APAARI

GFAR

# Workshop on Regional Synthesis of Research Needs

18-19 August 2006
Rama Gardens Hotel, Bangkok, Thailand

## PROCEEDINGS

**ASIA-PACIFIC ASSOCIATION OF AGRICULTURAL INSTITUTIONS (APAARI)**
**GLOBAL FORUM ON AGRICULTURAL RESEARCH (GFAR)**

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## FOREWORD

APAARI provides a platform for regional priority setting based on the needs identified by the different stakeholders in the Asia-Pacific region. During the last decade APAARI has done its best to bring together all stakeholders to collectively decide on regional research priorities, its strategic plan, the networks it is associated with, and some new initiatives such as on ICT/ICM and biotechnology. While it has taken time to bring in NGOs and FOs, they are now more actively engaged and involved in the process.

In 2001, sub- regional priority setting exercises were conducted by APAARI member institutions. The synthesized regional priorities have helped shape global perspectives and priorities of the CGIAR system to maximize its contribution to the Millennium Development Goals (MDGs**).** Two regional programs have been initiated and supported by APAARI and other donors, namely, the Asia-Pacific Consortium for Agricultural Biotechnology (APCoAB) and the Asia-Pacific Regional Information System (APARIS). A new initiative in post harvest and linking farmers to market (LFM) is being facilitated by the Global Forum on Agricultural Research under the Global Partnership Programme (GPP-LFM).

In 2004 and 2005, APAARI conducted research needs assessment for the three sub-regions, taking into consideration new development and challenges. One of the major challenges the Asia-Pacific region faces is the on-going shift from a focus on increased production to meet national food security targets, to increased farm productivity that factors in environmental concerns and profitability. Since majority of the producers in the region are small scale farmers, moving them beyond the subsistence level to market - oriented and environmentally sound production systems will not be easy. This therefore constitutes a major paradigm shift for ARD. In South and West Asia for instance, new research areas deserving additional emphasis include agro-enterprise development (focus on legumes, post- harvest technology for value adding products), and policy and institutional reforms with special emphasis on strategies to encourage higher investments in infrastructure, and enabling policies on marketing, credit and commodity pricing. In the Pacific, serious gaps have been identified in important research areas such as value adding and post- harvest management, markets and marketing. In Southeast Asia (SEA), main priority areas include (1) food safety and security, specifically agriculture and fisheries product quality, value adding of products for competitiveness, productivity and profitability, export/import competitiveness, policy researches related to food safety, market changes, biotechnology and other emerging issues; and (2) farmers/fisher folks capability enhancement including value chain analysis and improve market access, entrepreneurial development of farmers and fisher folks, provision of access to credit, and intra/inter-household production access. There is growing recognition that research must transform subsistence farming into agro-entrepreneurship.

The Regional Synthesis of Research Needs in Asia-Pacific conducted on 18-19 August 2006 in Bangkok brought together key stakeholders in the three sub-regions, namely, the NARS, CGIAR centers, NGOs, farmers' and Private Sector organizations, donor representatives, regional and international organizations, and the youth sector. The workshop synthesized regional research needs and identified regional priorities in the short and medium term, and suggested anticipatory researches, and the roles of APAARI and GFAR. To the extent possible, the workshop addressed concerns for inter -sector imbalance, harmonization with priorities of the CGIAR and GFAR, and building new partnership based on complementation and subsidiarity principles. It identified six regional research themes: Natural resource management, Genetic Resources and Biotechnology, Enterprise Improvement, Post harvest

and Value addition, Policy and Institutions, and Capacity building. A number of recommendations and follow-up actions generated from all stakeholders are contained in this report.

We thank our partners and stakeholders and assure them that APAARI and GFAR shall continue to play the role of honest brokers and facilitators, and ensure that inputs of all stakeholders are respected. We hope that the NARS leaders will address the priorities and recommendations from this regional synthesis and donors will be more supportive of ARD.

Ola Smith
Executive Secretary
GFAR

Raj Paroda
Executive Secretary
APAARI

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AIT | Asian Institute of Technology |
| ANGOC | Asian NGO Coalition for Agrarian Reform and Rural Development |
| APAARI | Asia- Pacific Association of Agricultural Research Institutions |
| APAFRI | Asia-Pacific Association for Forestry Institutions |
| APARIS | Asia-Pacific Agricultural Research Information System |
| APSA | Asia-Pacific Seed Association |
| APCoAB | Asia- Pacific Consortium on Agricultural Biotechnology |
| ARD | agricultural research for development |
| ARIs | advanced research institutions |
| ASARECA | Association for Strengthening Agricultural Research in East and Central Africa |
| ASTI | Agricultural Science and Technology Indicators |
| AVRDC | Asian Vegetable Research and Development Center (World Vegetable Research Center) |
| CAC | Central Asia and Caucasus |
| CARP | Sri Lankan Council of Agricultural Research Policy |
| CGIAR | Consultative Group of International Agricultural Research |
| CIAT | Centro Internacional de Agricultura Tropical |
| CIRAD | Centre de Coopération Internationale en Recherche Agronomique pour le developpment |
| CSOs | civil society organizations |
| DA-BAR | Department of Agriculture –Bureau of Agricultural Research (Philippines) |
| EFARD | European Forum on Agricultural Research for Development |
| FAO | Food and Agriculture Organization of the United Nations |
| FOs | farmers' organizations |
| GDP | gross domestic product |
| GFAR | Global Forum on Agricultural Research |
| GMOs | genetically modified organisms |
| GPP | Global Partnership Program |
| IAASTD | International Assessment of Agricultural Science and Technology for Development |
| IAC | Institut Agronomique Neo – Caledonien (New Caledonia) |
| ICAR | Indian Council for Agricultural Research |
| ICIMOD | International Center for Integrated Mountain Development (Nepal) |
| ICM | information and communication management |
| ICRISAT | International Crops Research Institute for Semi-Arid Tropics |
| ICT | information and communication technology |
| IDRC | International Development Research Center |
| IFAD | International Fund for Agricultural Development |
| IFAP | International Federation of Agricultural Producers |
| IFPRI | International Food Policy Research Institute |
| ILRI | International Livestock Research Institute |
| IPRs | intellectual property rights |
| IRRI | International Rice Research Institute |
| ISTA | International Seed Testing Association |
| ITPGRFA | International Treaty on Plant Genetic Resources for Food and Agriculture |

| | |
|---|---|
| ITTO | International Tropical Timber Organization |
| JIRCAS | Japan International Research Center for Agricultural Sciences |
| LFM | Linking Farmers to Markets |
| M & E | Monitoring and Evaluation |
| MDGs | Millennium Development Goals |
| NACA | Network of Aquaculture Centers in Asia-Pacific |
| NARI | National Agricultural Research Institute (Papua New Guinea) |
| NARIs | National Agricultural Research Institutions |
| NARS | National Agricultural Research System |
| NGOs | Non-Governmental Organizations |
| NRM | Natural Resource Management |
| OECD | Organization for Economic Development |
| R & D | Research and Development |
| SEA | Southeast Asia |
| SI | System of Innovation |
| SWA | South and West Asia |
| TRIPS | Trade- Related Aspects of Intellectual Property of the WTO Agreement |
| VSAT | Virtual Academy for Africa and Asian Semi-Arid Tropics |
| WB | World Bank |
| WTO | World Trade Organization |
| YP | Young Professionals |
| YPARD | Young Professionals Platform for Agricultural Research for Development |

## BACKGROUND/RATIONALE

APAARI provides a platform for regional priority setting based on the needs identified by the different stakeholders in the region. In 2001, sub- regional priority setting exercises were conducted by APAARI member institutions, which were synthesized into a set of regional research priority areas. The 2001 regional priorities have helped shape global perspectives and priorities about agricultural science and technology to maximize its contribution to the challenge of meeting the Millennium Development Goals (MDGs**).** For instance, these regional priority areas were inputted into the Challenge Programs initiated by the CGIAR and new research priorities identified by the CGIAR Science Council . Moreover, these regional priority setting exercises and research needs assessment have resulted into at least two regional programs initiated and supported by APAARI and other donors, namely, the Asia-Pacific Consortium for Agricultural Biotechnology (APCoAB) and the Asia-Pacific Regional Information System (APARIS), and a work- in- progress on Linking Farmers to Market Global Partnership Programme (GPP) facilitated by GFAR. In 2004 and 2005, APAARI conducted research needs assessment for the three sub-regions. In all three cases, there was limited participation of NGOs, farmers' and Private Sector organizations.

In the recent past, science for agricultural development processes becomes more inclusive, consultative and participatory. More opportunities for progress as well as new challenges are identified jointly and actively by different stakeholders with broader range of agenda and priorities. Increasingly, science for agricultural development is focusing on: partnerships, multiple knowledge bases, innovation triggers and champions, reworking the existing stock of knowledge, institutional learning and capacity development, and social responsibility. Donors and research organizations are beginning to direct more support to building the capacity of local systems to generate, diffuse and use new technology, recognizing that capacity development in the systems is the route to more effective impact from research investments (Science Council, 2005).

With support from GFAR, the Regional Synthesis of Research Needs in Asia-Pacific conducted on 18-19 August 2006 in Bangkok brought together key stakeholders in the three sub-regions, with the involvement of NARS, CGIAR centers, NGOs, farmers' and Private Sector organizations, donor representatives , regional and international organizations, and the young professionals organization. The Workshop was conducted with the aim of: (1) synthesizing regional research needs and identifying commonalities among sub-regions, and (2) identifying regional priority collaborative research and development programs and specifying the role of different stakeholders. This is consistent with the aim of both APAARI and GFAR to broaden partnership both at the regional and global levels. In order to have a more meaningful outcome, pre-workshop activities were done such as (a) commissioning an expert to synthesize and critically examine the outputs of the three sub- regional research needs assessments and identify commonalities across sub-regions, and (b) soliciting feedback on-line with selected NARS and other stakeholders such as NGOs, farmers' and Private Sector organizations . The result of the synthesis work was reported during the workshop and served as main basis of discussions. A number of recommendations and follow-up actions generated from all stakeholders are reported in these proceedings.

