of anticipatory research to deal with climate change, abiotic/biotic stresses, risk management, diversification through livestock, fishery and horticulture, matching with resources and market opportunities, strengthening policy dialogue and communication etc. On the basis of various suggestions, the recommendations were broadly prioritized as:

1. Commodity-based:

- Rice, wheat, local staple cereals, pulses, milk and livestock, horticulture and fisheries

2. Overarching non-commodity based:

- Natural Resource Management (NRM), including climate change,
- Socio-economics, policy and value chain management,
- Germplasm conservation and improvement,
- Post-harvest management, agro-processing and value addition,
- Quality improvement and safety, and
- Rural non-farm employment and income generation.

Working Group on Southeast Asia

The working group on Southeast Asia was chaired by Dr. Kenji Iiyama, President, JIRCAS. Dr. David Raitzer, Consultant made the presentation of his sub-regional report. Besides him, Dr. Xu Yinlong, CAAS, China, Consultant also made a brief intervention. Both had also served as facilitators for this group. The Executive Summary of his report on Southeast Asia is given at Annexure-V.

The presentations by the consultants covered existing agricultural development situation and research investment patterns, analysis of research needs including impact potential and probability of success as well as research investment gaps. The presentation also covered new approaches to do business differently. The priorities presented were: genetic improvement and post-harvest management, with emphasis on rice, aquaculture, vegetables and fruits. Based on detailed discussions, the group came out with following main recommendations:

1. Commodity-based:

- Rice, vegetables, fruits and aquaculture

2. Cross-sectoral:

- Enhanced productivity and sustainability for food and nutritional security and poverty alleviation,
- Increased resilience against climate change, extreme meteorological aberrations and market volatility,
- Value chain management and prevention of post-harvest losses,
- Genetic improvement and management of biotic and abiotic stresses,
- Enhanced accessibility of research outcomes on part of small and resource-poor farmers.

The group also recommended to lay stress on new approaches to do business differently for maximizing the impact on the poor. It was also highlighted that despite good progress on reducing poverty, the sub-region still has concentration of poor farmers and consumers and hence must receive due consideration for agricultural development support by concerned governments and donor agencies.

Working Group on the Pacific

The working group on the Pacific region was chaired by Dr. R.D. Ghodake, Director General, NARI, PNG. Dr. Alan Quartermain, Consultant served as facilitator and presented the sub-regional report. In the presentation, the unique features of the sub-region including challenges for agricultural development were explained. These are: small populations and economies, high islands and atolls, weak institutional capacity, isolation, access and communication problems, remoteness from international markets, vulnerability to frequent natural disasters and climate change, limited R&D capacity, fragility of land and marine ecosystems, limited fresh water supply and high import dependency. According to the analysis, the priority research needs can be: value adding for niche markets, crop improvement, horticulture, fisheries, forest conservation and management, mitigation and adaptation to climate change, adoption of participatory approaches to research and extension, capacity building, policy support to agriculture for development, community based systems for managing resources, biosecurity and trade facilitation. The Executive Summary of the report prepared by Dr. Alan Quartermain on the Pacific is given at Annexure-VI.

Based on detailed group discussion, the following priorities emerged:

- 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 food and nutritional security;
- Climate change management through mitigation and adaptation (modeling to be pursued);
- Bio-security and trade facilitation – market access and farmer-market linkage; and
- Sustaining livelihoods in atolls.

The group also stressed on the importance of policy support, community based resource management systems, participatory approaches to research and extension activities, biosecurity and trade facilitation.

B. Plenary Discussion Session

In this session, various recommendations of the sub-regional working groups were presented and discussed. The session was chaired by Prof. R.B. Singh, Lead Consultant. The sub-regional recommendations were presented by the respective facilitators and discussed at length for general agreement. In addition to those mentioned in the recommendations, the following additional observations were accepted for necessary follow up:

- (i) It may be necessary to revisit the Southeast Asia priorities in respect of the importance of livestock in agriculture.
- (ii) The recommendations of the South Asia sub-group are too many and hence may require reprioritization.
- (iii) There should be specific recommendation on funding linked to atleast 1% of AgGDP in all the developing countries of Asia-Pacific.
- (iv) Needed funding and policy support be offered to the resource poor farmers to ensure large scale adoption of modern technologies/innovations.
- (v) Combining priority on germplasm improvement with NRM may not address recent challenges needing specific efforts on integrated natural resource management (INRM) and also would lose importance of germplasm improvement.

- (vi) Traditional knowledge should be suitably blended with the modern technology as well as new innovations.

In his concluding remarks, Prof. Singh observed that the recommendations of the three sub-groups will serve to identify the specific directions for priority agriculture and natural resource research for development in the Asia-Pacific region. All important suggestions made in the open-house will be kept in view by the consultants while finalizing the sub-regional/regional report(s). He thanked all the participants for their valuable inputs.

Session 2: Emerging Challenges and Opportunities in the Asia-Pacific

Keeping in view, the importance of emerging challenges such as global climate change, energy crisis, soaring and highly volatile food prices and uncommon opportunities like scientific advances in biotechnology, nanotechnology, ICT, management science, institutional innovations like SHGs, producer companies, public-private partnership, policy reforms, HRD etc. specific group discussions were organized in this session.

The following five thematic areas were specifically addressed in parallel working groups, each chaired by an eminent person.

Thematic Area	Chairperson
(i) Institutional arrangements linking research, extension, and farmers to markets	Ms. Simone Staiger-Rivas Knowledge Sharing Specialist ICT-KM Program CGIAR
(ii) Financing agriculture research and financing arrangements	Dr. Katsuji Matsunami Advisor and Practice Leader (Agriculture, Rural Development, and Food Security), RSDD, ADB
(iii) Supportive agriculture services, infrastructure, policies, and Asia governance for integrated food	Dr. Nerlita M. Manalili Regional Adviser on Market Access, DHRRRA and CIP-UPWARD value chains Program, Philippines
(iv) Human resource development for agriculture research for development	Dr. Ajit Maru GFAR Secretariat
(v) CGIAR's Mega programs ¹ in the context of Asia and Pacific's investment needs for AR4D	Dr. David Hoisington Deputy Director General-Research, ICRISAT

¹Mega programs proposed are: (1) agricultural systems for the poor and vulnerable; (2) institutional innovations and markets; (3) Genomics and global food crop improvements; (4) agriculture, nutrition, and health; (5) water, soils, and ecosystems; (6) forest and trees; and (7) climate change and agriculture.

Specific guidelines were also provided to set the direction of discussions. The working groups held detailed deliberations and the outcomes were presented in the plenary session chaired by Dr. Achim Dobermann. The main recommendations of each thematic area emerged as follows:

(i) Institutional Arrangements:

The working group emphasized that there should be common objectives within a value chain so that they align to achieve specific objectives while pursuing demand driven research agenda meeting the market needs. Also, there should be a strong commitment of respective actors within the value chain partnership and it should be organized and implemented in the form of consortia/association with a focal point as facilitator.

The group suggested to strengthen public-private partnership through formal-informal arrangements while adhering to country's legal framework and farmers' bargaining power since there are uneven relations between the farmers and the buyers.

The group also recommended that (a) empowerment of farmers through capacity building (technical, financial and managerial support), and strengthening should receive greater attention, (b) government must provide enabling environment and support Institutions should effectively deliver technology and package of practices, and (c) funding support has to be significantly enhanced to strengthen institutional arrangements.

(ii) Financing:

The group recommended that for increasing the funding support, following requirements/steps will be desirable:

- Documentation and wide dissemination of success stories
- Developing appropriate innovative business/revenue models
- Use of innovative funding models
- Greater synergy between international/regional/national research priorities
- Performance based funding
- Active engagement with Ministries of Finance/Planning

For making the fund flow more effective and efficient, the following need attention:

- To provide functional autonomy to NARS
- To ensure long term, predictable funding support
- To follow common and transparent cost recovery policies among donors/IARCs
- To create a research pool fund for each country
- To have unrestricted funding from donors
- To have more clarity on CG funding

To manage effectively the available funds, the following are needed:

- There is need to develop and implement strategic research framework
- Funding requirements needed for infrastructure and staff salaries should be an integral part of country strategic framework
- Innovative funding for training /scholarships
- Innovative models for upscaling and outscaling of technology and innovations

(iii) Supportive Agri-services:

The working group made specific recommendations with respect to five important services such as land tenure, water, climate change, human resource development and market and trade. In each one of these services, recommendations are spelt out in respect of infrastructure and support services, research and needed policies.

- (a) Under land tenure, land security and package of support assistance (training, credit, extension, post-harvest and market), research on competing land uses, policies on ensuring land security rights (including women), transboundary concerns and emerging land uses.
- (b) Under water services, organizing systems and mechanisms to operate irrigation structures, research on innovative irrigation systems that are pro-resource poor farmers' and policies on appropriate pricing of water.
- (c) Under climate change, more farmer friendly information to be collected, processed and disseminated, research on coping mechanisms, besides policies on adaptation and mitigation require priority attention.
- (d) Under human resource development, updated curriculum, focused training programs, developing extension systems appropriate for poor farmers' needs, documentation, translation and dissemination of information, research on implications of ageing farming population, upscaling of best practices, and the rights of farmers to organize and get mobilized.
- (e) Under market and trade, post-harvest facilities, use of ICT in market information, research on pricing mechanism, innovative business models appropriate for resource poor farmers, quality and standards required during the post harvest processes, scenario building, natural input utilization for sustainable and viable production and policies on food security, south-south cooperation, and incentives to encourage multi-stakeholder partnerships.

(iv) Human Resource Development:

The main recommendations of the group were:

- (a) Change in the education and learning systems with emphasis on education to learning, strategic planning and integrating research, extension and education,
- (b) Change in institutions which include changes in schools and universities statutes, curriculum, structure, infrastructure finally leading to total transformation and adaptation,
- (c) Process changes where teaching includes lifelong learning, use of technology mediated learning, learning from farm practitioners, and
- (d) Soft skills development such as partnership management, livelihood analysis, PME etc.

(v) CGIAR Strategic Research Framework and Mega Programs:

The main recommendations of this working group included the following:

- (a) There is need to seek more inputs/involvement from the regional fora and NARS,
- (b) There is no need to create any additional bureaucracy, and
- (c) The current structure is sufficient to achieve the required integration and make the proposed mega programs exciting and useful.

Session 3: AR4D –The Stakeholders’ Perspective

Under this session, four working groups were constituted as under:

Working Group 1- Public Sector: short- and medium- term actions and requirements - NARS/IARCs in South Asia, facilitated by Dr. J.N.L. Srivastava, IFFCO Foundation, India;

Working Group 2- Public Sector: short- and medium-term actions and requirements- NARS/IARC in Southeast Asia and PRC, facilitated by Dr. Abd Shukor Abd Rahman, Chair, APAARI, Bangkok, Thailand;

Working Group 3- Civil Society: short- and medium-term actions and requirements in the Asia-Pacific region, facilitated by Mr. Raul Montemayor, Vice President, IFAP, Philippines;

Working Group 4- Pacific Government and Private Sector: short and medium term actions and requirements, facilitated by Dr. Mary Taylor, Genetic Resources Coordinator, Secretariat of the Pacific Community (SPC), Fiji.

The facilitators of the respective working groups reported their main recommendations in the Plenary chaired by Dr. Cynthia Bantilan, ICRISAT, India. These were:

Working Group 1- Public Sector: short- and medium- term actions and requirements - NARS/IARC in South Asia

The group discussion was mainly focused on small farmers and had identified main issues related to the food and nutritional security, increasing net incomes primarily from agriculture while ensuring sustained livelihood security, and enhancing farm productivity through optimization of input and resources’ use efficiency. Concerns were expressed regarding the lack of access to new technologies, timely and adequate supply of inputs at affordable prices, and availability of know-how to produce required inputs on farm. The need to have favourable terms of trade (market, prices, infrastructure), and suitable measures for managing risk on account of vagaries of weather or market fluctuations were strongly emphasized. The group observed that the issues of depletion of production resources, impact of climate change on production and prevention of post-harvest losses need to be addressed as a matter of priority.

The group made the following recommendations:

- Reorientation of agriculture research to meet the needs and aspirations of resource poor farmers and other rural poor
- Farming systems’ approach in eco-system framework through appropriate diversification (livestock, horticulture, fisheries) matching with resources and market.
- Addressing research with focus on women and youth
- Inclusion of leguminous crops in the Farming Systems’ Research (FSR) as a source of protein for human, livestock and for the improvement of soil health
- Thrust in research on local crops for achieving food and nutritional security.
- Develop contingent plan for addressing natural calamities
- Research focus should be on post-harvest management, value addition, quality improvement and safety

- Improving the risk management capacity through appropriate farmer-friendly policies, programs and business models
- Exploring employment and income opportunity options beyond agriculture in rural areas
- Development of package of practices on knowledge based farming
- Strengthen research on natural resource management (water, soil and agro-bio-diversity) for enhancing agricultural sustainability and productivity

The group also emphasized upon the need for Governments to create favourable policy environment. Some of the suggestions related to enhancing investment in agriculture and allied sectors in general and allocation of budget to agricultural research to a minimum of 2% of AgGDP, of which minimum 50% should be for operational expenses. Simultaneous initiatives were proposed to be taken to encourage private sector investment and public-private partnership. Creation of appropriate farmer friendly institutions and mechanisms to achieve short and medium term objectives, creation of necessary infrastructure for storage of farm produce, especially the produce with short shelf life, value addition technologies and training in these areas were considered critical. The transfer of technology was identified as a weak link and it was suggested that the governments should take steps to strengthen technology transfer mechanisms and technological empowerment of farmers. The public sector institutions also need to promote conservation agriculture and post harvest technologies. It was suggested that with respect to small farmers, public sector will have to play a very important role through budgetary and policy support systems, whereas civil society organizations (CSOs) can help in effective transfer of technologies (ToT).

Working Group 2- Public Sector: short- and medium-term actions and requirements - NARS/IARC in Southeast Asia and PRC

The group discussed mainly the agricultural research agenda for South-east Asia which should have focus on integrated genetic and natural resource management (diversification, ecological), resilience (climatic, economic and political shocks), value chain (post-harvest) and transfer of technology for easy access of technologies to the small farmers.

The group also outlined an action plan to implement above stated research agenda with focus as stated above. Firstly, a shift from commodity to thematic area research was suggested taking into account the integration of several institutions/agencies for harnessing the synergy and better use of resources. It was further mentioned that the thematic area research is becoming a global trend and has to be based on national priorities.

The group observed that to have greater impact of agricultural development programs in the short term, replication of success stories would be very helpful. The role of NARS led priority setting, with clearly defined action plan and deliverables was emphasized. At the same time, it was mentioned that the approach on evidence based priority setting be adopted to have maximum benefits from AR4D.

For enabling the NARS to deliver the desired results, the Group felt that the national Governments need to be more proactive towards ARD, the policy makers need to be well informed and be forthcoming to implement the agricultural research for development agenda. In view of the present day requirements for infusion of new technologies and products for improving the efficiency and profitability of agriculture, the government sectors were urged upon to enhance investments. It was also considered desirable to enable the farmers for technology uptake through their capacity building.

Working Group 3- Civil Society: short- and medium-term actions and requirements

The group identified seven priority research areas, along with the challenges, strategies, implementing agencies and the time frame.

The group felt that connecting traditional knowledge with new science was critical for which lack of funds, attitude/openness of parties, biopiracy (IPR), popular language, time and commitment were seen as some of the challenges. In the short-term, the strategies proposed included: development of mechanisms for dialogue and action oriented multi-stakeholder involvement, especially NGOs and farmers. Also, action oriented research, in a participatory mode, will be most rewarding.

The second priority area identified was farmers' empowerment wherein lack of traditional seeds and knowledge were considered as major challenges. Several strategies were suggested such as low input technologies, research on integrated farming systems, research on how farmers can graduate to undertake independent operation (least dependence on external cash inputs), strengthening farmers' organization for efficient extension (Farmers' Field School), focus on women and youth, participatory research (involving farmers), policy and advocacy, and developing opportunities for off-farm and on-farm employment. In terms of time frame, the action needs to be in a continuum with greater involvement of CSOs.

The working group felt that soil, water, climate change, market and trade and risk management were main priority research areas needing immediate action by all stakeholders.

Working Group 4- Pacific Government and Private Sector: short and medium term actions and requirements

The group identified three priority areas for priority intervention. These were: (i) crop improvement, (ii) community-based systems for managing resources, and (iii) biosecurity and trade facilitation (market access).

Crop improvement was considered important on account of several factors that influence crop production and more importantly in the wake of emerging challenges. The global climate change and its likely impact on agriculture was considered a foremost challenge. The need to optimally use potential of existing genetic diversity in crop improvement program along with appropriate agronomic practices was emphasized. Institutional capacity, its sustainability, commensurate investments and weak quarantine facilities were also identified as significant challenges. In order to address various challenges, the group identified several opportunities such as: increased adoption of new skills; development of new varieties; exploring and capitalizing on trade opportunities; fostering functional linkages with stakeholders and enforcing intellectual property and farmers rights. Considering the nature and magnitude of the challenges in the sub-region, it was felt that networking with intra-regional and inter-regional stakeholders and organizations such as regional fora and the CG system is essential. On the issue of crop improvement the short-term needs highlighted were: (a) training, and (b) access to genetic resources for which institutional capacity has to be developed; and the long-term measures suggested were: sustainable funding and proactive policy support for which respective governments need to be more forthcoming. For sustainability, capacity in using a more participatory approach to crop improvement must be strengthened, resulting in an increase in the use of participatory varietal selection and participatory plant breeding.

Community-based systems for managing resources were suggested as an important approach in the Pacific given the way in which Pacific community works. It was felt that a major challenge was the

lack of Government support to such initiatives. Further, the need to put in place the incentives for the community to be duly recognized and appreciated for adoption of new technology. Attracting and retaining youth is also emerging as a serious constraint in the way of agricultural development. In a community-based approach for managing resources, opportunity was seen in strengthening the value addition component and also in taking advantage of local culture and traditional system to support the much needed conservation of natural resources.

Biosecurity and trade facilitation (market access) were seen as key issues to generate income and promote trade. The major challenges encountered relate to weak negotiating capacity, inadequate quarantine facility and systems and institutional capacity to deal with issues of biosecurity. In this context, HRD through training programs, adequate financial resources supported by an enabling policy environment were considered important. These were considered equally important for markets especially for regulation of import and export of agri-produce/products. To address current issues and challenges, action was desired to identify gaps and needs on short-term basis, whereas areas of capacity building, conservation of resources, strengthening agri-information systems, R&D monitoring were mentioned as long term measures to improve agriculture in the Pacific sub-region.

Session 4: Consolidation of Discussion and Recommendations

Dr. Ajit Maru of GFAR chaired the session for consolidation of overall recommendations.

Prof. R.B. Singh made a comprehensive presentation capturing the main outcomes of the sub-regional reports and the deliberations that took place in different sessions of the Face to Face consultation. Presenting the existing agricultural scenario, he highlighted the high prevalence of global hunger and poverty in the Asia-Pacific region. He mentioned that the number of poor has risen in South Asia and their number is much higher in absolute terms than the Sub-Saharan Africa (SSA). Citing the success of Green Revolution, he stated that agricultural growth in the region has the potential to reduce both poverty and hunger to a greater extent. However, currently the agricultural development faces major challenges in the region. Accordingly, the Face to Face consultation discussed various options for large scale impact and the highlights of deliberations were presented by Prof. Singh (see Summary of Regional Report at Annexure-VII).

The key issues and challenges prominently figured during the consultation were: fighting stubbornly high and ever increasing poverty in the region; intensifying disparity between rural-urban, farm-non-farm workers' income; enhanced vulnerability of poor to the forces of markets and vagaries of weather; degrading and declining natural resources; poor infrastructure, governance, regulatory mechanisms; policy-program-practice mismatch; non-alignment of input-output prices; deteriorating net trade; low and declining investment in agriculture; hesitant private sector for investments; inadequate fiscal and monetary policies; eroding human resources; poor strategic linkages among productivity, profitability, sustainability, equity and feminization of agriculture; crisis of entitlement for the poor farmers for their agricultural production and marketing; under used traditional knowledge/indigenous technologies; non-availability of reliable data/information for proper agricultural planning; technology fatigue/complacency and persisting huge technology transfer, knowledge and innovation gaps.

Dr. Lourdes Adriano presented the draft "Bangkok Declaration", which was based on stakeholders' concerns and combined outcomes of the review, e-consultation and Face to Face meeting. The text of "Bangkok Declaration" is given at Annexure-VIII. Dr. Adriano stated that the declaration emphasizes the urgency of addressing poverty, hunger and malnutrition in Asia Pacific region through agricultural

research for development, a major supplier of food and agriculture commodities. The main highlights of the draft declaration included: doubling of investment in agricultural research for development; need of the firm commitment of the developing country Governments to allocate at least 1% of AgGDP to AR4D, clear prioritization of research agenda with focus on resource poor farmers, emphasis on rice, wheat, local staple cereals, horticulture, livestock, fishery; integrated natural resource management; socio-economic and policy research; human resource development; post-harvest and value addition; new approaches such as farming systems' approach, value chains, blending indigenous knowledge with modern technologies, public-private sector partnership, linking farmers with markets, involvement of stakeholders and use of information and communication technology for technology generation, assessment and transfer. It further emphasizes on promotion, organization and strengthening of regional networks, collaboration and south-south collaboration. The declaration also hopes for faithful implementation of the recommendations so that the national governments are able to make speedy progress in achieving the MDGs.

Accordingly, the "Bangkok Declaration" (see Annexure-VIII) was unanimously adopted. The participants were also requested to send their suggestions, in track mode, for the improvement of draft circulated in the Plenary Session. It was agreed to have the same circulated widely.

Based on detailed discussions on key issues, the following main recommendations had emerged from the consultation, beside the adoption of "Bangkok Declaration":

- (i) Main focus should now be laid on the farming systems' research suiting to the needs of small and resource poor farmers. Hence, reorientation of research agenda in consultation with all stakeholders, especially small farm holders, is critical at this juncture.
- (ii) There is an obvious need to forge the synergy among productivity, profitability, sustainability and biosecurity, which would require policy reorientation by the developing countries in the region.
- (iii) In order to meet the twin challenge of hunger and poverty, there is an urgency to double the current investments in agricultural research for development by the nations whose economy is largely dependent on agriculture.
- (iv) Financial innovations are needed to increase the intensity and overcome the imbalance of resource allocation for AR4D, especially in areas of high income-return sectors like livestock, horticulture and fisheries. Also, there is need to implement appropriate fiscal measures regarding credit, subsidy and insurance and trade off between social safety and the creation of productive assets.
- (v) It is high time to focus now on improving crop varieties for tolerance to biotic and abiotic stresses; improving product quality (nutrition, value addition, shelf life and suitability to processing); developing short duration HYVs of rice, wheat, maize to be grown with other crops, especially legumes, vegetables and flowers in the cropping systems' mode; and to enhance cropping intensity and resource productivity. Also diversifying the production system consistent with land, water, socio-economic requirements and market demand; improving input use efficiency through ICM, IPM, INM etc.; designing the cropping systems for higher yields, pest management, natural resource conservation and integration with livestock, fishery and trees; production and distribution of quality seed and planting materials; small farm mechanization and protected cultivation of vegetables and flowers, post harvest handling, value addition through low cost processing and safe storage are the key areas for research focus and innovations.