**OPENING SESSION**

APAARI Chairman Prof. H.P.M. Gunasena delivered the Welcome and Opening Remarks. He expressed his appreciation to the many stakeholders who attended this meeting and impressed on the importance of their participation in the process of identifying regional research priorities and collaborative programs. He mentioned that agriculture has been sidelined in many countries because of industrialization, and that R & D investment in the region remains very low, about 0.20 % of GDP in agriculture. He recognized that while many technologies have been generated by the NARS, very few of these technologies are adopted by the farmers. He emphasized that the socio-economic aspects of the farmers in the region must be considered when discussing and identifying R & D priorities.

APAARI Executive Secretary Dr Raj Paroda presented the background/rationale and the expected outcomes/outputs of this workshop (***Annex 1)***. He thanked GFAR for funding this activity and thanked all participants for their interest in and support to APAARI. He thanked Dr. Ghodake for preparing the draft synthesis report for meaningful discussion during the workshop. He was very pleased that there was good representation of all stakeholders, including the farmers/Farmers' organization, NGOs and the youth. He mentioned that APAARI has been working with important partners in the region and intimated that the process has been evolutionary. APAARI's experience for over a decade will be published into a book which will be launched during the November meeting in New Delhi. The book, in addition to various APAARI publications on success stories and other topics, can be used to sensitize and catalyze donors and policy makers. On research needs assessment and priority setting, Dr. Paroda appreciated the efforts of the NARS and the CGIAR partners who have organized them on behalf of APAARI , and valued the many information generated in terms of the gaps , priorities and indicative collaborative programs which the workshop participants can build on. He fully recognized the challenges to overcome inter -sector imbalance, ensure harmonization with priorities of the CGIAR and GFAR, and build new partnership based on complementation and subsidiarity principles. He expressed optimism that the workshop will finally result to some specific actions or collaborative programs, similar to the on-going APAARI regional programs on ICT (APARIS) and biotechnology (APCoAB), and the forthcoming partnership program on linking farmers to market (GPP-LFM) facilitated by GFAR. The expected outcomes of this synthesis workshop are:

- Identification of major research priorities based on gap analysis and with particular attention to overcoming inter-sector imbalance
- Ways to build new R & D partnerships
- Harmonization with others priorities such as the CGIAR and GFAR
- Complementation of collaborative programs and principle of subsidiarity involving other stakeholders
- Sensitization of NARS and all stakeholders
- Convincing donors on the importance of further investing in ARD
- Strengthening partnership with CGIAR, GFAR, ARIs, FAO, Private Sector, NGOs, and Farmers

**TECHNICAL SESSION 1:**
**GLOBAL/INTERNATIONAL RESEARCH FOR DEVELOPMENT AGENDA, R&D INVESTMENTS AND OTHER DEVELOPMENTS**

*Chair : Dr. William G. Padolina, IRRI*
*Co- Chair : Dr. Sim Heok-Choh, APAFRI*

The Session Chair Dr. William G. Padolina introduced the session theme. He cited the changing environments under which the global, regional and national research systems are operating, namely, new international regimes such as the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), greater understanding of climate change, new market opportunities, new tools available including GIS and econometric models for impact assessment, and a number of good institutions evolving. He acknowledged that APAARI represents the interest of developing countries in the region and that through APAARI our clients such as the marginal farmers will get access to important information in a timely manner.

The Session Co-Chair Dr. Sim of the Asia-Pacific Association for Forestry Research Institutions (APAFRI) mentioned that although forestry has separated from agriculture, there are still many cross-linking issues. Both are important contributing to many GDP's in the region. He indicated that more and more forestry professionals are venturing into research in domesticating and cultivating some forest plants, and that agricultural crops are now included in agro forestry schemes which are being popularized in most countries in the region. Moreover, forest products are being commercialized.

There are four papers presented covering priorities and partnership programs at the global level, research investments in agriculture worldwide, and the recently established young professionals platform for agricultural research for development.

Dr. C.C.L. Gowda presented an overview of the CGIAR System priorities developed through an exhaustive Science Council-led process of participatory information gathering, analysis, synthesis and debate. He gave examples how these priorities are translated into operational programs by ICRISAT.

There are 20 research priorities for the CGIAR, organized within five System Priority areas such as:

1. Sustaining biodiversity for current and future generation;
2. Producing more and better food at lower cost through genetic improvements;
3. Reducing rural poverty through agricultural diversification and emerging opportunities for high–value commodities and products;
4. Poverty alleviation and sustainable management of water, land, and forest resources; and
5. Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger.

The criteria used for identifying priorities are:

1. expected impacts on major CGIAR goals such as poverty alleviation, food security and sustainability of natural resources taking into account the expected probability of success and expected impact if successful;
2. whether the research is of an international public goods nature; and

3. whether there are alternative sources of supply of the research and whether the CGIAR has a comparative advantage in undertaking the research.

The 20 priority areas listed on ***Table 1*** are expected to contribute directly or indirectly to seven of the eight MDGs, namely:

1. Reduce extreme poverty and hunger,
2. Reduce gender disparity,
3. Reduce child mortality,
4. Improve maternal health,
5. Combat HIV/AIDS, malaria and other diseases,
6. Ensure environmental sustainability, and
7. Develop a global partnership for development.

Dr. Gowda mentioned that not all priorities will have to be done by the CGIAR alone, but in partnership with other stakeholders. It is expected that 80 % of the CGIAR centers research will be within the five priority areas, and 20 % will be the so called "blue skies research" or outside the five priority areas which may be developmental in nature. Capacity building which is program-based falls within the 80%, but stand alone capacity building will be part of the 20 %. Accordingly, all centers have developed their medium- term plans with clear indications of outputs and outcomes. ICRISAT has developed its project portfolios on the basis of the CGIAR system priorities as given on ***Table 2.*** The "blue skies research" includes the Virtual Academy for African and Asian SAT (VASAT), disaster rehabilitation and agribusiness incubator.

The Science Council will periodically review these priorities and the implementation of the same based on a set of mutually agreed upon measurable indicators.

The paper prepared by GFAR Executive Secretary Dr. Ola Smith, entitled "Going beyond Agricultural Research Priorities and Needs Assessment" was read by Dr. Raj Paroda on his behalf. Dr. Smith commended APAARI's efforts to adopt the principles of subsidiarity and inclusiveness in its priority setting exercise and other activities. He pointed out that one of the challenges the Asia-Pacific region faces is the on-going shift from a focus on increased production to meet national food security targets, to increased farm productivity that factors in environmental concerns and profitability. Since majority of the producers in the region are small scale farmers, moving them beyond the subsistence level to market - oriented and environmentally sound production systems will not be easy. This therefore constitutes a major paradigm shift for ARD. He suggested that this synthesis meeting considers the following:

1. Critically examine the framework for agricultural research within the region through the prism of this major paradigm shift, and consider the phenomenon of linkages to the market which appears to be an important issue for producers;
2. Integrate and intensify livestock production, aquaculture and fisheries within existing farming system, as the demand for foods from animal origin is bound to grow with increasing incomes and prosperity in the region; and
3. Identify intra–and inter-regional activities to solve common agricultural problems, fully harnessing the exceptional capacities, i.e. huge pool of talented researchers, experts and high quality institutions in the region.

He intimated that a major concern for GFAR has been in conveying the outcomes and impact of regional ARD collaboration to all its stakeholders, hence the need to develop an appropriate monitoring and evaluation system. GFAR expects the following outputs from this meeting:

- Regional agricultural research priorities and needs;
- A framework for implementing these priorities and evaluating outcomes;
- Plans and strategies for collaborating and sharing information, knowledge, skills and technology within the region and globally to meet the identified ARD needs; and
- Mechanisms of monitoring and evaluating regional collaboration in ARD.

Ms. Inane Beintema gave a presentation titled "Global and Regional Investments in Agricultural R & D" based on the results of the Agricultural Science and Technology Indicators (ASTI) initiative managed by IFPRI. The ASTI initiative comprises a network of national, regional and international agricultural R & D agencies. APAARI member institutions were involved in data and information collection. The main objective of ASTI was to assist policy makers and donors in making better informed decisions about the funding and operation of public and private agricultural R & D agencies by making available internationally comparable information on agricultural research investments and institutional changes. The following are some of the highlights of this study:

Total R & D spending:

- Of the developing countries, the most notable growth rates were in Asia-Pacific (11.9%) and Middle-East and North Africa regions (11.5 %).
- In the Asia-Pacific region, China and India accounted for 59% of the region's scientific spending in 1995, and 73 % in 2000.

Public and private agricultural R & D investments worldwide:

- Public investments in agricultural research worldwide increased by 51 % over the past two decades, from an estimated US $ 15.2 billion in 1981 to US $ 23.0 billion in 2000 (in 2000 international prices).
- Asia-Pacific region accounted for an ever-larger share of the developing-country total since 1981.
- China and India accounted for 39.1 % of the developing world's expenditure in 2000, a substantial increase from their 22.9 % combined share in 1981.
- Growth in spending for the Asia-Pacific region averaged 4.3 % per year in the 1980s and 3.9 % in the decade to follow;
- Growth in China and India picked up in the late 1990s, reflecting government policies to revitalize public research and improve its commercialization prospects, including linkages with the private sector.
- In 2000, the developing world spent just 53 cents on public R & D for every US $ 100 of agricultural output; the corresponding ratio for Asia-Pacific was 43 cents that same year.
- 9 of the 11 Asian countries sampled increased their research intensity ratios over the 1981-2000 periods.

Key trends for the 10 Asian countries (1991-2002/3):

- Size in research capacity ranges from very small (100 full-time equivalent (fte) research staff) to very large (>3,500 fte's).

- Moderate annual growth rates in total researchers (1.9 %) and total spending; Vietnam has the highest growth rates in agricultural expenditures and researchers for 1991-2002.
- Agricultural R & D is funded mainly through government contributions with exception of few countries such as Malaysia and Sri Lanka (cess revenues) and Laos (donor funding).
- Differences in financial resources per researcher.

The recently published in IFPRI Food Policy Report *Agricultural Research- A Growing Global Divide*? can be found at the ASTI website: http://www.asti.cgiar.org. The synthesis brief on agricultural R & D investment trends will be published by IFPRI and APAARI before the end of 2006.