- (vi) It is also important that we lay focus on livestock, including poultry, especially in the context of characterization and improvement of local breeds through selective breeding and evolving a science led policy on cattle breeding; improving digestive capacity of crop residues and removing anti-nutritional factors, and reduction in methane emission. Also improving animal health by enhanced science-based capacity in epidemiology and diagnosis; vaccine production for major diseases; disease-nutrition interactions and genetic resistance to major diseases; overall management capacity to check cross-border diseases and zoonosis; and product (milk, meat, wool) processing including animal waste management are the important areas needing specific attention.
- (vii) Focus on fisheries (coastal and inland/aquaculture) for sustainable integrated management of coastal systems and marine protected areas including mangroves; sustainable management of marine shrimp farming including efficient effluent management; reef fishery systems' management; crab culture and ornamental fishes is needed by the NARS of the developing countries in the region. In addition, emphasis on genetic improvement for faster growth and disease resistance, aquaculture systems' management, including deepwater rice-fish/freshwater prawn, integrated fish farming, and open water culture-based fishery and cold water fish culture will be desirable.
- (viii) In the area of agro-forestry, scientific management of felling-cutting cycles, timber utilization, inventorying, evaluation and development of agro-forestry resources, promotion and management of alley cropping, carbon sequestration and trading, and genetic improvement of medicinal and aromatic plants should receive priority attention.
- (ix) Natural resources and climate change management has to be given high priority through integration of traditional knowledge with scientific innovations around integrated management of soil, water and other non-renewable resources. There is an urgent need for input use of resources such as water, soil and nutrients/fertilizers, while ensuring crop-animal-water-nutrient synergy. Policy issues covering water pricing, watershed management, aquifer recharge, reclamation of saline/sodic lands, use of saline and arsenic contaminated water, sustainable land use, organic recycling, soil fertility management and organic farming, especially in the context of adaptation and mitigation of global climate change should receive immediate attention of all stakeholders.
- (x) The suggested thematic research priorities for Asia-Pacific are: (a) productivity enhancement particularly in food staples and those that will diversify incomes from the farm sector through use of science and technology; (b) improved value chain development and management. Major gaps in the chain are infrastructure that link farmers to markets; and market outreach through building networks and partnerships (PPPs, farmers' cooperatives/associations etc.); and (c) increased resilience in two major areas: climate change, and those resulting from economic shocks. The thematic research priorities with spatial dimensions are provided in Annexure-VII.
- (xi) Research orientation is specifically needed to address climate change through twin strategy of adaptation and mitigation. Also, a proper balance is to be ensured between bioenergy and food security in the region. Long term strategy for risk management against natural calamities must be devised and put in place as a matter of priority.
- (xii) Institutional innovations are needed for capacity building, feminization of agriculture, market management, entire extension approach and the establishment of small farmers' organizations including producers companies, co-operatives, self help groups (SHGs) etc. in order to link farmers to the markets. Such an approach would benefit both producers and consumers.
- (xiii) Enabling policy environment needs to be created for the overall agricultural development; agricultural research; trade in the globalized world (with appropriate IPR, PVP and SPS measures);

public-private partnership in research, technology generation, assessment, refinement and transfer; innovative ways for South-South, South-North collaboration and regional partnership involving all stakeholders in the production-consumption chain.

- (xiv) In the on-going process of change in CGIAR, including the finalization of Strategic Research Framework (SRF) and Mega Programs (MPs), it will be desirable to ensure:
- Effective involvement of Regional Fora and the NARS,
 - Focus be laid on South Asia and Southeast Asia,
 - Required integration among Centers be ensured to address effectively the eco-regional problems, and
 - More creative and exciting MPs be planned, involving developing country NARS and the Regional Fora/Organizations.
- (xv) As regards future course of action, effective communication of the outcome of Face to Face Consultation to all stakeholders, besides Governments, donors, and Development Banks is strongly recommended. Hence, advocacy for implementation of “Bangkok Declaration”, internalizing the recommendations into the GCARD 2010 process, integration of recommendations with proposed CGIAR SRF and Mega Programs, as well as with regional fora networks will be highly rewarding. Governments, therefore, need to be sensitized to immediately double their allocations for AR4D.

Both Dr. Katsuji Matsunami and Dr. Lourdes Adriano of ADB suggested to include the feedback from this consultation as a valuable input in ADBs review exercise on agriculture and for presentation of agriculture strategy in the forthcoming high level Investors’ meet during mid-2010 and welcomed APAARI to participate being a key partner.

Dr. Raj Paroda, in his concluding remarks, mentioned that earlier APAARI had undertaken the ARD priority setting agenda for the three sub-regions during 2005 and later during 2006 for the region as a whole. Most of the recommendations have re-enforced the outcome of earlier deliberations. He expressed optimism that Asia-Pacific region has great potential to become a vibrant agricultural region. However, it would then need required investments and enabling policy framework, especially when ‘*Inclusive Development*’ for the resource poor farmers is our main focus. Appreciating the overall consensus on “Bangkok Declaration”, he expressed hope that it would sensitize the national leaders as well as donor to address major AR4D issues on priority. In this context, he desired to have a high level policy dialogue involving national leaders, policy makers, and the lead international and donor organizations like ADB, FAO, GFAR, CGIAR etc. He also appreciated the excellent contributions made by the participants, consultants, ADB and all those present for coming out with useful recommendations relating to reorientation of AR4D agenda to make a difference in the lives of resource poor farmers, producers and consumers. The outcome so derived will not only provide an important feedback to GCARD 2010 process but would catalyse APAARI member countries in reshaping their agricultural research with greater focus on the poor. He finally thanked the participants and both ADB and GFAR for their specific interest and support in organizing the meeting. At the end, he hoped that the outcome will help reshape regional agricultural research agenda.

The consultation concluded with a vote of thanks to the Chair.

*Annexure - I***Program**

Day/Time	Topic	Speaker/Lead
DAY ONE: 30 October, 2009		
OPENING SESSION		
Chair : Dr. Raj Paroda, APAARI		
8:00 - 8:50	Registration	
9:00 - 9:10	Welcome from APAARI Venue: Pinnacle 4/5	Dr. Abd Shukor Abd Rahman Chair, APAARI
9:10 - 9:20	Welcome from ADB	Dr. Katsuji Matsunami Advisor and Practice Leader (Agriculture, Rural Development, and Food Security), RSDD, ADB
9:20 - 9:40	GFAR and the GCARD Process	Dr. Ajit Maru GFAR Secretariat
9:40-10:00	Presentation of CGIAR's Strategic Results Framework	Dr. David Hoisington Deputy Director General-Research International Crops Research Institute for the Semi Arid Tropics (ICRISAT)
10:00-10:30	Discussion	
10:30-11:00	Tea Break and Group Photograph	
11:00-11:20	Overview of the Asia-Pacific Region, Key Issues from the E-Consultations, and Purpose, Expected Outcomes and Flow of Face to Face Meeting	Prof. R.B. Singh Lead Consultant
Session 1. Sub-Regional Discussions		
Dialogues on Agriculture Research at Sub-Regional Levels		
Chair: Prof. R.B. Singh, Lead Consultant		
11:20-11:30	Introduction of and Breakout to Sub-Regional Groups	
11:30-13:00	Parallel Working Groups: AR4D in South Asia Venue: Pinnacle 1	Chairperson/Facilitator: Prof. Rohan Rajapakse Executive Director Sri Lanka Council for Agricultural Research Policy (SLCARP)

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Day/Time	Topic	Speaker/Lead
		Resource Person: Dr. Mruthyunjaya, Consultant
	AR4D in Southeast Asia, including PRC Venue: Pinnacle 4/5	Chairperson/Facilitator: Dr. Kenji Iiyama President, Japan International Research Center for Agricultural Sciences (JIRCAS)
		Resource Persons: Dr. David Raitzer, Consultant Dr. Xu Yinlong, Consultant
	AR4D in the Pacific Venue: Pinnacle 2	Chairperson/Facilitator: Dr. R.D. Ghodake Director General National Agricultural Research Institute (NARI)
		Resource Person: Dr. Alan Quartermain, Consultant
13:00-14:00	Lunch	
14:00-14:30	Sub-regional Working Groups to Consolidate their Discussion Points	
14:30-16:00	Reporting Back and Discussions by Sub-regional Working Groups Venue: Pinnacle 4/5	
16:00-16:30	Tea Break	
16:30-18:00	Reporting Back of Session I Working Groups and Discussions	
19:00-21:00	Cocktails, ADB	

DAY TWO: 31 October, 2009

Session 2: Emerging Challenges and Opportunities in the Asia-Pacific

Chair: Dr. Achim Dobermann, IRRI

08:30-08:40	Introduction of and Breakout to Working Groups' Thematic Areas	
08:40-10:00	Parallel Working Groups :	
	Working Group 1- Institutional Arrangements Linking Research, Extension, and Farmers to Markets Venue: Pinnacle 1	Chair: Ms. Simone Staiger-Rivas Knowledge Sharing Specialist ICT-KM Program CGIAR
	Working Group 2- Financing Agriculture Research and Financing Arrangements Venue: Pinnacle 2	Chair: Dr. Katsuji Matsunami Advisor and Practice Leader (Agriculture, Rural Development, and Food Security), RSDD, ADB
	Working Group 3- Supportive Agriculture Services, Infrastructure, Policies, and Governance for Integrated Food Value Chains Venue: Pinnacle 3	Chair: Dr. Nerlita Manalili Regional Adviser on Market Access Asia DHRA and CIP-UPWARD Program, Philippines

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Day/Time	Topic	Speaker/Lead
	Working Group 4- Human Resource Development for Agriculture Research for Development Venue: Pinnacle 6	Chair: Dr. Ajit Maru GFAR Secretariat
	Working Group 5- CGIAR's Mega Programs ² in the Context of Asia and Pacific's Investment Needs for AR4D Venue: Pinnacle 4/5	Chair: Dr. David Hoisington Deputy Director General- Research ICRISAT
		Resource Persons: Dr. David Raitzer, Consultant Dr. Xu Yinlong, Consultant
10:00-10:15	Tea Break	
10:15-11:30	Reporting Back of Session 2 Working Groups and Discussions	
² MEGA programs include (1) agricultural systems for the poor and vulnerable; (2) institutional innovations and markets; (3) Genomics and global food crop improvements; (4) agriculture, nutrition, and health; (5) water, soils, and ecosystems; (6) forest and trees; and (7) climate change and agriculture.		
Session 3: AR4D– The Stakeholders' Perspective Chair: Dr. Cynthia Bantilan, ICRISAT		
11:30-11:40	Introduction of and Breakout to Working Groups	
11:40-13:00	Parallel Working Groups :	
	Working Group 1- Public Sector: Short- and Medium- Term Actions and Requirements - NARS/IARCs in South Asia Venue: Pinnacle 1	Chair: Dr. J.N.L. Srivastava Chairman, IFFCO Foundation
	Working Group 2- Public Sector: Short- and Medium- Term Actions and Requirements - NARS/IARC in Southeast Asia and PRC Venue: Pinnacle 2	Chair: Dr. Abd Shukor Abd Rahman Chairman, APAARI
	Working Group 3- Civil Society: Short- and Medium-Term Actions and Requirements Venue: Pinnacle 4	Chair: Mr. Raul Montemayor Vice President, IFAP
	Working Group 4- Pacific- Government and Private Sector: Short and Medium Term Actions and Requirements Venue: Pinnacle 5	Chair: Dr. Mary Taylor Genetic Resources Coordinator Secretariat of the Pacific Community (SPC)
13:00-14:00	Lunch	
14:00-15:30	Reporting Back of Session 3 Working Groups and Discussions	
15:30-15:45	Tea Break	