Dr. Balasubramanian 'Bala' Ramani, Coordinator of the Young Professionals' Platform for Agricultural Research for Development (YPARD), presented the genesis of YPARD and the recent progress with respect to its strategic plan which was formulated last June 2006. YPARD is composed of young professionals in ARD, those below 40 years old. YPARD had its beginnings during the European Forum on Agricultural Research for Development (EFARD) Conference in Zurich, Switzerland in April 2005. Succeeding meetings in Italy, Morocco, Switzerland, and the Netherlands crystallized YPARD's vision, mission, objectives, and plan of action. YPARD is a global multi-stakeholder initiative by and for the young professionals in ARD. It recognizes the young people as key elements to achieve the Millennium Development Goals (MDGs) and to go beyond 2015. Young professionals have potentials to contribute to ARD because of their creativity, openness, enthusiasm, and willingness to work in partnership with field agents and farmers. They have common problems in ARD regardless of their origin, discipline or employment. YPARD is a platform where they can advocate and voice their needs and beliefs.

YPARD's vision is *"Sustainably improved livelihoods, worldwide, through dynamic agricultural research for development"*. Its mission is to serve as a global platform through which young professionals can express their ideas and realize their full potential towards a dynamic agricultural research for development.

Its guiding principles are:
- Multi-stakeholder
- Transparency
- Participatory
- Global- local (subsidiary)
- Equality
- Inclusiveness
- Representation
- Accountability
- Comparative advantage

YPARD has four objectives where they wish to make the following contributions to ARD, as follows:
- To facilitate the exchange of information and knowledge among young professionals (YP) across disciplines, professions, age, and regions- results of successful ARD shall

be shared among peers; YPARD will give a platform to minor players alongside with major ones.

- To broaden opportunities for young professionals to contribute to strategic ARD policy debates- YPARD will give support and experience to YP in policy dialogue, participate in international bodies, and exchange such experiences.
- To promote agriculture among young people- this will be addressed at appropriate levels, for example, in curricula enhancement or change, in Agriculture Open University, job opportunities, market boards, etc.
- To facilitate access to resources and capacity building opportunities- YPARD will be a service platform to provide access to training materials and experts in ARD, organize or list/advertise events, create and link –up opportunities.

As a global platform, YPARD shall foster South-South and South-North collaboration. It shall be strongly associated with the Global Forum on Agricultural Research (GFAR) and its unique quality of multi-stakeholder values.

To date, YPARD's coordination unit has been officially opened in the University of Hannover, Germany, its organizational structure finalized, and its website prototype launched www.ypard.org. Major funding and support are provided by GFAR, University of Hannover, Swiss Agency for Development and Cooperation (SDC), United Nations International Fund for Agricultural Development (IFAD), and European Forum on Agricultural Research for Development (EFARD). YPARD will be officially launched during the GFAR Triennial Conference on November 8-11, 2006 in New Delhi.

On behalf of YPARD, Dr. Ramani expressed thanks and appreciation to APAARI in general and to Dr. Raj Paroda and Dr. Betty Del Rosario in particular for their encouragement, support and the first opportunity given to YPARD to be part of the process in the regional forum like APAARI.

**Discussion and Synthesis:**

The main discussants were Mr. Satoru Miyata (JIRCAS) and Dr. Ellie Osir (IDRC). Other participants provided comments, shared their experiences and insights which contributed greatly to the rich discussion.

Mr. Miyata raised the following points: (1) On regional priorities- He reiterated the need to : (a) identify and narrow the gaps in the region which includes both very diversified developing and developed countries that have achieved very rapid economic and social development, and (b) recognize the role of the private sector; (2) On R & D investments- He pointed out the need to handle the conclusions with caution with respect to the trends in the Asia-Pacific region as only 10 countries are sampled in the ASTI survey, and data for some important countries including China and Thailand are missing. He also referred to a need to integrate R & D activities in the region to derive benefits from economic integration, which becomes very popular in the region. He emphasized the need to enhance more integrated and advanced South-South cooperation where both developing and developed countries would work together for common issues in the region; (3) On young professionals- He pointed out that young people in developed countries have less interest in agriculture and more universities have abandoned the name of agronomy faculty and adopted a pure science-based name like faculty of natural sciences to attract more young people to join their faculty.

Dr. Ellie Osir provided the following comments on the papers presented and shared some information on what IDRC does in the region : ( 1) on whether donors are driving priorities in the region- he stated that if we consider the fact that APAARI is supported by its members, and members are considered "donors" in this sense, then donors are able to drive priorities in the region as APAARI engages these "donors" in priority setting process such as this synthesis exercise; (2) we should be careful not to engage in a lengthy process of setting priorities as many factors change suddenly , and priorities identified may no longer be relevant; (3) on the four papers presented- up to what extent do they agree with other initiatives such as the on-going World Bank International Assessment of Agricultural Science and Technology for Development (IAASTD); (4) on thinking along the lines of systems approach to innovation- while R & D is very important in the system of innovation (SI) , we should not lose sight of the other components of the SI such as policies, institutions, etc; (5) the paper on R & D investment is interesting as it looks not only of agricultural but also the overall science spending worldwide ; the challenge is how one can use the information to influence policy.

He mentioned that IDRC (1) supports application of new knowledge in the South, (2) focuses on problems identified by partners in the South, and (3) provides technical support to build capacity and learning. There are four major program areas of IDRC, namely, (1) Environment and Natural Resources, (2) Socio-economics, (3) ICT for development , and (4) Innovation, policy and science (IPS), which is a relatively new area in IDRC. IPS aims to (a) improve understanding and capacity of innovation system, (b) support the development of explicit and implicit S & T, and (c) strengthen socio-economic analysis, social institutions, including biotechnology and nanotechnology. The project portfolio on IPS includes African S & T Strategies, Role of Universities in Developing Countries' Innovation System, Genomics and Health, and Biopharmaceutical Innovation System.

Dr R.C.A Jain representing Asian IFAP Committee shared his observations and insights. On the CGIAR System priorities, Dr. Jain mentioned two important omissions in the CGIAR system priorities on high value commodities, namely, (1) different models need to be developed, such as contract farming which will give the farmers the opportunity to add value to their produce through processing and linking them to market (LFM); and (2) novel uses of energy with focus on cultivation of biofuel crops such as *Jethropa* in order to supplement farmers' income. He suggested that since the CGIAR research constitutes only 4% of the global R & D, it could go into (1) anticipatory research such as climate change, developing eco-technology to reduce green house gases emission, and (2) risk management in agriculture such as developing insurance products like credit, and other system to indemnify damage to farmers. On R & D investments, Dr. Jain raised the issue on declining trends and how to attract the private sector to invest in the agriculture sector. On the YPARD, he suggested to expand the definition of young professionals to include young farmers, NGOs and others.

Dr Sena Da Silva (NACA) inquired on whether the information on R & D investment is correlated to productivity. Ms Nienke affirmed that this correlation exists; however, their study did not show this relationship because the study considered only the inputs (investments) but not the outputs (productivity). This is clearly one of the weaknesses of their study.

Dr Jodha (ICIMOD) mentioned that based on his experience with the CGIAR centers, the CGIAR is more reactive rather than proactive. According to him, agriculture is seemingly a losing industry, and therefore there is a need to look at inter-linkages among the physical,

socio-economic and environmental factors affecting agriculture. We need to think for instance, in terms of per capita expenditure, or per capita global warming contribution, among others.

Dr. Ramesh Chand (ICAR) pointed out the need to pay particular attention to delivery system and relevance of research to small farmers, and the potential contribution of the CGIAR on policy with respect to high value crops.

Mr. Raul Montemayor (FFF) inquired how the CGIAR and APAARI view extension. While he acknowledged that many technologies have already been generated, these are however mishandled by resource-poor farmers. Certainly good delivery is needed by and important to poor farmers. He thinks that the CGIAR focus on genetic crop improvement should be balanced with researches on appropriate management practices, such as use of inputs, among others.

Dr. Shantaram (Mekong Project) reiterated the importance of extension; more so with the advent of genetically modified crops (GMOs). As technologies become more sophisticated, a lot of information and knowledge will be needed to manage the seeds. He cited the case of Bt cotton in India where the lack of a clear extension to disseminate the useful information resulted to apprehension on the benefits of the new technology already delivered to farmers.

Dr. Rod Lefroy (CIAT) shared some experience with the CGIAR system priorities which according to him the CGIAR centers and a lot of donors had difficulty accepting in the beginning. While donors would love to see research on extension, this area falls within the 20 % "blue skies research." There were varied opinions on where the CGIAR mandate should stop along the research-development continuum. He believes the CGIAR has some expertise on value addition and LFM, and that extension research is something it needs to address.

Dr. Gowda clarified that value addition and LFM are in fact included in the CGIAR system priorities, however the CGIAR centers are not the only players and there are others who have the competitive edge and can do them better. On biofuels, while this is taken in the ethanol production project of ICRISAT, the overall goal of the CGIAR is food security rather than energy security. On attracting young professionals to pursue agriculture- related fields, he mentioned that companies which used to hire only molecular breeders to work on biotechnology are now hiring plant breeders with molecular breeding background to work successfully on biotechnology.

On the ASTI report, Ms, Nienke made some clarifications: some countries were not included for various reasons such as lack of funding (in the case of China) and reorganization (in the case of Thailand); no in-depth analysis were done in relation to the trends in R & D spending; the study also did not address the issue on how to provide incentives to the private sector to increase investment in agriculture; intensity ratios per capita, per labor force are included in the overall report.

On the young professionals, Dr. Bala clarified that YPARD is still in its formative years. However, one of its guiding principles is inclusiveness, and therefore young farmers, NGOs and others will be included.

Dr. Raj Paroda thanked the participants for their contribution in the discussion during this very important session on global initiatives, and addressed many issues raised during the

discussion. He acknowledged the important role of the CGIAR system, and cited its impact in terms of genetic resources. But the CGIAR research constitutes only four per cent of global R & D. He is particularly pleased that the CGIAR has revised its priorities, and 20 % of its work could be on development activities and other "blue skies research." On the other hand, GFAR's major focus is reorienting R & D to contribute to MDGs, while APAARI is focusing on linking farmers to markets (LFM). He sees the possibility of reorienting the R & D agenda to consider biofuel crops such as sugar cane, sorghum, maize, etc, including anticipatory research on climate change. On R & D investments, he mentioned that Asia-Pacific countries, especially China, Korea and India, are getting better catalyzed than the rest of the world. On capacity building and human resource development, he cited the case in Central Asia and Caucasus (CAC) where the average age of scientists in institutions is 65 years old and no one is interested in agriculture or agricultural research. Hence, there is a need to train second generation scientists. There is obviously a serious gap in the delivery system which should be addressed not only by governments but also by other players involving the youth, private sector, among others. Moreover, most countries have yet to strengthen their NARS by evolving from NARIs to NARS through the process of involving and engaging other stakeholders such as the NGOs, FOs, and others. Dr. Paroda stated that the regional synthesis should address not the needs of specific countries but broad issues which are going to make bigger impacts. In consideration of APAARI thrusts on information sharing, human resource development, networking and policy advocacy, the participating stakeholders in this meeting should take the agenda back to their system for appropriate action.

In his synthesis, the Chair thanked everyone for the very rich discussion and highlighted the following points:

1. On the CGIAR and global perspectives- these are always contentious and one can expand or contract depending on one's experience. Better yet the participants can pick up the insights and counter prove them to their own institutional mandates subject to availability of resources and funding. There is flexibility in the CGIAR system to review its priorities and respond to new needs and challenges.
2. The CGIAR centers are very strong in plant breeding; however their work in natural resource management (NRM) is very minimal. On sustainable agriculture, there is a need to consider other factors, but tools are available to monitor capacity to absorb the shock.
3. On technology delivery system, while there has been a lot of discussion in many meetings, technology delivery is very much dependent on the strength and health of NARS, other partners and other collaborators. In the private sector, there is a system of product stewardship until the product reaches the market. Maybe the public sector can adopt this system, carefully considering market signals and opportunities.
4. On concern for human resource both for research and actual farming- Rice research is getting more geriatric, hence the need for second generation, young people who will commit themselves to agriculture. The challenge is both at the scientist and farm level.

The Co-Chair added the following points with respect to forestry and agricultural research:

1. In forestry research, the major issue which will be addressed and launched soon by the International Tropical Timber Organization (ITTO) is private-public sector partnership.

2. Forestry schools have been disappearing. Lately however, there is an emerging change in the Asia-Pacific region as new programs in tropical forestry are offered, for instance in Kasetsart University, Thailand.
3. On R & D investments- there is increase in funding agriculture and natural resource management in Malaysia.
4. Food security and self-sufficiency are of prime concern in all countries; hence agriculture is still very important.
5. Relevant, accurate and timely information need to be conveyed to policy makers for better informed decisions.

**TECHNICAL SESSION 2:**
**STAKEHOLDERS PERSPECTIVES ON PRIORITY RESEARCH NEEDS**
*Chair : Prof. H. P. M. Gunasena, CARP*
*Co-Chair : Mr. Raul Montemayor, IFAP*

**R.D. Ghodake: Regional Synthesis Report on Research Needs**
Dr. Ghodake in his presentation traced the development of regional synthesis report and explained his approach to identify specific research gaps. The efforts had been to synthesize and aggregate the results from the sub- regions and may have lost some details in the process. He suggested that the working groups at the workshop consider the draft synthesis, presentations made by various stakeholders, and any other deliberations on the basis of which the working group could agree on research priorities at the regional and sub-regional levels and then on identifying research programs common at the regional and sub- regional levels. He appreciated the on-line feedback provided by IRRI, CIRAD, YPARD and ICAR which he included in his full report found in APAARI web site http://www.apaari.org.

Categorization of research areas in the three sub- regional reports:

- 82 research areas, 18 sub-themes and 7 themes
- 31 research areas common to all sub-regions
- 11 research areas common between SWA and SEA, 4 between SWA and the Pacific, and 1 between SEA and the Pacific
- Specific to a particular sub region: 19 research areas to South and West Asia, 10 to Southeast Asia and 6 to The Pacific

The seven major research areas/themes which are common among the three sub-regions are summarized in ***Table 3.***

1. Natural resource management
   - Land and water management
   - Soil and water management
   - Watershed management
   - Integrated management

2. Genetic Resources and Biotechnology
   - Genetic Resources Conservation/Biodiversity
   - Genetic Resources Improvement/Biotechnology

3. Enterprise Improvement
    - Systems Improvement
    - Commodity Improvement

4. Livestock
    - Livestock genetic improvement
    - Livestock systems improvement

5. Post harvest and Value addition
    - Processing and other means for agriculture, fisheries and forest products
    - Food safety and product quality

6. Policy and Institutions
    - Policy issues
    - Institutional reform

7. Cross-cutting
    - Research issues: monitoring, impact assessment, research tools and techniques, mechanization, market studies, research and information resource bases, etc.
    - Capacity Development: assessment, training, methods, processes, arrangements for specific target groups
    - ICT and Technology Transfer: ICT/ICM, knowledge management

Following are the stakeholders' perspectives on synthesized regional priority research needs presented by Dr. Ghodake.

**Asian CSOs:** The Asian CSOs perspective was presented by Mr. Nathaniel Don Marquez, Executive Director of ANGOC. He reported that the challenges and proposed agenda for agricultural research drew heavily from the following: ANGOC Policy Paper on Sustainable Development, Regional Workshop on Policy and Institutional Priorities for Sustainable Agriculture and Rural Development, Summary Report of Regional Caucus towards a New Agenda for Agricultural Research in Asia, and Inputs from ANGOC Members. He elaborated on the directions, priorities of agricultural research and how the local, national, regional and global R&D institutions address these issues. Developing a farm-focused research agenda is a major challenge.

The CSOs called on paradigm shift, particularly in social research, to put into practice the following:

- Participatory approach;
- Involved vs. detached science;
- Applied problem-solving orientation;
- Constructive vs. extractive research;
- Integration of social science with technical science;
- Integrated / holistic system approach;
- Study on social *processes;*
- Research as a medium for empowerment and mediation.

The following regional research areas were proposed by the CSOs:

- Natural resource management- research must adopt an integrated, holistic approach taking into account agro- ecology and the socio-eco-political aspects, with due consideration of traditional knowledge.
- Land reform and resource rights- policy issues related to land reforms, tenurial security, and resource management.
- Statistical tools and methods- simulation research which factors in multi-variable interactions.
- Research on research approaches- review of conventional crop-based research and other research methods such as farming systems research.
- Policy research- both in government and non-government organizations. Topics could include impact of market –led development strategies on the plight of the rural poor, distributional reforms and redefining priorities on public spending.
- Poverty reduction studies and strategies- how to reduce risk and vulnerability of the rural poor, maximization of profit and stable livelihoods.
- Rural enterprises and markets- understanding market opportunities and requirements, capacity building, make linkages and favorable policy environment for empowering small producers, and impact of including agriculture in WTO.
- Solidarity network and information exchange to build cooperation and partnership – information network and databases, appropriate infrastructure, and capacity building.
- Cross-cutting areas- sustainable livelihood of rural poor, empowerment of rural women and poor, social dimensions of technologies, indigenous knowledge, IPR, methodologies and research utilization approaches and research investment.

Comparison of the synthesized regional priority areas with the NGO list given in ***Table 4*** identified eight common areas of further work by APAARI and NGOs and pointed out the need to balance the biophysical with the social aspects.

Based on the results of the past CSO consultations and the synthesized regional research areas, the emerging research areas for possible collaboration may include, but not limited to, the following:

- Poverty reduction and household food security programs and strategies;
- Biodiversity, ecological protection and conservation;
- Natural resource management;
- Management of conflicts on common resources;
- Farmers' participation and capacity building;
- Social and gender equity;
- Rural enterprise development and markets;
- Development of regional standards for organic agriculture;
- Institutionalization of sustainable agriculture in the tertiary curriculum of agricultural schools and universities; and
- Information and knowledge management system

Mr. Marquez mentioned that a possible mechanism to sustain this collaboration is through the formation of an NGO consortium that will facilitate linkages of NGOs working on sustainable agriculture towards poverty alleviation and to link up with the public research institutes at the national level, like the National Agricultural Research System (NARS); at the regional level, the Asia-Pacific Association of Agricultural Research Institutions (APAARI); and the global level, the Global Forum for Agricultural Research (GFAR) and other

international research institutes like the Consultative Group for International Agricultural Research (CGIAR).

**Farmer Leader (Thailand):** Mr. Phongsak Thamrongratanasilp, Farmer leader and Secretary of Thailand Nature Farming Association, Sa-kaeo Province, Thailand gave a power point presentation tracing the success story of organic farming of asparagus which beginning with two villages in 2000 ( 38 acres) has expanded to 12 villages (526 acres) in 2006. The case is a classic example of how farmers could be linked to the markets by grouping them together and providing the technology, skills and access to markets to be able to compete in the export market. The farmers group follows the principles of good quality, good quantity, and regular frequency of delivery, faithfulness and discipline. The group follows the approach of organic farming with good marketing leading to economic and social upliftment of the farmers and protection of environment. The group has been assisted by a private company Swiff Company Ltd on the technical and marketing aspects. The company exports both white and green asparagus to Europe and Japan. Products are duly certified as organic asparagus and command premium price.

**Private Sector***:* Dr. Sampan Campiranon, Deputy Director Asia-Pacific Seed Association (APSA) presented APSA' perspective, APSA being the world's largest regional seed forum, with 354 members from 40 countries. APSA was established by FAO in 1994. It works in collaboration with FAO, ISF, ISTA, CGIAR, GFAR, OECD, AVRDC and other international and regional seed organizations. Its mission is to improve production and trade of quality seed and planting material of agri-horticultural crops. For instance, it ensures availability of germplasm through collaborative research with AVRDC. In rice, attempts are being made to utilize modern technology for hybrid production. For cross-boundary commercialization there is need of standard guidelines for production, export, import and, harmonization programmes on phytosanitary regulations since these could work as trade barriers.

The following private sector APSA priorities match the synthesized regional priorities:

- Genetic Resources and Biotechnology- germplasm collection, conservation and use of crop biodiversity
- Enterprise Improvement
- Post-harvest and Value-Addition
- Cross-cutting- focus on quality ( technology, information and communication)
- Policy and Institutions- relations with policy makers and government's role

**NARS:** Each sub-regional representative provided additional comments and suggestions as follows:

**South and West Asia:** Dr. Ramesh Chand of Indian Council of Agricultural Research (ICAR) discussed specific issues which are serious problems in certain parts of the region. These include the following: Arsenic in ground water is a serious problem in some regions of Eastern India. Animal biotechnology is important in South Asia in which new generation diagnostics, vaccines and capacity building in regulatory areas need to be prioritized. He suggested some modification in the research themes, such as: Value addition to address not only processing but also productivity and profitability of value added products. Food procurement and policy should not be limited to rainfed system. New innovations in rural credit system should be included. Issues regarding transboundary movement of plants and animals in South Asia should be addressed.