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Day/Time	Topic	Speaker/Lead
Session 4: Consolidation of Discussion and Recommendations Chair: Dr. Ajit Maru, GFAR		
15:45-16:15	The Asia-Pacific Agriculture Research Agenda - Consolidation of Discussions and Recommendations	Prof. R.B. Singh Lead Consultant
16:15-16:45	Open Forum	
17:00-17:30	Adoption of “Bangkok Declaration”	Dr. Lourdes Adriano Principal Agriculture Sector Economist, RSDD, ADB
17:00-17:20	Closing of the Meeting	Dr. Raj Paroda Executive Secretary, APAARI

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Summary of the Feedback Received from E-consultation

Introduction

Through a series of electronic and face-to-face regional and global consultations, the Global Forum on Agricultural Research (GFAR) in collaboration with the Consultative Group on International Agricultural Research (CGIAR) aims to reshape the global agricultural research agenda for development and reorient it to the needs of the poor through both the generation of new and relevant knowledge and the empowerment of rural communities to make use of all that is known. The consultation results will feed into the Global Conference on Agricultural Research for Development (GCARD), 2010. The process is being supported by Asian Development Bank (ADB) and Asia-Pacific Association of Agricultural Research Institutions (APAARI).

The e-consultation in the Asia-Pacific region (South, Southeast and East Asia and the Pacific) spanned from 1st to 24th September. Nearly 100 different participants for a total of about 350 messages and 110,000 words had actively participated.

Key Agricultural Development Issues

The stakeholders had endorsed a list of important issues (16 main drivers and 53 specific challenges) of agriculture-led development in the Asia-Pacific region (sent along with the list of ten questions). The key issues are grouped as below:

- (i) ***Fighting Stubbornly High Hunger and Poverty:*** Stubbornly high hunger, under-nutrition and poverty and high dependence on agriculture, especially for employment and livelihood, bridging the huge yield gaps by doubling the rates of growth of yield and income while improving input use efficiencies particularly in the vast rice ecologies and rainfed areas which are often the hunger and poverty hotspots;
- (ii) ***Synergizing Productivity, Sustainability and Equity– Towards Evergreen Revolution:*** Extremely high and growing population pressure, nearly 75% of the world's agricultural population cultivating only 37% of the world's agricultural land under increasing land degradation, water scarcity and biodiversity erosion, thus underpinning the urgency of enhancing productivity in perpetuity by developing and adopting eco-technologies towards creating an Evergreen Revolution;
- (iii) ***Can Small Always be Beautiful– The Crisis of Entitlement:*** Predominance of small and marginal farmers and increasing land fragmentation, emphasizing the need to generate technologies suited to smallholders, to enhance labour productivity, and to enhance access to land, water, energy, inputs, credit and insurance;
- (iv) ***Research– The Engine of Growth and Development:*** Centrality of technology, information, knowledge and innovations for development and to promote informed diversification to optimize opportunities in horticulture, livestock, fishery and agroforestry and to meet the challenges of rising income, inequity, urbanization and human health, and to revitalize the technology generation and diffusion process;

- (v) ***Linking Farmers with Markets:*** Linking farmers with markets, strengthening post-harvest management, agro-processing, value addition, enhancing food availability for the poor through market, trade and distribution reforms, safety nets and integrated on-farm – off-farm – non-farm employment and income; strengthening bio-security toward safe and green agriculture and facilitating international trade; and
- (vi) ***Policy Support– A Must for Science-led Development:*** Policy options and actions for increased investment in agriculture and agricultural R&D, improving terms of trade for agriculture, participatory (involving public, private, NGO, CSO sectors and farmers) research, extension and education, input-output pricing, institutional and services supports, bioenergy, climate change management and minimization of distortions of crop-animal-soil-water cycles, regulatory measures and standards, gender sensitivity, and retention of youth in agriculture and agriculture-related activities.

Voices of the Stakeholders

The main messages emerging from the responses of the stakeholders on the ten questions have been summarized below. It is hoped that this rather extended summary will be internalized in the Regional Report.

Have the Research Agendas Addressed the Development Needs of the Resource Poor?

Generally, research agendas, particularly in the recent decade, have not addressed the needs of the resource poor sufficiently well. The inability of resource poor farmers to afford costly inputs and to take risks associated with new technologies has not been internalized adequately in research agendas.

Inadequate attention has been paid to sectors that are growing rapidly and have a lot of potential to reduce poverty, hunger and under-nutrition/malnutrition through production and marketing of high value products e.g. horticulture, livestock and fisheries.

Research on rice, wheat and maize, particularly the development of high yielding varieties including hybrids, coupled with enhanced fertilizer use, irrigation and integrated pest management, had triggered the Green Revolution in the 1960s. The process had more than doubled food-grain production, mostly through productivity enhancement, resulting in halving the levels of poverty and hunger between 1970 and 1995.

The Green Revolution, however, often due to inappropriate use of technology, had its liabilities, such as loss of biodiversity, environmental pollution, land and water degradation and increased incidences of pests and diseases. The total factor productivity (TFP) growth rate has been continuously declining and the input-output ratios have become increasingly unfavourable.

Research agendas are often based on perception of certain experts and those having a set of goals towards pursuing science in the background of international waves of agricultural research, and often do not accommodate the views of farmers, priorities of states, status of input supply chains, market forces and edaphic factors.

Level and Cost Effectiveness of Investment in Agricultural R&D

Agriculture sector in the overall economies of Asia-Pacific countries is underestimated and undervalued and suffers from veritable asymmetries. In relative terms (percentage of Agricultural GDP), investments

in agriculture and agricultural research have steadily declined in most developing countries, although in absolute terms, primarily due to boost in public sector investment in AR4D in China and India, the regional level investment had doubled between 1981 and 2000.

Some believe that the unsatisfactory productivity, food security and poverty situations are due to the fall in investment in agriculture, particularly in agricultural research since late 1980s. The fall in budget had also caused decline in the human resources for agricultural development which has created a generation gap in agricultural science.

The primary constraint for productivity growth decline over years is, however, not fully on account of low investment, but often because of depleting and degrading natural resources, improper resource management practices and non-availability of quality seeds and other critical inputs.

Notwithstanding the importance of cereals in the diets of people in Asia-Pacific, dietary changes towards increased consumption of livestock, horticulture and fish products are evident even in the diets of poor. Such changes demand commensurate changes in investment.

While agricultural and natural resource management research is undertaken to meet the various challenges, the different objectives require different research approaches and solutions. Although not mutually exclusive, there is hardly any analysis undertaken to guide balanced allocation of resources across these different objectives. This research gap should be abridged urgently so that the limited resources could be judiciously and effectively deployed.

Emerging challenges in climate change adaptation, water scarcity, soil fertility and biodiversity erosion, gaps in institutional and human resources development, increasing biotic stresses and biosecurity concerns call for both increased resource allocations and their effective and transparent utilization (monitoring, evaluation and impact analysis should be an integral part of all research programs).

Conventional research has been badly affected by preferential investment in biotechnology, and the asymmetry should be corrected. There is underinvestment in socio-economic and natural resources management (NRM) research, thus adversely affecting the development of more effective policies, the functioning of institutions, capacity building and the decisions on investments with focus on inclusiveness and the poor, and the development of rainfed dry-lands and other environmentally non-congenial areas.

More recently, nonetheless, in some countries there has been some shift in emphasis on research on resource conservation technologies for resource-poor farmers in disadvantaged eco-regions such as rainfed, upland, hilly, arid, and semi-arid areas. But their visible large scale impacts are neither widely demonstrated nor up-scaled.

A balanced investment is called for catering to the needs of research for maintenance, for extending the benefits to new areas such as dry lands, hills and mountains, small island countries and coastal eco regions, and for attaining new gains.

Shift in Research Strategies

Low-input, but high return farm practices, integrated knowledge and farming systems based on organic farming principles (green agriculture and not strictly organic agriculture), participatory, interdisciplinary

and multidisciplinary research and extension approaches should be promoted towards meeting the food, nutrition and income needs of resource-poor farmers, increasing inclusiveness and ensuring resource conservation and sustainability.

Use of locally available natural and man-made resources should be promoted so that outputs are efficiently and cost effectively produced, generating direct benefits to indigenous populations, including the poor and women.

Emphasis should shift from mere knowledge generation to innovations by involving all major stakeholders, namely, farmers, agro-industry, CSOs and market players. Demand-driven AR4D models should be duly verified (action research) through formal but participatory research and extension teams under real farming situations and, based on merit, should be scaled up and scaled out.

The research led by commitment to a set of guiding values— poverty focus, gender inclusivity, demand-led and partnerships, as espoused by GFAR, can directly and quickly impact the poor. For instance, the widespread adoption of BRRI Dhan-47, a salinity tolerant rice variety in Bangladesh was facilitated by the Poverty Elimination through Rice Research Assistance Project (PETRRA), a multi-partner project which had impacted the livelihood of thousands of households. “It showed that change within traditional structures is possible. For poverty focus the partnerships need to be close to the ground. Technological breakthroughs that may be generated through advanced research can interface the resource poor and women through simple facilitating processes. And this needs to be in country.”

Science should help in resolving the conflicting views on the efficacy of organic agriculture as well as of biotechnology in meeting the objectives of alleviating hunger and poverty. If there are economic and nutrition and biosecurity niches for profitable organic production, farmers should certainly adopt/adapt those. Where farmers-friendly agro-technologies generated through the use of biotechnology and the transgenic crop varieties and hybrids have a proven advantage and the science is clear about their impact on farmers’ livelihoods, human health, biodiversity and the environment, not allowing farmers access to such technologies is difficult to justify.

Renewed commitment to productivity growth, especially at small farms, is needed. Building on mutual confidence and respect and based on comparative advantages, PPP should be promoted for technology generation and sharing.

Several of the small countries lack adequate scientific research capacity to address the veritable problems. The “soft skills” such as research planning, priority setting, impact assessment, innovative resource mobilization etc. are usually missing among scientists.

Researchers need to work more closely with development agencies and policy makers so that appropriate action research is pursued at the farm/micro level and to address also the needs of landless farmers, pastorals, small fishers and tribals.

Diversification should be commensurate with income, nutrition, soil and water availability and their conservation, employment opportunity, equity, women welfare, market trend and access, technology, labour and energy availability with research effort broadened to a range of crops and commodities including coarse grains, legumes, roots and tubers, fruits and vegetables, livestock, aquaculture and agroforestry.

Priority Researchable Areas

Productivity of crops and livestock should be enhanced through genetic improvement to increase their adaptation to heat, water, disease and pest stresses, besides being high yielding and rich in nutritional qualities.

Research should be intensified to enhance conservation and sustainable use of natural resources particularly land, water and natural ecosystems resulting in the reversal of the decline of the total factor productivity growth rate, more efficient and remunerative use of resources, enhanced resilience and improved competitiveness of the farmers, particularly in face of the climate change and economic vulnerabilities.