He recommended that the following general issues be addressed as well:

- Agriculture as a generator and consumer of energy.
- Emphasis on water use efficiency and health implications of agriculture.
- Development and dissemination of factual information on GM research and GM crop varieties.
- Futuristic research like climate change, biofuels.

**Southeast Asia:** Mr. Nicomedes Eleazar of Philippine Bureau of Agricultural Research (BAR) pointed out that:

- The research agenda needs to be demand- driven and developed in consultation with stakeholders.
- Identifying specific crops and commodities would make the research priorities more focused.
- New research agenda such as biofuels should be included.
- Due emphasis on livestock, veterinary medicine from plants, poultry production, food safety issues of GMOs.

**Pacific:** Mr. Thierry Mennesson of Institut Agronomique Neo-Caledonien indicated that the Pacific region has some specific needs. Due to limited research input strong partnerships are required. There is a need to ensure economic and social development using marine and terrestrial resources. The specific needs of Pacific to improve land, natural resources and environmental management need to be highlighted in the list.

**CGIAR:** Dr. Douglas Gray of International Livestock Research Institute (ILRI) revisited the reason and the process leading to this exercise. He pointed out that the outcome of priority setting would be significant and APAARI has a better mechanism of dealing with NARS issues. Since nations have their own priorities, it needs to be seen what role the regional priorities have. Livestock have been mentioned at appropriate level in the analysis. ILRI can contribute to addressing regional issues and operate same network projects across countries.

**Advanced Research Institute:** Dr. Jodha of the International Center for Integrated Mountain Development (ICIMOD) explained that mountains have unique ecosystem that do not match that of plains. They are characterized by inaccessibility, fragility of ecosystem, but great diversity. Crops and technologies of plains do not do well in hill situations and there is need for local initiatives in developing appropriate crop varieties and technologies. Indigenous rights of local people on biodiversity are being lost to public parks and biodiversity parks. Exploitation of herbals by private companies does not help local stakeholders.

**Young Professionals Platform for Agricultural Research for Development (YPARD):** Dr. Balasubramanian Ramani referred to his earlier presentation in Session I regarding YPARD's vision, mission and plans. He reiterated the need of and importance to involve the youth in identifying appropriate priorities, technologies and action plans in ARD..

**Technical Assistance Provider:** Dr. Sivramiah Shantharam of the Mekong Agriculture Project of ADB (Technical Assistance on Biotechnology) shared his insights and experience in ARD. He mentioned that personnel from many developing countries trained in advanced biotechnology laboratories do not get facilities and opportunities to utilize their expertise. Critical mass of trained staff with good facilities is essential. Biotechnology policy must

encourage utilization and sharing of new biotech tools and products across countries and regions.

**Conclusion and Synthesis:**
The Chair reiterated that the working groups at the workshop consider the draft synthesis, presentations made by various stakeholders, and any other deliberations on the basis of which the working group could agree on research priorities at the regional and sub-regional levels and then on identifying research programs common at the regional and sub- regional.

The common research themes are as follows:

- Natural resource management
- Genetic Resources and Biotechnology
- Enterprise Improvement
- Livestock
- Post harvest and Value addition
- Policy and Institutions
- Climate change
- Biofuels
- Cross-cutting- Capacity Development, ICT and Technology Transfer, knowledge management

The growing interest and initiatives in biofuels in many countries such as Brazil, India, Philippines, Thailand, among others, suggests the need for a forum like APAARI to synthesize the many initiatives so that research managers and policy makers will be more informed. Such synthesis could look at information useful for sound, science-based decisions. For instance, Dr. Padolina intimated that ethanol is very pollutive, and that it is imported for alcoholic drinks. Yet many countries produce ethanol from crops such as sugar cane, cassava, sweet sorghum. There is a need to reduce the level of pollutant from ethanol, i.e. 60, 000 liters of ethanol produces 600,000 liters of pollutants per day, to an acceptable. *Jethropa* which grows on marginal soil is being promoted recently by some countries, yet there are very limited studies regarding its oil content, agronomy and management.

Additional topics were raised during discussion: the potential lack of labor in future agricultural systems, research on mechanism of extension and scaling up of technologies and on seed markets.

It was noted that APAARI's efforts to revisit and update the regional research priorities through the sub-regional needs assessment and gap analyses in 2005 is well ahead of the CGIAR process, since the Science Council has just implemented the System Priorities 2005-2015. Convergence among these priorities will have to be considered.

**TECHNICAL SESSIONS 3:**
**REGIONAL RESEARCH COLLABORATION ON PRIORITY PROGRAMS**

The group was divided into three working groups, namely:

Group 1- South and West Asia
Group 2- Southeast Asia
Group 3- the Pacific

The list of working groups' members and their designated Chairs and Co Chairs is given in Annex 2.

The following discussion guidelines were provided to the groups:

(a) Revisit Priorities (add or delete) and specify gaps;

(i) Sub-region;

(ii) Region wide;

(b) Choose top 5 priorities for the short and medium term;

(c) Choose top 2-3 priorities for anticipatory research (Long term);

(d) Specify potential collaborators for both (b) and (c);

(e) Suggestion for future role of Regional Fora/ Global Forum, etc.

The outputs of the working groups' discussions are given in ***Tables 4, 5 and 6.***

**TECHNICAL SESSION 4:**
**JOINT PRIORITIES ACROSS SUB-REGIONS**
*Chair : Dr. N.S. Jodha, ICIMOD*
*Co-Chair : Dr. Douglas Gray, ILRI*

**Discussion and Synthesis:**

1. The three groups presented the outputs from their discussions on the priorities for each of the sub-regions: South and West Asia, Southeast Asia and the Pacific. All three groups completed their tasks and submitted written summaries which are included in the meeting notes on CD distributed to the participants.
2. The South and West Asia group put much effort into editing and reorganizing the research areas. The bigger changes included re-assigning biotechnology to its own Research Theme, and re-distributing the livestock theme to other appropriate themes. Some major gaps were identified including fisheries genetic resources, diagnostic tools and vaccines for animal health, improving small farm viability, outreach for financial services, the harnessing of traditional knowledge and practices, capacity building in trade and IPR issues (***Table 5***)
3. The Southeast Asia group spent more time on setting priorities of their region and for the Asia-Pacific region as a whole. They identified a wide range of stakeholders who would need to be involved in appropriate research programs. One new research area not previously discussed was the need to have a mechanism to monitor and evaluate networks. Perhaps APAARI can take a lead in this **(*Table 6)***.

4. The priorities of the Pacific group were grouped into themes that were shared by the other groups: markets, NRM, biodiversity, livelihoods, local genetic and feed resources and biofuels (***Table 7).***
5. Biofuels and Biotechnology were not commonly identified by the sub-regions as regional priorities ***(Table 8)*.** **Biofuel** was identified by:
    - SEA as a priority in the short to medium term for SEA only, not for the region;
    - SWA as anticipatory research for SWA only, not for the region;

- The Pacific as a regional priority;

**Biotechnology** was identified by:

- SWA as regional priority;
- SEA as a priority for SEA, not for the region, in the short and medium term.

6. Biofuels were seen as an emerging issue and stimulated significant debate during the discussion. It was proposed that APAARI and its members can play a leading role to ensure that debate on biofuels is well-informed and based on good science and could become a resource for relevant information for scientists, research managers and policy makers.
7. Some problems and opportunities may be shared across the regions but that different countries may have different perspectives, and that variation needs to be recognized and highlighted in the synthesis of regional priorities. For example, some countries may use the demand for biofuel to initiate a profitable enterprise which augments existing agricultural production. For others, biofuels will be a competing enterprise, creating different problems.
8. There is a need for APAARI and others to focus on the topics that are most significant for the region and for the topics that are in greatest need of a regional approach. Watershed management was suggested as a research topic that obliges cooperation across national boundaries. ***Tables 8 and 9*** summarize regional research priorities identified across sub-regions.
9. Environmental sustainability in general and climate change and risk management in particular are major anticipatory researches identified for the region ***(Table 10)***.
10. APAARI and other regional fora and GFAR are expected to continue their roles as facilitators in the areas of information and knowledge sharing, capacity building, partnership and networking, resource mobilization and policy advocacy. A new role in Monitoring and Evaluation of these collaborative activities was suggested ***(Table 11).***
11. There was a request that, in synthesizing and summarizing all the steps that have lead to this meeting, the details of the individual workshops and their outputs are not forgotten and are readily available for future use and revision.

**SESSION 5: FUTURE ROAD MAP**

*Chair : Dr. Raj Paroda, APAARI*
*Co-Chair : Mr. Nathaniel Don Marquez, ANGOC*

The different stakeholders presented their suggested courses of action or next steps to bring forward the ideas, insights and recommendations from this meeting, as follows:

**NARS:**

- Comprehension/ understanding/appreciation of the regional priority needs in the context of sub-regional and national needs;
- Further understanding of the priority needs within NARS priorities, agro-ecologies, micro- and macro- development issues, national priorities, policy context, bilateral and international obligations;
- Disaggregation of R & D components relevant for implementation- reference to country and sub-regional presentations;
- Priorities linking to existing and indigenous knowledge systems and innovation systems;

- Sensitizing/ consultations with various NARS, collaborators, stakeholders and donors- reconfirmation of gaps and needs at the national level;
- Sensitizing/consultation with countries within sub-region for confirmation of gaps and needs at the sub-regional level;
- Decide and implement programs through national and sub-regional initiatives;
- Consultations with APAARI/GFAR and other regional for a and IARCs and others with a view to developing and implementing regional programs; and
- Respond proactively to regional and sub-regional needs.

**CGIAR:**

- CGIAR centers remain committal to produce international public goods;
- Need to reorganize intra-natural traits and connections;
- APAARI should enhance its role to facilitate access to quality information ; as such it must be alert in identifying issues related to market access;
- CGIAR centers can be partners in capacity building.