Prevention of post-harvest losses and efficient agro-processing interventions should be emphasized so as to add value and create attractiveness to the products that are grown/raised locally and link them with both domestic and international markets.

The ownership of livestock is more egalitarian than the ownership of land, hence the accelerated growth of this sub-sector is expected to be more pro-poor. But, with the intensifying industrial large-scale and vertically integrated livestock production and distribution, the vast small scale livestock production is losing ground as also the environmental pollution is accentuating.

Can research and innovations save the small scale livestock production? The threat from transboundary animal diseases and epizoonotics has increased. Research emphasis should be on developing crop-livestock farming systems based on integrated food-fodder breed-health and biosecurity management. Socio-economic and environmental implications of these developments should be critically analyzed to provide policy guidance and to create regional institutions and mechanisms to meet the biosecurity challenges.

The Asia-Pacific is world leader in aquaculture and small-scale fisheries. Promoting an ecosystem approach to fisheries and aquaculture, research in this sub-sector should emphasize adaptation to the changes due to climate change, diversification of aquaculture through breeding, feeding and seed technology, improving water productivity in aquaculture, developing Best Management Practices in Aquaculture, biosafe and quality production and inshore marine fish management through stock assessment and regulated fishing.

Enhancing Farmers' Income, Competitiveness and Employment Security

Poor economic, social and ecological access to food and declining farmers' income are the main causes (not production *per se*) of hunger. The lack of entitlement to productive assets (soil, water, livestock, fishery, poultry) is attributed to the poor policies, inappropriate technologies and lack of knowledge. Innovative approaches are needed to improve employment security by integrating on-farm – off-farm – non-farm employment and for adoption of growth strategy with equity, and provision of enabling environment to increase farmers' competitiveness.

Recognizing that the relative income of farmers has been sliding down consistently, the focus of research must shift from only production to the whole value chain. Production, processing and distribution of high value crops and commodities should be encouraged. Off-farm rural employment and essential facilities and infrastructure for primary health and education should be created with due emphasis on streamlining of input-output markets, agro-processing and value addition, particularly in horticulture

and livestock sub-sector, and services geared towards the resource-poor farmers, including the landless and women. Research should lead to high-value labour-intensive employment opportunities.

A multipronged approach should be adopted to increase income of farmers through policy, social, infrastructure, technology and market development, with emphasis on productivity and inclusiveness. In case, despite all efforts, the farming households whose land and other farming endowments are not able to provide the minimal livelihood should be given informed guidance for facilitating them to exit farming with promising livelihood alternatives.

Bridging Productivity and Technology Transfer Gaps

Often, a good number of new technologies are not adopted. Reasons for the adoption gaps are: (i) low profitability and low income, (ii) inappropriateness of the technology *per se*, (iii) knowledge and information gap, (iv) investment, input and infrastructural gap, (v) non-availability of market for the intended products, and (vi) policy and institutional gaps.

Generally, the high cost input based technologies are not sufficiently adapted to the conditions of small and marginal farmers and their ability to take risks. The farmer will surely adopt an income yielding technology, voiced many.

More participatory action research and innovation approaches could lead to research outputs that are more relevant, both in regard to the technologies themselves and to the required context, leading to the development of affordable and appropriate technologies. This clearly emerged from the experience of the Indo-Swiss Collaboration in Biotechnology (ISCB), jointly funded and steered by the Dept. of Biotechnology (DBT), Govt. of India and the Swiss Agency for Development and Cooperation (SDC). Over the last 10 years, adopting the value chain concept, ISCB has been successful in transferring and upscaling its promising technologies to the end users by involving private sector, formulating appropriate policy framework, licensing agreements and establishing a Technology Advancement Unit.

Even the best of science must respond to a well identified need. It was reported that it took over 30 years for T58, a highly productive tropical forage grass to impact on a few poor farmer families because the scientists worked in isolation and in a 100% “top-down” fashion. But, with a participatory approach, the same variety got quickly adopted widely both at large and small farms and became the driver of highly successful milk and income producing systems.

Economic viability and ecological compatibility of promising alternative farming systems for different farm sizes should be demonstrated through participatory modes at farmers’ fields to build the confidence of the farmers in the R&D process and to identify the best mix of technology components and the processes for wide adoption of the selected technology packages.

Successful farmers should serve as resource persons to oversee the research and scale-up programs in a “farmer-to-farmer” module. They should lead/guide the extension system and there should be greater respect for the farmer as knowledgeable practitioner.

Lack of services support and of timely availability of quality inputs discourages adoption of new technologies, such as limited flow of quality seed from breeders’ plots to farmers fields would delay variety replacement.

Policy instruments such as improved access to credit and crop and livestock insurance should be introduced to reduce risks. Farmer friendly technologies, such as low to no external input requiring, labour productivity enhancing, conferring high acceptability of products in local market, promoting local value addition, possessing desired nutrition, taste and cooking quality and reducing risks both in market and monsoon, will readily be adopted.

Research institutions are generally willing to be development friendly and even entrepreneurial but are not able to meet their commitments due to shortage of funds. There needs to be a better balance between (a) long-term funding to ensure continuity and the ability to undertake long-term research, and (b) competitive short-term funding to allow fast response to emerging research challenges and to ensure quality and relevance.

Donor agencies must be willing to fund the more downstream efforts of R&D institutions. But, research grants should be linked to involvement of stakeholders in defining the research agenda and the beneficiaries. Risks, accountability and benefits of research must be clearly defined and results recorded. Innovative and progressive farmers should be trained to record data and maintain documentation so that their experiment, experience and learning is available to the agriculture scientists, professionals and other farmers.

Revitalizing Innovation Sharing and Extension Systems

Extension/technology/knowledge transfer systems have weakened (some voiced that the extension systems are “dead”). These must be revitalized and strengthened and rendered more relevant, dynamic, farmer-centric and development oriented. Common weaknesses include: (i) lack of connection between teaching, research and extension institutions and agencies, (ii) lack of cooperation between government, NGO and private sector, and (iii) lack of integrated approaches along the whole value chain.

Instead of trying to find common ground and exploiting their different strengths, public and private organizations involved in grass-root level delivery of information and technologies tend to ignore each other and push their own interests. Farmers are bombarded with confusing information from different sources and at the end they become indifferent even to good messages.

Traditional knowledge is the cornerstone of a production system and should be congruent with modern knowledge and innovations. However, one must also acknowledge that the traditional knowledge and technologies must also evolve over time. Groundbreaking discoveries in science and technology are usually not made because of traditional knowledge alone, but they can certainly help creating a new stock of future traditional knowledge.

Amidst the generally unsatisfactory situation of extension services, there are some good models of extension and support services by the private sector and NGOs, which should be supported by the public sector by establishing innovative public-private/NGO-market partnership.

The recent development in ICT, village knowledge centres, TV and radio networks should be used for sharing knowledge and information and to bridge extension centers to markets– a market-led extension. Several studies have revealed the efficacy of mobile phones in message sharing particularly for market information.

Farm schools established at farms of lead farmers have proved to be highly effective particularly for transfer of complex messages and technologies such as those related to integrated farming, integrated

pest management, integrated plant nutrient management and integrated crop care, and the approach should be vigorously promoted.

Performance of scientists should be measured not by just number of papers published and number of conferences attended, but should be measured also by what the individual has contributed to the farming community by providing improved practices/technologies and in having them diffused widely.

Appropriate IPR regimes should be established for patenting of new technologies developed particularly by the private sector such as hybrid seed, GMOs, farm machinery, fertilizer blends, and other research products.

Village agriclincs, training, especially of youth and women, and market-led extension have proved extremely helpful in technology transfer. With the increasing feminization of agriculture, women-friendly technologies and tools should be promoted and women training for skill, agribusiness and entrepreneurship development should become regular features.

Each research centre should have a strong outreach program and a window of agribusiness. Effective SPS and quarantine facilities are essential for facilitating safe sharing of technologies and materials.

Farmer-market-value Chain Linkage

Farmers must be linked with markets and positioned along the value-chain to be enabled to capture most of the price paid by the consumer through promoting producer companies, small farmers estates, nucleus estate system, cooperatives and SHGs. They should be duly trained and incentivized to innovate and become change agent so as to be a part of the change that he/she aspires for.

The linkages should be further strengthened through contract, corporate and group farming, marketing cooperatives for farm inputs and outputs, introduction of agriculture commodity exchange and futures market for food and other agricultural products. Policies aimed at private sector-led development of value and supply chains for high value agriculture will further strengthen the linkages. Developing off-farm agro-based livelihood activities and agri-business enterprises will greatly complement the effort.

The producer company approach ensures that arranging finance, procuring quality inputs, crop insurance, cultivation, harvesting, storage, value addition, packaging and marketing are all done professionally. The profits generated from the value additions would go back to the farmers as dividends and bonus. The producer company in its own interest would take care of extension, technology packaging, sustainability and environmental aspects in association with relevant stakeholders, in addition to finance, value addition, marketing, etc.

Local governments should appoint climate change agents in rural blocks to provide on-spot assistance to ensure sustained production and supply.

Research should be carried out to ensure that the markets (domestic and international) are working effectively and there are minimal market risks and farmers are advised accordingly for production planning. This should be complemented by providing appropriate technologies, timely credit, business support services etc. Efficacies of different agri-business models should be researched to provide effective guidance for their adoption.

New policy is needed for handling commodities (both perishable and non-perishable) on an order-based production mode (a type of contract farming; Minimum Support Price does not ensure such contract) wherein governments should secure public interest. The worthiness of a suitable design shall be through both backward and forward linkages.

Competitiveness of farmers in developing countries is adversely affected by non-tariff barriers in the globalized world. Increased emphasis is required on biosecurity, gene literacy and food and health safety at all levels, especially at the grass-root. Research is needed for undertaking comprehensive risk analysis and management along the value chain.

Enhancing Attractiveness of Agricultural Education

Agricultural education is generally missing the spark and is not able to promote excellence in science and to make agriculture more meaningful and attractive to graduates and scientists and to render them more entrepreneurial.

Efforts should be undertaken to provide basic systematic agricultural knowledge to a much wider audience, preferably all stakeholders. Ideally, this could be achieved through collaborating with educational institutions to develop agricultural modules for rural primary and secondary schools and agriculture, natural resource management and livelihood security should be made a compulsory subject in all schools as launched in PNG. College/University curricula should include also traditional integrated agriculture systems. Desired infrastructure/labs and competitive salary/service structures are needed.

Effort should be restored to keep educating plant breeders, entomologists, pathologists, agronomists, crop physiologists and other traditional agricultural disciplines. Having an increased supply of biotechnologists is not an adequate substitution.

Since the job-market determines inflow of students in a given discipline, it is imperative that course designing shall be an ongoing marketing strategy of universities. New areas such as intellectual property management, molecular technology and adoption, marketability of knowledge and products are to be cared for.

Bio-security

Inter-country cooperation in research and surveillance, monitoring and control for managing trans-boundary diseases and pests should be strengthened. Monetary benefits should be provided to farmers practicing various safety measures and adopting Good Agricultural Practices. Advocacy to ensure biosecurity by decision makers is a pressing need.

Safety standards and regulations are to be the domain of enforcing system that guide the agriculturists and relevant stakeholders about the global demands and national interest about these issues. Grass-root level literacy and awareness on these aspects can build up only when volumes of market-driven production find place in villages.

Reaching Out to Farmers through Policy Advocacy

Intensification of farming systems is essential if we are to meet the challenges of reducing poverty and feeding an increasing population but this must be done in a way that is environmentally sustainable,

socially equitable and economically viable. In most countries policies aiming to achieve this are very weak. Agricultural and natural resources research (ANRR) has potentially a huge role to play in providing the evidence based on which such policies can be developed.

Unfortunately, the research community is not very effective at communicating with policy makers and ensuring that information and knowledge is delivered to the right people at the right time in the right format. There is a need to (a) better understand the processes leading to agricultural development policies and the contribution provided by research outputs, (b) undertake research on how to strengthen the research-policy-practice interfaces to increase the impact of research outputs, and (c) train researchers on how to communicate and interact with policy makers.

The policy formulation and advocacy systems to guide farmers on biotechnology products and bio-fuel crops should be science-based to allow a consistent and well thought out long term policy. At present, it is primarily driven by multinationals. There is an urgent need to develop local capacity to address technological, food safety, social and environmental issues associated with these products.

In the Asia-Pacific region utilization of agricultural land for non-food crops adds challenges and pressure to food production and food security.

Policy advocacy and actions are needed on the following aspects:

- Accelerated agricultural productivity and income growth and inclusiveness to alleviate hunger, under nutrition and poverty,
- Research, technology and innovations for development with focus on the poor, especially the resource-poor farmers,
- Adequate public and private investment in agriculture and agricultural research, education and extension and in participatory REE, with focus on development,
- Institutional support for bridging yield, employment and income gaps,
- Integrated management of natural resources, biodiversity, inputs and biotic and abiotic stresses, including transboundary diseases, biosecurity,
- Fair trade, input-output pricing, access to domestic and international markets and management of market volatility, linking farmers with markets, Producers' Company,
- Climate change management– adaptation and mitigation of crop-animal-soil-water cycle distortions,
- Enabling mechanisms, public-private partnership, knowledge pool and human resource capital (trained youth and women in agriculture), and
- Improve infrastructure, particularly roads, and provide minimum amenities in rural areas.

Meeting the Challenges of the Pacific Countries

In the Pacific countries, the situation is characterized by smallness, isolation, high transport costs, poor communication, poor or non-existence of ARD capacity, inadequate or absence of infrastructure (research facilities), devoid of ARD policy (not even understanding and appreciation of this), exposure to serious climatic extremes, resources degradation and often influenced by external policy advices that are usually detrimental to any local considerations, culture, traditions and societal norms. Locally, agricultural development is fundamental to social stability.

Very often considerations with respect to environmental/sustainability/protection are dominated and very little is attempted with respect to productivity enhancement and growth in the agriculture sector so as to secure at least basic livelihood (e.g. food security).

Agriculture in the Pacific countries must be treated as the agenda for development. Food security and basic survival should be at the heart of this recognition. All out efforts must be made to orient ARD options as a priority intervention based on location specific crops/commodities, issues, needs, solutions and opportunities.

As individual countries neither have abilities nor resources, regional and focused initiative be taken to establish regional ARD organization(s) with support from international development organizations such as ADB and supported well by regional organizations such as SPC and other national organizations such as PNG, NARI, universities in the region, ACIAR, and CG centres of relevance to the region. Research agenda for development identified and prioritized by the collaborative mechanism should be adapted and implemented through a participatory mode involving local communities, the foremost aim being assured livelihoods and the happiness of the local people.

Three priority actions needed are: (i) enhancing and sustaining investment in agriculture and agricultural research and technology development, (ii) filling the extreme shortage of desired human resources, and (iii) establishment of appropriate institutions and mechanisms for collaboration, transfer and adaptation of technologies and innovations including technologies from mainlands, towards achieving food self-sufficiency and reliance.

These countries are not disturbing climates but due to the developed countries greenhouse gas emissions and increase in CO₂ levels the sea level is increasing and these countries are suffering. Therefore, the Pacific countries need international financial support and cooperation in advanced education and technology to adopt the change.

Build food and nutrition security based on local crops/commodities, particularly roots and tubers, in each community through diversified farming systems, resource management and a system of self reliant agriculture. Surpluses could focus on low volume high value products with long shelf lives. In order not to be held hostage to the global seed companies, sub-regional Pacific seed companies should be established by the local people as per needs of such states and their small-scale farmers.

Plantations (sugarcane, banana, coco, coconut, palm oil, root crops, tropical fruits, vegetables, etc) are their main crops with large production potential for domestic and international markets. Industrial crops are most suitable for commercial production as joint ventures.

Research on agriculture production systems in changing climate should have major emphasis on adaptation and mitigation measures. Atoll resources management and production of organics, livestock and fisheries products are priority areas. Corporate farming by Producer Companies may be the way forward to minimize transaction cost and to achieve economy of scale in many agricultural enterprises.

Public sector extension is almost nonfunctional. Private sector and NGOs have been successful in technology transfer and should be encouraged for the purpose. Distance education may supplement the effort. Local customs and social systems are rather strong and often impact the extension activities.

Fisheries account for 80% of dietary protein intake in the Pacific, but the availability is declining and, if not corrected, the sub-region will face fish crisis within a decade. Inshore fishery as well as mariculture should be strengthened. Adaptation to climate change in small scale fisheries will require addressing both existing and known issues as well as building more general resilience and capacity for collective action at local scales.

Pacific countries need to create common groups or align with existing groups of countries that power political alignments to secure their interests. Certain existing moves are bearing fruits.

Executive Summary of the Report on South Asia

Dr. Mruthyunjaya and Dr. P. Kumar
Consultants

The Global Forum on Agricultural Research (GFAR) in collaboration with the Consultative Group on International Agricultural Research (CGIAR) aims to reshape the global agricultural research agenda for development and re-orient it to the needs of the poor through agricultural research synergized with adequate and rapid supply of agri-services. The effort is supported by Asian Development Bank (ADB) and Asia-Pacific Association of Agricultural Research Institutions (APAARI). The process consists of preparation of regional reports incorporating feed back from well structured and widely organized e-consultations with all the relevant stakeholders in the region and face-to-face regional and global consultations. The report on hand deals with South Asia which also includes the main feed back (voice of the stakeholders of the region) from e-consultation spanned from September 1 to 24, 2009 and Face to Face meeting held during 30-31 October, 2009.

South Asia comprising the countries of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka has shown impressive growth of about 6.5% annually during 2001-06 owing to adoption of pro-growth policies. Rapid growth has significantly contributed to reduction of poverty as well. Progress in human development index is also observed. Notwithstanding these positive developments, South Asia still tops in the home of the poor in the world with about 400 million below poverty line people. The numbers of undernourished, under-weight and under-height children and of low birth-weight infants in the South Asian region are substantial. There has been a rising inequality within and among the countries of the region. Agriculture is the main source of livelihood of people in these countries. Despite impressive GDP growth in agriculture in recent years, dependence of people on agriculture as a principal occupation has seen very little decline. Disparity between per worker income in agriculture and non-agriculture sectors is the main source of income inequality in South Asian countries. Further, agricultural productivity has considerably slowed down and further increase in productivity requires more and more use of expensive external inputs like fertilizer, plant protection chemicals, machinery, etc. There has been stagnation or deceleration in total factor productivity growth in majority of crops/enterprises.

Technological breakthroughs are not visible owing to unfavourable, declining, degrading soil-water ecosystems, enhanced biotic and abiotic stresses, significant post-harvest losses, dwindling national and global funding support to agriculture in general and agricultural research and education in particular, restrictive knowledge-sharing opportunities, stagnating capacity and skills, uncertain policy support, collapsing service and support system and indifferent, inefficient and non-supportive governance system. Combined with these are deplorable basic facilities like health, sanitation, literacy, which have made rural life highly miserable, and agriculture unrewarding. New opportunities are also emerging in the form of demographic advantages (more young people), new technologies (biotechnology, nanotechnology, information technology), diet revolution and changing demands, emerging value chains and super markets, entry of private sector, etc. Above all, the recent dramatic rise in the prices of basic foods has sent a shock wave through the world community, particularly poor people, arousing individuals and institutions from years of complacency about the state of the agricultural sector.

Numerous studies have shown that investments in agricultural research typically rank first or second in terms of returns to growth and poverty reduction, along with investments in infrastructure and education. Fortunately, there is a consensus and also action in these countries towards higher investment in agriculture and related areas. The obvious questions in this context are how much this investment should be and where should it be focused.

The organization and management of agricultural research in the form of National Agricultural Research Systems (NARS) in these countries is at different stages of evolution. Some NARS like in India and Pakistan, are relatively large and strong whereas, in others they are weak. Over the years, they have tried to respond to the changing contexts by re-orienting their structure, functioning, priorities and activities. Some of these countries, particularly India, has made systematic efforts in agricultural research prioritization and utilized the results for research resource allocation. The efforts of APAARI in guiding the research prioritization process in the region are also significant.

Over the years, commodity, regional, within the countries, sub-regional, and Asia-Pacific region priorities have been defined through consultations as well as using standard prioritization methodologies. The results from this empirical exercise suggest that (a) cereals, horticulture, livestock and fisheries in commodity groups and rice and milk as commodities should receive greater attention in resource allocation at South Asia level with certain minor variations among the countries, (b) prioritization exercises need to explicitly target poor as otherwise their needs are under-funded, and at least 2-3 times (if the AgGDP growth is assumed at 2.1%) and 3-4 times increase (if the AgGDP growth is assumed at 4%) in funding support in these countries to agricultural research and education to attain food and nutritional security and social empowerment. The uniqueness of the analysis is that it has used standard methodology commonly understood by decisions makers, poverty focus, demand driven approach and estimated the research investment needs to sustain food and nutritional security and social empowerment. Four percent growth in agricultural GDP can only be achieved with greater emphasis on the development of livestock, horticulture and fishery sectors. The feedback from e-consultation suggest the over-arching non-commodity based priorities as NRM, socio-economics and policy research, germplasm collections, conservation and improvement, strengthening of NARS institutions, strengthening of basic and strategic research in frontier areas of agricultural sciences, major focus to be given to upgrading the skills of farmers and change agents, follow participatory action research in value chains and sustainable livelihood security, more investment on education, roads, markets, power supply, communication, health and sanitation services, strengthening farmers' organizations including aggressive strategy to involve private sector, and effective management of service and support system, safety net and income enhancement programs and better governance and political will and commitment in general. Besides these, the F2F meeting identified specific investment areas requiring additional attention which include (a) Farming systems approach in ecosystem, framework to pursue diversification (livestock, horticulture, fisheries), (b) Focus on women and youth in agricultural research, (c) Inclusion of local crops, along with wheat, rice and pulses as priorities, (d) Involve progressive successful farmers, NGOs and private entrepreneurs in technology transfer, (e) Address impact of climate change on agricultural production (f) Develop contingent plan for natural calamities, (g) Focus on post-harvest management, value addition, quality improvement and safety, (h) Improve risk management capacity by suitable farmer friendly policies, programs and business models, (i) Linking farmers with market through value chain approach, (j) Policy dialogue with effective communication, (k) Blending modern technologies, innovations with proven indigenous technologies, and (l) Exploring income and employment opportunities beyond agriculture in rural areas. If these recommendations are attended, the growth in South Asian countries will be not only faster but also inclusive.

Executive Summary of the Report on Southeast Asia

Dr. David Raitzer
Consultant

The present study attempts to identify agricultural research investments with the highest expected levels of benefits for the poor and the environment, and contrasts relative expected impact potential with current relative allocations across research areas. Current investment patterns by the National Agricultural Research Systems (NARS) in the sub-region and by International Agricultural Research Centers (IARCs) are quantified to explore present allocation patterns.