**Private Sector:**

1. **APSA**
   - Identify high priority research program;
   - Identify partners;
   - Establish TOR and relevant standing Committees;
   - Formulate research proposal;
   - Implement program;
   - Assess results;
   - Utilize results.

   The key concerns are: feasibility, practicality, time frame, acceptability and sustainability.

2. **Monsanto**
   - There is a role for private sector research and development.
   - The private sector must understand their role within the context of overall regional priorities
     - R & D expertise
     - Farmers' needs
     - Policy issues and opportunities
     - Potential collaborators
   - Market development appears to be an area that APAARI members, the private sector like Monsanto and other stakeholders can work together.
   - Private sector should pursue science- based research and policy decisions.
   - Farmers should have access to technology; private sector however needs to demonstrate a return on R & D investments.
   - Information sharing and outreach should be for mutual benefit of both the public and private sector;
   - Private entities should have the opportunity to participate in this process.

**NGO/ANGOC:**

- Information dissemination
  - sharing the results to ANGOC Network Members and partners
  - continuous feedback on priority areas

- linking network members with APAARI at national level

- Information sharing of results of ANGOCs research /studies by including APAARI in mailing list and inviting APAARI to its meetings/conferences on the following topics:
  - poverty reduction and household food security
  - sustainable agriculture
  - agrarian reform
  - building coalitions of rural poor organizations
- Possible collaborations:
  - Development of regional standards and certification process for organic products, i.e. rice;
  - Institutionalization of sustainable agriculture in the tertiary curriculum of agricultural schools and universities;
  - Policy studies on land reform, access to land vis a vis poverty reduction and productivity;
  - Policy dialogue on food security;
  - On-going discussion with YPARD
  - Will open discussion with APCoAB , looking objectively at the positive and negative impacts of modern biotechnology
- Proposed Partnership Mechanism: NGO- APAARI Consortium
  - sustain collaboration by facilitating linkages among NGOs working on sustainable agriculture with the public research institutes at the national level (NARS), at the regional level (APAARI)and at the global level (CGIAR and GFAR).
- The NGOs will continue to impress the importance of social science research. They will continue their watchdog role to attain MDGs.

**Youth/YPARD:**

- This is a milestone event for the youth /YPARD and APAARI to involve the youth in this ARD process.
- APAARI has helped in bringing together YPARD and ANGOC.
- YPARD will work with ANGOC to build up young people profile, those involved in ARD, in APAARI region and in the sub-regions.
- YPARD will request APAARI to provide time and space and support for a workshop to be jointly organized by YPARD and ANGOC as a side event of the APAARI meetings in New Delhi, India on 6-8 November 2006.
- YPARD requests APAARI to nominate a young professional to be a liaison between APAARI and YPARD, who can sit in the decision making processes of APAARI.
- APAARI shall be kept informed about YPARD activities, and progress of the current networking established with participants of this workshop.

**Farmers' organization/IFAP:**

- IFAP is an international network of national farmer's organizations.
- IFAP has placed high priority in developing linkages with the agriculture research and development system
  - IFAP Special Committee on Agricultural Research
  - Linkages with and representation in the CGIAR, GFAR, GCP, etc.
  - Representation in the regional R & D networks like APAARI

- Need to strengthen linkages at national level for policy formulation, programming and prioritization, implementation, impact assessment and feedback.
- APAARI should convince the NARS and the CGIAR to experiment with this partnership and accommodate the other stakeholders

- APAARI priorities are very close to IFAP's priorities, namely, sustainability, farmer empowerment in markets, biofuels, risk assessment, food safety and quality and other concerns in relation to WTO and globalization. IFAP however lacks the R & D perspective.
- Need to institutionalize partnership with time, set up formal mechanisms, and sustain partnership with farmer organizations.
- Need to be patient but persistent in developing partnerships. Over time, partnership will evolve and will be strengthened. A direct link with the NARS should be pursued.

**Donor/IDRC:**

Looking at the different priority areas identified earlier, the following areas are similar and are of interest to IDRC:

1. Socio-economic agenda and equity impacts of technology- IDRC believes that while both modern and traditional technologies are important, the socio-economic aspect particularly on how these technologies impact on the lives of the farmers and the farming community is often neglected .
2. IPR- IDRC's interest is on the extent to which IPR influences innovation. A strong IPR regime can be both an incentive and a disincentive to innovation.
3. Traditional knowledge- IDRC's interest is on the extent to which traditional knowledge contributes to innovation capacity of farmers as innovators and not just recipients of innovations.
4. International Agreements such as WTO, TRIPS have important influence on national policies. Of particular interest to IDRC is how these agreements impact on the innovation systems.
5. IDRC tends to support projects conceived by the South, particularly research that are policy relevant. IDRC will continue to participate in future meetings with other partners.
6. Capacity building which is built into the research project (as opposed to the stand alone project) to strengthen partners' skills and build experiences especially of young researchers shall be supported.
7. IDRC supports collaborative projects, similar to what APAARI does to bring partners together.
8. Suggests that APAARI initiate a dialogue with donors to explore possibility of having donor consortium (could be led by IFAD or WB), similar to what was done by ASARECA in Africa.

**APAARI:**

1. Recommendations and report of this synthesis meeting will be circulated to all for inputs and further suggestions.
2. The long list of priorities as edited by Group 1 (South and West Asia) shall be shared with all participants.
3. The proceedings of this meeting shall be made available during the November 2006 APAARI General Assembly in New Delhi.

4. APAARI shall continue the process of catalyzing NARS in the region, bringing all stakeholders including NGOs, FOs and private sector together and ensuring their inputs are respected.
5. As APAARI executes its mandates and more is expected of it by its members and stakeholders, it will strive to:
    - Generate more donor support
    - Strengthen its Secretariat
    - Work closely with partners and other stakeholders and share responsibility
    - Be more proactive in information sharing
    - Vigorously perform its facilitative role in knowledge sharing especially on global and emerging issues such as ITPGRFA, WTO, Biofuels, etc.
6. Initiatives for networking will continue and hope that ILRI will come up with one on livestock, similar to what the other CGIAR centers have established to date, namely CORRA (IRRI), CLAN (ICRISAT), among others.
7. APAARI shall ensure the effective participation of the CSOs in decision –making, through a process that they will agree upon during the November 2006 APAARI General Assembly in New Delhi.
8. APAARI welcomes the YPARD and NGO proposal to convene YPARD/NGO jointly as a side event during the November 2006 APAARI General Assembly in New Delhi.
9. APAARI endorsed very strongly to GFAR the establishment of an ASIAN NGO Consortium led by ANGOC, an initial meeting of which will be supported by GFAR during the November GFAR 2006 Conference in New Delhi.

**CLOSING AND CONCLUSIONS**

Dr. Julian Gonsalves, GFAR Consultant, expressed his appreciation and thanks to APAARI and GFAR for the opportunity to observe the process, listen to the discussions and interact with APAARI members and stakeholders. He was very impressed that this meeting is "so well attended, so much enthusiasm, no hierarchy in the discussion, very well organized, and the level of discussion is very high". He recognized that APAARI and other regional fora can add value to the debates at all levels through synthesis of information, policy dialogue and advocacy which are the current strategic thrusts of APAARI, among others. The regional fora can contribute to the future visioning exercise for agriculture beyond the MDGs.

Mr. Nathaniel Don Marquez, ANGOC Executive Director, encouraged the participants to internally reflect on the priority areas and their implications on their particular institutional work plans and budget. He emphasized that appropriate partnership arrangements to pursue regional priorities and focus on similarities should be collectively decided to move the process forward.

Dr. Raj Paroda, APAARI Executive Secretary, in his closing remarks, acknowledged that this meeting is a continuing exercise among APAARI members and stakeholders. He intimated that APAARI during the last decade has done its best to bring all stakeholders together to collectively decide on regional research priorities, its strategic plan, the networks it is associated with, and some new initiatives such as on ICT/ICM (APARIS) and biotechnology (APCoAB). While it has taken time to bring in NGOs and FOs, he is very pleased that the stakeholders are picking up and are now more actively engaged and involved in the process. APAARI shall continue to play the role of honest broker and facilitator, and ensure that

inputs of all stakeholders are respected. He informed the participants that APAARI Executive Committee shall endorse for approval of the General Assembly in November 2006, the effective participation of CSOs and other stakeholders in decision making, i.e. one seat each for CSO, CGIAR and GFAR in the APAARI Executive Committee. He acknowledged that ANGOC is a partner of APAARI, and has been involved in its programs and activities since 2003. He expressed optimism that the NARS leaders will address the priorities and recommendations from this regional synthesis, and that donors will be more supportive of ARD. He thanked GFAR for the financial support, the APAARI Secretariat for ably organizing the meeting and all participants for their active participation. He expressed hope that the partnership with all stakeholders including the NGOs, FOs and private sector will remain strong and will continue.

| Table 1. System Priorities for CGIAR Research 2005-2015 |
|---|
| **Priority area 1: Sustaining biodiversity for current and future generations**<br><br>Priority 1 A: Conservation and characterization of staple crops<br>Priority 1B: Promoting conservation and characterization of under-utilized plant genetic resources to increase the income of the poor<br>Priority 1C: Conservation of indigenous livestock<br>Priority 1D: Conservation of aquatic animal genetic resources |
| **Priority area 2: Producing more and better food at lower cost through genetic improvements**<br><br>Priority 2 A: Maintaining and enhancing yields and yield potential of food staples<br>Priority 2B: Tolerance to selected abiotic stresses<br>Priority 2C: Enhancing nutritional quality and safety<br>Priority 2D: Genetic enhancement of selected high-value species |
| **Priority area 3: Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products**<br><br>Priority 3 A: Increasing income from fruit and vegetables<br>Priority 3B: Income increases from livestock<br>Priority 3C: Enhancing income through increased productivity of fisheries and aquaculture<br>Priority 3D: Sustainable income generation from forests and trees |
| **Priority area 4: Poverty alleviation and sustainable management of water, land and forest resources**<br><br>Priority 4 A: Integrated land, water and forest management at landscape level<br>Priority 4B: Sustaining and managing aquatic ecosystems for food and livelihoods<br>Priority 4C: Improving water productivity<br>Priority 4D: Sustainable agro-ecological intensification in low-and high-potential area |
| **Priority area 5: Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger**<br><br>Priority 5 A: Science and technology policies and institutions<br>Priority 5B: Making international and domestic markets work for the poor<br>Priority 5C: Rural institutions and their governance<br>Priority 5D: Improving research and development options to reduce rural poverty and vulnerability |

Source: System Priorities for CGIAR Research 2005-2015. Science Council Secretariat, December 2005.