The value of production of the top 20 agricultural product groups is calculated, and projections are made based on recent growth trends for values of production in 2020. This is used to calculate the expected economic surplus effects of a 5% reduction in the average unit cost of production for commodities with the highest production values. A poverty weighted value of production is calculated by overlaying spatial crop production data with poverty maps, which is applied to estimate benefits to poor producers. Expected expenditures by the poor on different food items are calculated for 2020 and are used to estimate the portion of economic benefits accruing to poor consumers. These estimates are compared with indicative values for environmentally and nutrition oriented research.

A comprehensive inventory of past documented research benefits is performed, and patterns of economic benefits accruing from research on different commodities and from different activities are compared. This is complemented by an analysis of important changes in the context for agricultural research and agricultural production, which will affect future impact potential.

In the final section, projected potential benefits, patterns of documented historical impact, and implications of future trends are drawn together, and are compared with current investment levels. This analysis finds key gaps between current investments and expected impacts for productivity enhancing research on rice, vegetables, fruit and aquaculture, with the rice gap being most pronounced, as it is the source of 87% of documented past research impact and over 40% of quantified potential future benefits for the poor. In terms of research activities, genetic improvement is the most substantial investment gap, as it accounts for 80% of documented past impact, and recent advances in genomics are likely to continue this trend, but it receives only 15% of NARS investment in the sub-region.

Executive Summary of the Report on the Pacific

**Dr. Alan Quartermain
Consultant**

The Pacific sub-regional report sets out considerations for the prioritization of agricultural and natural resources research and development with the overall theme of transforming knowledge into development impact. It is based on a recognition of present capacity, constraints and challenges, as well as opportunities to address the real needs of the 80-90 percent of the island populations directly dependent on their sustainable use of renewable natural resources for sustenance, health and prosperity. While in half of the countries over half of the population is urbanized, these people need food security. The emphasis is on combating hunger, malnutrition, poverty and environmental degradation.

The 22 island countries under consideration are extremely diverse in every possible way – ecology, demography, economy and culture – but its rural people have a commonality of approach to agriculture or gardening, coastal or forest management, and community development. They share in common the Pacific Ocean with its resources, including Exclusive Economic Zones much larger in most cases than the land areas. Their opportunities are constrained by extremely small populations, limited land, vast distances between countries or even between islands within countries, high costs of transport and communications, and poorly developed policies or capacity for research and its application for development. Atolls have particular problems since they are not rich in biodiversity, there are shortages of fertile soil and fresh water, and they are extremely vulnerable to natural disasters and the predicted effects of climate change.

The key priorities of subsistence or smallholder farmers are for food security and income generation. Most rural people eat enough most of the time but their diets are so often nutritionally unbalanced. Over-reliance in some countries or in urban areas on imported food has led to increasing health problems. In other situations there is protein-energy imbalance and hidden hunger. Many communities are so isolated that they have very few opportunities for any form of income generation and so cannot purchase food in times of natural disaster such as drought. They are truly neglected. Domestic markets for agricultural products are small and export opportunities limited. Income from remittances sent by family living abroad, mining, logging, tuna fishing and a few exported agricultural commodities such as sugar, cocoa, coffee and palm oil give an illusion of wealth which is not reality for most rural people and urban immigrants.

The results of previous exercises in research prioritization were based on limited consultation with stakeholders and assessment as to feasibility and potential impact. High priority research areas covered crop production and improvement, livestock, forestry, fisheries, natural resource management, marketing, mechanization, socio-economic studies and bio-security. These are still valid since little has been done in most areas or countries over the past decade. Little is really known about which species or varieties of crops or livestock are best suited for specific local conditions, how much labour is required to produce them, and what are the comparative nutritional advantages of each product. Traditional foods are not inferior foods and the focus should be on these with additions to reduce

vulnerability and create new opportunities. There is continuing interest everywhere in the traditional basic staple food crops – roots and tubers, banana, breadfruit and sago – and new or renewed interest in traditional or indigenous fruit, nuts and vegetables.

There are a reasonable number of scientists working in the region but much of this resource is primarily engaged in tertiary teaching, administration or conduct of bio-security measures. Lack of research capacity is a very real constraint. The tertiary educational institutions with natural resource programs vary in their abilities to attract and train research and development personnel. Agricultural science has always been an undervalued profession because its impact is not readily identified. Effective research requires a better understanding of the farmers and their systems, their traditional knowledge and capacity for innovation, and what they are willing and able to do. Then it is essential to include them and all other relevant actors in planning of the research right from inception and continuing their involvement. Uptake will then be likely to be more successful. Farmers are innovative if they are not desperate and can take risks, and good news spreads quickly in spite of poor communications. Participatory approaches fit well with Pacific social systems built on cohesiveness, sharing and democratic decision making.

The tendency in looking at priorities and gaps is to concentrate on the constraints of limited resources, isolation, rapid population increases, infrastructure, health and education. But natural resource research cannot deal with these. The challenge is to find ways around them. Farmers have needs and aspirations to meet but not at any cost and availability of labour will always be limiting. Hence we need products that are light weight and travel well, identification of niche export markets as well as domestic demand, and low input systems. Smallholder production of current export crops can be doubled with improved management and no further research but yet this is not happening because of social constraints. Innovation Systems studies may help to uncover weak linkages requiring attention. There are numerous identifiable success stories in technology uptake from which lessons can be learnt.

The Secretariat of the Pacific Community (SPC) and the Australian Centre for International Agricultural Research (ACIAR) are the key regional support agencies. SPC provides technical assistance, research support and capacity building in agriculture, forestry and fisheries while ACIAR is the primary collaborator and donor in these areas for six of the seven largest countries. The United States and France support those countries in their respective spheres of influence. Networking has been, and continues to be, of major value in making efficient and effective use of individual country strengths, capacities and donor support. There is a serious regional shortage of plant breeding expertise.

Areas of particular research need include readiness for climate change, means for improving human nutrition, soil and water management, communal fisheries management and stocks assessment, non-timber forest products providing incentives for forest retention and management, minimal labour and other input production, and improved crop and livestock productivity through selection and breeding as well as agronomy and husbandry, including pest and disease management. Networking and cooperation to share resources of knowledge, skill, bio-diversity and capacity, are critical to success. Other areas of research interest include livestock production systems, agro-forestry or farm forestry, fresh water and marine aquaculture, bio-prospecting or bio-discovery and assessment of products with medicinal or other valuable properties, the use of coconut oil for bio-fuel, organic production systems, seed selection processes, post-harvest handling and processing, marketing systems, and demand and supply analyses.

The critical need is to generate knowledge and transform it into development impact through harmonizing research findings with traditional knowledge. Impact will result from increased productivity of all resources, more effective use of products and enhanced capacity to meet new challenges as they occur. The following research areas are assessed as having the greatest priority in terms of meeting critical needs and challenges by filling gaps that need urgent attention with increased effort and support:

- Horticultural crops for meeting climate change challenges, especially for atolls
- Horticultural crops and varieties to improve human nutrition
- Communal coastal or reef fisheries management, including stocks assessment
- Incentives for forest retention and management
- Management of the pressures on soil and water use and soil fertility.

Horticultural crops include the traditional crops given prominence in a Pacific Crops for the Future workshop in September 2009. They also include those crops most likely to find export niche markets accessible by smallholder producers but relying on public-good funding for such development.

The Pacific working group at the GCARD 2010 Asia-Pacific Regional Meeting in October, 2009 developed a set of broader themes which cover these identified research priorities. Integrating rural people's existing knowledge with new knowledge from research and the critical need for working with, and not for, rural people who, even if disadvantaged, will go to extraordinary lengths to maintain cultural integrity are at the heart of all Pacific Island proposals. The themes are:

- Value adding at a range of levels for domestic and export niche markets
- Crop improvement and breeding
- Meeting climate change through prediction, risk management and recovery strategies
- Community-based systems for managing all natural resources
- Bio-security, trade facilitation and market access.

Commonalities underlying all the priorities are capacity building, public and private investment, linkages or networking within and between countries and regions, continuity of effort, sustainability and strategic planning.

Pacific governments seem simply to take the natural resource sectors for granted and assume that these sectors will continue to put food on the table, generate export income and support the rural majorities. The greatest challenge of all is advocacy to persuade governments and influential persons to take agricultural and natural resource development seriously and institute policies to allocate adequate resources to these sectors before it is too late. Agriculture, fisheries and forestry need to be recognized and treated as the primary drivers of sustainable development. All other issues are secondary and all else necessary for improved livelihoods and prosperity should follow.

Executive Summary of the Report on Research, Technology and Innovation Priorities in the Asia-Pacific

Prof. R.B. Singh
Lead Consultant

Context

The Asia-Pacific region underpins the global agrarian economy. Encompassing South Asia, Southeast Asia, East Asia and Pacific sub-regions, the region is the largest supplier of the world's food and agricultural products. It houses about 58% of the world's population and 74% of the agricultural population, but, has only 38% of the world's agricultural land. Consequently, land availability per person in agriculture in the region (0.3 ha) is almost one-fifth of that in the rest of the world (1.4 ha), and over 80% of the world's small and marginal farmers belong to this region.

In agriculture-based developing and transforming economies, as in most of the A-P countries, there is no greater engine for driving growth and thereby reducing poverty and hunger than investing in agriculture, complemented by programs that assure people to claim their entitlements. In the post-Green Revolution era, however, the agriculture sector has recorded hardly 1.5 percent annual growth rate and the total factor productivity growth rate has declined, thus widening rural-urban divide. The small farmers, comprising over 80 percent of the farming households have gotten hungrier and poorer over the years.

Science and innovation are major engines of agricultural growth and development. The internal rate of return on investment in agricultural research has been remarkably high, averaging about 20 to 40 percent in Asia-Pacific. Most of the Asian and one or two Pacific countries have established fairly good national agricultural research systems comprising research, education and extension (REE). However, except for China and India, investment in agriculture in the region, particularly in REE, has declined or stagnated during the last one decade or so.

Agricultural research, technologies and innovations must lead to the development of technologies rooted in the principles of economics, equity, and environment to increase productivity, income and livelihoods in perpetuity. Technology and innovation systems that are changing rapidly must go well beyond just raising yields and should be dynamically geared to meet the challenges of increasing resource scarcity and the structural transformation of the economic and social role of agriculture.

Notwithstanding the centrality of generation and transfer of new and improved technologies for attaining sustained productivity gains, science today is thus called upon to address also the new challenges of market oscillations, soaring food and energy prices and global climate change.

Identification of AR4D Priorities

The AR4D priorities in Asia-Pacific region were assessed through the following reiterative processes: (i) *E-Consultation* : 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 Studies on AR4D* : Sub-regional and regional reports on AR4D in A-P were commissioned from the 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, and (iv) *Recent reports/literature on the subject and wisdom* of selected scientists/academicians.

Key Feedbacks from E-Consultation and F2F Consultation on AR4D in Asia-Pacific

The following key feedbacks were received through the E- and F2F Consultations:

- Needs of the resource-poor smallholders not well addressed (except generally in case of rice) by the AR4D agenda in the past
- Inability of majority of resource-poor farmers to adopt high-input-cost and high-risk technologies, and this fact not internalized in the past research agendas
- Underinvestment in Agriculture and AR4D, particularly in horticulture, livestock and fisheries, rainfed areas, socio-economic and NRM research, maintenance research and human capital formation
- Climate change adaptation, uncertainty and vulnerability, scarcity and declining quality of water, declining soil fertility, agro-biodiversity erosion, increasing biotic stresses, increasing threats of bio-insecurity, market volatility and income divides are frontline issues.
- Besides fighting stubbornly high hunger and poverty, synergizing productivity, sustainability and inclusiveness, closing technology transfer gaps at various levels, and strengthening linkage of farmers with markets and value chain were identified as other key drivers for AR4D.

Sub-regional Priority AR4D Needs

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 (Mruthyunjaya and Kumar, 2009):

1. Commodity-based:

- Rice, wheat, local staple cereals, pulses, livestock, horticulture and fisheries

2. Overarching non-commodity-based:

- Climate change management,
- Natural Resource Management (NRM),

- Socio-economics, policy and value chain management,
- Germplasm conservation and improvement,
- Post-harvest management, agro-processing and value addition,
- Quality improvement and safety, and
- 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 poor as otherwise their needs are under-funded.

Southeast Asia

The Southeast Asian sub-regional study (Raitzer *et. al.*, 2009) had attempted to identify agricultural research investments with the highest expected levels of benefits for the poor and the environment and contrasted relative expected impact potential with current relative allocations across research areas. The analysis had found 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:

1. Commodity-based:

- Rice, vegetables, fruits and aquaculture

2. Cross-sectoral:

- Enhanced productivity and sustainability for food and nutritional security and poverty alleviation
- Increased resilience against climate change, extreme meteorological aberrations and market volatility
- Value chain management and prevention of post-harvest losses
- Genetic improvement and management of biotic and abiotic stresses
- Enhanced accessibility of research outcomes on part of small and resource-poor farmers

Pacific

The Pacific sub-region had highlighted (Quartermain, 2009) 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 (modeling sadly lacking);
- Bio-security and trade facilitation – market access and farmer-market linkage; and
- Sustaining livelihoods in atolls.

Supportive policy actions and approaches were also suggested and have been internalized in the regional scenario.

AR4D Challenges in Asia-Pacific Region as a Whole

The following continuing and new and emerging challenges deserve high attention:

- Continuing Challenges
 - Limited resource base, particularly land (cultivates only 38% of global arable land) and water (scarce both in terms of quantity and quality)
 - Fast declining water and agro-biodiversity resources with environmental footprint of agriculture intensifying
 - Majority of producers are small and marginal farmers who cultivate on the average about 0.3 ha per person (versus average of 1.4 ha per person with the rest of the world)
 - There are fairly good number of NARES, despite dwindling resources received. It should be noted that there are emerging NARES in India and China that can and have started playing lead roles in the region.
 - Continuing challenges that need to be addressed head on are: (i) more than 60% of hungry and extremely poor are in Asia and Pacific; (ii) the undernourished in the region is the highest globally and is still rising; and (iii) the number of poor is highest and rising too in South Asia.
- New Challenges
 - Food and nutritional insecurity
 - Global economic downturn and market volatility
 - Climate change with projected intense and more frequent extreme weather resulting in increased risks, bio-insecurity and vulnerability
 - Competing land use: food versus fuel versus feed

Priority Criteria for AR4D in Asia-Pacific (feedback from the e- and F2F consultations) noted the following considerations for identifying and selecting the AR4D:

- Focus on development needs of the resource-poor smallholders
- Synergize productivity, sustainability and inclusiveness (pro-poor and gender inclusive): these in turn are the drivers for sustained structural transformation and industrialization
- Demand-driven and Market-based AR4D: AR4D should ensure that it particularly addresses the food and agri- and food and nutrition-based needs of the poor and especially the extremely poor (hungry) consumers, women and children. AR4D should aim for Food and Nutritional Security

- Multi-stakeholder led AR4D: Need for ownership of those who will directly contribute to the value chain.
- Maximize use of partnerships for science, technology/innovations, ICT; as well as ensure wide outreach among smallholders

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 emerged as under:

- Productivity enhancement particularly in food staples and those that will diversify incomes from the farm sector through use of science and technology;
- Improved value chain development and management. Major gaps in the chain are infrastructure that link farmers to markets; and market outreach through building networks and partnerships (PPPs, farmers' cooperatives/associations etc.)
- Increased resilience in two major areas: climate change, and those resulting from economic shocks

The above thematic research priorities have the following spatial dimensions:

	South Asia	Southeast Asia	Pacific
Increased Productivity			
Food staples	Rice, wheat, local staple cereals, pulses	Rice	Local cereals/foods
Diversified crops/ livestock	Horticulture, fisheries, livestock	Vegetables, fruits, aquaculture	Vegetables, fruits and those which ensure inclusive value adding for niche markets
Science and technology	Germplasm conservation and improvement	Genetic improvement, management of biotic and abiotic stresses	Sustaining Atoll livelihoods and for nutritional security, value-adding
Improved Value Chain			
Infrastructure: farmer-market linkages	Post-harvest, agro-processing, ICT management, Food safety and quality	Post-harvest management, ICT, Food safety and quality	Post-harvest management, Transport facilities, ICT and knowledge sharing, Food safety and quality
Networks/partnerships and markets	Public-private-partnerships (PPPs), South-South cooperation	PPPs, South-South cooperation	Niche markets (domestic, foreign), Trade facilitation, Community involvement and empowerment

Contd...

	South Asia	Southeast Asia	Pacific
Increased Resilience			
Climate change management	Adaptation and mitigation	Adaptation and mitigation	Adaptation and mitigation, Need for increased capacity on modeling/ forecasting
Economic shocks	Rural and non-farm jobs risk management	Resilience to market volatility	Special concerns of Atolls

- In addition, the cross-cutting themes for all the sub-regions are: good governance, gender sensitivity and capacity building
- The other priority research agenda are:
 - Integrated farm and natural resources (land, water, agro-biodiversity) management and enhanced sustainability. Special focus on land degradation and water erosion and scarcity.
 - Innovative institutional and financing arrangements for revitalizing innovation sharing and extension systems to enhance access of research outcomes by small and resource poor farmers, and that strengthen NARS in frontier areas of agriculture science and links with extension services
 - Those that will stimulate or spin-off to off-farm and non-farm employments
- For all AR4D: cross-cutting themes are good governance and gender sensitivity

Do the CGIAR’s Mega Programs respond to the AR4D Agenda of Asia-Pacific?

Consensus that these MPs are not responsive to AR4D of the region. Key areas for improvement of the MPS are:

- The process will need to seek greater involvement of the regional fora and NARS
- MP proposal seems to create more complexity and the structure introduces more bureaucracy.
- It is difficult to see how current structure will achieve the required vertical integration and horizontal synergy and harmonization.
- AR4D of South East Asia and Pacific are left out.
- There was overall agreement that MPs portfolio did not excite the F2F participants.

Moving Forward will need a “Business Unusual” Modality and Mentality:

The “business as usual” has failed the poor and the hungry. The following major reiterative actions are needed for an effective AR4D system:

- With the existing, albeit low and declining, resources for AR4D, there is much room for their efficient and effective use and allocation:
 - Apply strategic results framework
 - Be performance-based. Ensure quantifiable, time bound and transparent/ accountable monitoring system and indicators; evaluate and periodically provide feedback

- Need for good governance in use and allocation: ensure accountability and transparency
- Introduce competitive funding
- Success is more ensured if there is strong ownership of the AR4D. This can only be done if multi-stakeholders/communities actively participate from planning to implementing and monitoring (impact assessments, etc.). There is also need for action research that combines different disciplines (e.g., socio-economic research).
- Unilateral development of AR4D has limited impact. There is need to build partnerships and networks with CSOs, NARES, private sector, farmers' groups, etc. harnessing the comparative strengths of the partners. Cross-country NARES (like big brother-small brother types) should be explored. Enhanced south-south collaboration, subregional developments (e.g., Greater Mekong sub-region) should be tapped for:
 - Value chain development and management, especially those that can link farmers to markets, farmers to technologies (envisage a technology supermarket where farmers can have a choice of technologies and select at competitive prices), knowledge flow and delivery
 - Innovative business models for financing (through risk management), sustainable water and land use, and improve resilience and funding these measures (e.g., a Climate Change Adaptation Fund).
- There is need for aggressive advocacy and communication to increase AR4D funding for Asia and Pacific for it to continue (but in a more efficacious fashion) its global food supplier and poverty alleviation roles. Specifically:
 - AR4D needs of Asia and Pacific are about US\$ 30 billion/year (current levels). Obviously will require funding sources from unconventional sources like private sector (supermarkets, agribusinesses, financial markets, development banks).
 - Immediately though, Asia Pacific Governments will need to commit to their national AR4D needs. They should, in the next 5-8 years, commit to increase AR4D support to 1% of their respective GVA for agriculture. Governments should also assure adequate and readily available funds for infrastructure, staff salaries and basic R&D facilities and operations.

AR4D is not a sufficient condition for achieving inclusive food and nutritional security and overall growth of agriculture sector. Policy actions and infrastructure investments are also required:

- i. Increase investment in agriculture and AR4D with focus on poor and resource-poor farmers and inclusiveness (women, youth and vulnerable);
- ii. Ensure entitlement of the poor to land, water, biodiversity, socio-economic safety nets and markets;
- iii. Build infrastructure needs for efficient value chain networks/highways. Provide enabling policies for value chain management and partnerships, and innovative institutional links.
- iv. Need for human resource development, and immediately for capacity building and re-tooling of NARES and technical staff;
- v. Strengthen capacities– infrastructure, ICT, rural/urban markets, human resource capital– trainings and skill development of actors in value chain to meet new and emerging needs
- vi. Trade facilitation and market collaboration.

- vii. Build innovative partnerships to strengthen REE, innovation systems, community-based management of natural resources and mutual enrichment and use of traditional and modern technologies and knowledge systems
- viii. Provide informed options/opportunities to exit farming, particularly to those who are under acute farming-related distresses and to those marginal farmers who despite their best efforts are not able to have their two hands meet

Conclusion

Asia-Pacific agriculture must liberate the region from the twin scourges of hunger and poverty and from the curse of carrying over 70% of world's undernourished children and women. It must continue to supply its region and world with adequate food and agricultural commodities. Given that the land, water and agro-biodiversity resources have been fast declining and degrading and the environmental footprint of agriculture has been intensifying, the task is difficult, but not insurmountable.

Accelerated science and innovation-led agricultural growth must be inclusive and address the needs and aspirations of resource-poor smallholders. Most importantly, it must bridge the income divide between farmers and non-farmers which continues to widen from 1:2 about 40 years ago to 1:4 now. Asia-Pacific would need to triple its investment in AR4D, requiring US\$ 30 billion/year to generate and adopt agricultural research, technologies and innovations which must be rooted in the principles of economics, equity, and environment to increase productivity, income and livelihoods in perpetuity.

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% and 73% 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% (640 million) of the world's hungry and malnourished, 50% (over 660 million) of the world's extreme poor (living on less than US\$ 1/day), and 70% 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%. 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, 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.

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 from October 30 to 31, 2009. The outcome of this consultation would provide an input to the Global Conference on Agricultural Research for Development (GCARD) to be held in March, 2010 in Montpellier, France. It will also contribute to the change management initiative of the Consultative Group on International Agricultural Research (CGIAR). The process as a whole will provide a clear focus on the development objectives that will contribute 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 National Agricultural Research Systems (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

1. 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.
2. 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.
3. 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.
4. In this Expert Consultation, priority AR4D needs have been identified which require increased resources urgently. New investments are essential for integrated natural resource management with focus on land and water issues; socio-economic 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.
5. 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.

6. 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.
7. 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% to at least 1%. 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.
8. 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.
9. 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.
10. 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 non-farmers. 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.

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