**Table 2. ICRISAT's project portfolio based on CGIAR System Priorities**

| System priority | ICRISAT Project portfolio | Amount (US $ M) |
|---|---|---|
| 1: Sustaining biodiversity for current and future generations<br>1A: Conservation and characterization of staple crops<br>1B: Promoting conservation and characterization of under-utilized plant genetic r4esources to increase the income of the poor | Sustaining biodiversity of sorghum, small millets, groundnut, pigeon pea and chickpea for current and future generation | 2.1 |
| 2: Producing more and better food at lower cost through genetic improvements<br>2A: Maintaining and enhancing yields and yield potential of food staples<br>2B: Tolerance to selected abiotic stresses<br>2C: Enhancing nutritional quality and safety<br>2D: Genetic enhancement of selected species to increase income generation by the poor | Producing more and better food at lower cost of the following through genetic improvement:<br>• staple cereals and legumes of the WCA SAT( sorghum, pearl millet and groundnut);<br>• staple cereals and legumes of the ESA SAT ( sorghum, millets, groundnut, pigeonpea, and chickpea;<br>• staple cereals and legume hybrids in the Asian SAT (sorghum, pearl millet and pigeonpea);<br>• staple open-pollinated cereals and legumes in the Asian SAT (sorghum, millets, pigeonpea, chickpea, and groundnut). | 3.0<br>3.0<br>2.2<br>2.8 |
| 3: Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products<br>3A: Increasing income from fruit and vegetables | Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products including biofuels and cosmetic products | 2.7 |
| 4: Poverty alleviation and sustainable management of water , land and forest resources system<br>4A: Integrated land, water and forest management at landscape level<br>4B: Improving water productivity<br>4D: Sustainable agro-ecological intensification in low-and high-potential environments | Poverty alleviation and sustainable management of water , land and forest resources, particularly at the desert margins of the Sahel and the drylands of ESA;<br><br>Poverty alleviation and sustainable management of water , land , livestock, and forest resources through sustainable agro-ecological intensification in low-and high-potential environments. | 2.8<br>4.1 |
| 5: Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger<br>5A: Science and technology | Improving policies and facilitating institutional innovation to support sustained reduction of poverty and hunger in the SAT | 4.1 |

| | | |
|---|---|---|
| policies and institutions<br>5B: Making international and domestic markets work for the poor<br>5C: Rural institutions and their governance<br>5D: Improving R &D options to reduce rural poverty and vulnerability | | |

**Table 3. Synthesized research needs and priorities common across the three Asia-Pacific sub-regions: 2004-05 priority setting exercise (Ghodake, R. 2006)**

| Research Themes | Research Sub Themes | Research Areas | |
|---|---|---|---|
| 1. Natural Resources Management | Soil and Water Management | 1 | Maintaining soil health and soil fertility in coastal agro-ecosystems |
| | Watershed Management | 2 | Watershed management in catchment areas |
| | Integrated Management | 3 | Integrated NRM, PM, CM and agro-ecology, including policy issues |
| 2. Genetic Resources and Biotechnology | Genetic Resources Conservation/ Biodiversity | 4 | Germplasm collection, conservation and use of crop biodiversity |
| | Genetic Resources Improvement/ Biotechnology | 5 | Genetic resources management and biotechnology |
| | | 6 | Enhancing and augmentation of germplasm through genetic improvement |
| | | 7 | Identifying new sources of resistance to biotic and a-biotic stresses for individual species/systems |
| 3. Enterprise Improvement | Systems Improvement | 8 | Coconut based cropping system in coastal agro-ecosystems |
| | | 9 | Integrated crop production technologies |
| | | 10 | Agro-forestry and community forestry systems |
| | | 11 | Fisheries enterprise and mangroves in coastal agro-ecosystems |
| | | 12 | Up-scaling the use of integrated pest, disease and crop management |
| | Commodity Improvement | 13 | Improvement of high value, low volume and low weight products (horticultural, medicinal plants) in hills/mountains |
| | | 14 | Improvement in locally produced vegetables and food crops in hills and mountains |
| | | 15 | Commodity and value chains (production and consumption) in under-utilised species |
| 5. Post Harvest and Value Adding | Post-harvest and Value Adding | 16 | Value adding through processing and other means to agriculture, fisheries and forest products |
| 6. Policy and Institutions | Policy issues | 17 | Post-harvest value addition and processing |
| | | 18 | Extension systems and research-extension interface in coastal agro-ecosystems |
| | Institutional reform | 19 | Sustainable financing mechanisms |

| | | | |
|---|---|---|---|
| | | 20 | Collective action in rainfed/arid ecosystems |
| | | 21 | Suitable public-private partnerships in rainfed/arid ecosystems |
| 7. Cross-cutting | Research Issue | 22 | Monitoring and socioeconomics impact assessment of technology transfer/adoption |
| | | 23 | Development of new research tools (biotechnology and genomics) |
| | | 24 | Identifying and mapping of poverty areas |
| | | 25 | Markets, marketing systems and enterprise development |
| | | 26 | Research with better and stronger impact in and on systems |
| | Capacity Development | 27 | Building the organization and management capacity of NARS |
| | Information, Communication and Technology Transfer | 28 | Information, communication technology, knowledge management and exchange |
| | | 29 | Development of new information and communication tools/techniques |
| | Allied areas | 30 | Participation of people in linking NRM with enterprise improvement |
| | | 31 | Tourism and mountain handicrafts in hills and mountains |

**Table 4. Comparison of NGOs proposed research areas and the synthesized regional research areas of APAARI** *(source: N. Marquez, 2006)*

| ***Regional Research Areas*** | ***APAARI*** | ***NGOs*** |
|---|---|---|
| *Natural resources management* | ✓ | ✓ |
| *Genetic resources and biotechnology* | ✓ | *X* |
| *Enterprise improvement* | ✓ | ✓ |
| *Livestock* | ✓ | *X* |
| *Post harvest and value adding* | ✓ | *X* |
| *Policy and institutions* | ✓ | ✓ |
| *Poverty reduction studies and strategies* | ✓ | ✓ |
| *Land reform and resource rights* | *x* | ✓ |
| *Cross-cutting concerns* | | |
| *- Capacity development* | ✓ | ✓ |
| *-Information, communication, and technology transfer* | ✓ | ✓ |
| *- Allied areas* | ✓ | ✓ |
| *- Research Investments* | ✓ | ✓ |
| *- Social dimensions of technology* | ✓ | ✓ |
| *- Voices of the poor* | *X* | ✓ |
| *- Indigenous knowledge* | *X* | ✓ |
| *- Intellectual Property Rights* | *X* | ✓ |

**Table 5. Group 1 output- South and West Asia (SWA)**

| **Priority Areas: SWA and region wide** | **Gaps** | **Short and Medium Term Priorities** | **Anticipatory Research** | **Potential Partners, Collaborators** |
|---|---|---|---|---|
| 1. Natural Resource Management (NRM)<br>1.1. Land, soil, climate and water management<br>1.2. Integrated water shed management | | 1. Sustainable agricultural systems<br>2. Farm productivity, quality and efficiency<br>3. Socio-economic improvement<br>4. Capacity building<br>5. ICT applications | 1. Climate change<br>2. Risk Management<br>3. Biofuels | Bilateral, Plurilateral, Private Sector |
| 2. Genetic Resources and Biodiversity<br>2.1 Germplasm collection, conservation , management and utilization<br>2.2. Genetic enhancement and improvement for resistance to biotic and abiotic stresses | Fisheries, Microbial genetic resources | | | Bilateral, Plurilateral, Private Sector |
| 3. Biotechnology<br>3. 1. Biotechnology research for crops, animals and fisheries for resistance to biotic and abiotic stresses | New diagnostic tools , vaccines | | | Bilateral, Plurilateral, Private Sector |
| 4. Enterprise improvement<br>4.1. Systems | | | | Bilateral, Plurilateral, Private Sector |

| | | | | |
|---|---|---|---|---|
| improvement<br>- Diversification activities in all ecosystems<br>4.2. Commodity improvement –<br>- Improvement of high value, low volume and low weight products ( horticultural, medicinal plants) in hills and mountains<br>- Improvement in locally produced vegetables and food crops in hills and mountains<br>- Commodity and value chains (production and consumption ) in underutilized species | Improving small farm viability | | | |
| 5. Post-harvest<br>5.1. Productivity and profitability of Value added products through processing and other means to agriculture, fisheries and forest products | | | | Bilateral, Plurilateral, Private Sector |
| 6. Policy and Institutions<br>- Credit support to farmers | Financial services in rural areas;<br>Recognition and harnessing of traditional knowledge and practices | | | Bilateral, Plurilateral, Private Sector |
| 7. Cross- cutting<br>- Market competitiveness, enterprise development, markets and marketing systems | | | | Bilateral, Plurilateral, Private Sector |

| | | | | |
|---|---|---|---|---|
| 7.1. Capacity development | Trade and IPR-related issues, negotiations, agriculture outlook, and market intelligence | | | |

**Table 6. Group 2 Output- Southeast Asia (SEA)**

| **Short and Medium Term Priorities**<br><br>**(SEA)** | **Short and Medium Term Priorities**<br><br>**(Region wide)** | **Anticipatory Research**<br>**(Long term- SEA and region wide)** | **Gaps** | **Potential Partners/ Collaborators** | **Future Role of Regional ora and GFAR** |
|---|---|---|---|---|---|
| 1. Linking farmers to market, entrepreneurial development of farmers and fisher folks, markets and marketing systems;<br><br>2.Enhance and sustain germplasm collection, conservation and use of crop and animal biodiversity;<br><br>3. Socio-economic assessment of technology transfer and adaptation, including participatory approaches (NGO, farmers, youth, women , and private sector;<br><br>4. Food safety, food quality, GMOs, biotech and market changes; | 1. Integrated NRM, PM, CM, and Agro-ecology, including policy issues;<br><br>2. Germplasm collection, conservation and use of crop biodiversity;<br><br>3. Value-adding through processing and other means, including policy issues with respect to agriculture, fisheries and forest products, and commodity and value-chains (production and consumption);<br><br>4. Markets, marketing systems and enterprise development;<br><br>5. ICT, knowledge management and | 1. Capacity building;<br><br>2. Environmental sustainability | 1. Land tenure and access to land;<br><br>2. Access to water;<br><br>3. Peri-urban agriculture | NARS, CGIAR, Private sector, NGOs, youth, farmers' organization, donors, APAARI, ARI, other international organizations | Catalyst of collaborative ctivities :<br>• Networking<br>• Resource nobilization<br>• Capacity building<br>• Policy advocacy<br>• Information and nowledge sharing (data ases)<br>• Monitoring and valuation of networks of bove activities) |

| | | | | | |
|---|---|---|---|---|---|
| 5. Biofuels;<br><br>6. ICT, knowledge management and exchange, development of information, communication tools and techniques. | exchange, development of new information and communication tools and techniques;<br><br>6. Socio-economic impact assessment of technology transfer and adaptation, including participatory approaches (farmers, youth, women, NGOs, private sector. | | | | |

**Table 7. Group 3 Output- Pacific**

| **Short to Medium Term Priorities: Regional** | **Short to Medium Term Priorities: Pacific** | **Anticipatory Research (Long Term)** | **Collaborators** | **Role of Regional Fora and GFAR** |
|---|---|---|---|---|
| 1. Integrated NRM including policy issues for increased agricultural productivity, profitability and sustainability.<br><br>2. Genetic Resources, agro-biodiversity (plants, fish, animal, micro-organisms) conservation, management enhancement and utilization.<br><br>3. Value addition through post harvest management and processing and linking farmers to markets (commodity and value chains) including policy issues with respect agriculture, fisheries, and forest products for increased income.<br><br>4. Socio-economics, marketing and policy research with emphasis on technology transfer, innovation systems and impact assessment.<br><br>5. Livestock, aquaculture management systems focusing on feeds and feeding systems using locally available resources and health issues.<br><br>6. Production and use of biofuel in agriculture. | Integrated NRM (greater emphasis on atolls) | 1. Studying impact of climate changes and evolving strategies to mitigate them.<br><br>2. Risk assessment and management in agriculture arising from natural disasters and variations. | NARS, CIRAD, IRD, ACIAR, SPC, CGIAR centers, greater involvement of stakeholders | Information and knowledge sharing;<br><br>Capacity building;<br><br>Facilitation;<br><br>Strengthening partnership;<br><br>Resource mobilization;<br><br>Catalyzing policy makers and donors. |

**Table 8. Summary of Regional Research Priorities identified by the three Asia-Pacific sub-regions**

| Southeast Asia (SEA) | South and West Asia (SWA) | Pacific | Remarks |
|---|---|---|---|
| 1. Integrated NRM, PM, CM, and Agro-ecology, including policy issues;<br><br>2. Germplasm collection, conservation and use of crop biodiversity;<br><br>3. Value-adding through processing and other means, including policy issues with respect to agriculture, fisheries and forest products, and commodity and value-chains (production and consumption);<br><br>4. Markets, marketing systems and enterprise development;<br><br>5. ICT, knowledge management and exchange, development of new information and communication tools and techniques;<br><br>6. Socio-economic impact assessment of technology transfer and adaptation, including participatory approaches (farmers, youth, women, NGOs, private sector. | 1. Natural Resource Management (NRM)<br><br>1.1. Land, soil, climate and water management<br><br>1.2. Integrated water shed management<br><br>2. Genetic Resources and Biodiversity<br><br>2.1 Germplasm collection, conservation , management and utilization<br><br>2.2. Genetic enhancement and improvement for resistance to biotic and abiotic stresses<br><br>**3. Biotechnology**<br><br>3. 1. Biotechnology research for crops, animals and fisheries for resistance to biotic and abiotic stresses<br><br>4. Enterprise improvement<br><br>4.1. Systems improvement<br><br>- Diversification activities in all ecosystems<br><br>4.2. Commodity improvement –<br><br>- Improvement of high | 1. Integrated NRM including policy issues for increased agricultural productivity, profitability and sustainability.<br><br>2. Genetic Resources, agro-biodiversity (plants, fish, animal, micro-organisms) conservation, management enhancement and utilization.<br><br>3. Value addition through post harvest management and processing and linking farmers to markets (commodity and value chains) including policy issues with respect agriculture, fisheries, and forest products for increased income.<br><br>4. Socio-economics, marketing and policy research with emphasis on technology transfer, innovation systems and impact assessment.<br><br>5. Livestock, aquaculture management systems focusing on feeds and feeding systems using locally available resources and health issues. | Biotechnology and biofuels were not commonly identified by the sub-regions as regional priorities.<br><br>**Biofuel** was identified by:<br>- SEA as a priority in the short to medium term for SEA only, not for the region;<br><br>- SWA as anticipatory research for SWA only, not for the region;<br><br>- the Pacific as a regional priority;<br><br>**Biotechnology** was identified by :<br><br>- SWA as regional priority ;<br><br>- SEA as a priority for SEA, not for the region, in the short and medium term. |

| | | | |
|---|---|---|---|
| | value, low volume and low weight products ( horticultural, medicinal plants) in hills and mountains<br>- Improvement in locally produced vegetables and food crops in hills and mountains<br>- Commodity and value chains (production and consumption ) in underutilized species<br>5. Post-harvest<br>5.1. Productivity and profitability of Value added products through processing and other means to agriculture, fisheries and forest products<br>6. Policy and Institutions<br>- Credit support to farmers<br>7. Cross- cutting<br>- Market competitiveness, enterprise development, markets and marketing systems<br>7.1. Capacity development | **6. Production and use of biofuel in agriculture**. | |

**Table 9. Summary of regional research priorities in the short to medium term as identified by the three Asia- Pacific sub- regions**

| SEA | SW A | Pacific | Remarks |
|---|---|---|---|
| 1. Integrated NRM, PM, CM, and Agro-ecology, including policy issues;<br><br>2. Germplasm collection, conservation and use of crop biodiversity;<br><br>3. Value-adding through processing and other means, including policy issues with respect to agriculture, fisheries and forest products, and commodity and value-chains (production and consumption);<br><br>4. Markets, marketing systems and enterprise development;<br><br>5. ICT, knowledge management and exchange, development of new information and communication tools and techniques;<br><br>6. Socio-economic impact assessment of technology transfer and adaptation, including participatory approaches (farmers, youth, women, NGOs, private sector. | 1. Sustainable agricultural systems<br><br>2. Farm productivity, quality and efficiency<br><br>3. Socio-economic improvement<br><br>4. Capacity building<br><br>5. ICT applications | 1. Integrated NRM including policy issues for increased agricultural productivity, profitability and sustainability.<br><br>2. Genetic Resources, agro-biodiversity (plants, fish, animal, micro-organisms) conservation, management enhancement and utilization.<br><br>3. Value addition through post harvest management and processing and linking farmers to markets (commodity and value chains) including policy issues with respect agriculture, fisheries, and forest products for increased income.<br><br>4. Socio-economics, marketing and policy research with emphasis on technology transfer, innovation systems and impact assessment.<br><br>5. Livestock, aquaculture management systems focusing on feeds and feeding systems using locally available resources and health issues.<br><br>**6. Production and use of biofuel in agriculture.** | The short and medium term regional priorities identified by the three sub-regions were similar, except for biofuel which was identified by the Pacific. |

**Table 10. Summary of Anticipatory Research priorities identified by the three Asia-Pacific sub regions**

| SEA | SWA | Pacific | Remarks |
|---|---|---|---|
| **1. Capacity building**<br><br>2. Environmental sustainability | 1. Climate change<br><br>2. Risk Management<br><br>**3. Biofuels** | 1. Studying impact of climate changes and evolving strategies to mitigate them.<br><br>2. Risk assessment and management in agriculture arising from natural disasters and variations. | Environmental sustainability in general and climate change and risk management in particular are major anticipatory researches identified for the region. |

**Table 11. Summary of Future Roles of APAARI and other regional fora and GFAR, suggested by the three Asia-Pacific sub-regions**

| SEA | Pacific | Remarks |
|---|---|---|
| Catalyst of collaborative activities :<br>• Networking<br>• Resource mobilization<br>• Capacity building<br>• Policy advocacy<br>• Information and knowledge sharing (data bases)<br><br>Monitoring and evaluation of networks of above activities) | Information and knowledge sharing;<br><br>Capacity building;<br><br>Facilitation;<br><br>Strengthening partnership;<br><br>Resource mobilization;<br><br>Catalyzing policy makers and donors. | Monitoring and Evaluation is a new role suggested by SEA. |

## ANNEX 1

## CONCEPT NOTE ON REGIONAL SYNTHESIS OF RESEARCH NEEDS IN THE ASIA-PACIFIC REGION

### BACKGROUND/RATIONALE

APAARI provides a platform for regional priority setting based on the needs identified by the different stakeholders in the region. In 2001, sub- regional priority setting exercises were conducted by APAARI member institutions, which were synthesized into a set of regional research priority areas. The 2001 regional priorities have helped shape global perspectives and priorities about agricultural science and technology to maximize its contribution to the challenge of meeting the Millennium Development Goals (MDGs**).** For instance, these regional priority areas were inputted into the Challenge Program identification and the priority setting exercises led by the *Interim* Science Council and the current Science Council of the CGIAR. Moreover, these regional priority setting exercises and research needs assessment have resulted into at least two regional programs initiated and supported by APAARI and other donors, namely, the Asia-Pacific Consortium for Agricultural Biotechnology (APCoAB) and the Asia-Pacific Regional Information System (APARIS), and a work- in- progress on Linking Farmers to Market Global Partnership Programme (GPP) facilitated by GFAR. In 2004 and 2005, APAARI conducted research needs assessment for the three sub-regions. In all three cases, there was limited participation of NGOs, farmers' and Private Sector organizations.

In the recent past, science for agricultural development processes becomes more inclusive, consultative and participatory. More opportunities for progress as well as new challenges are identified jointly and actively by different stakeholders with broader range of agenda and priorities. Increasingly, science for agricultural development is focusing on: partnerships, multiple knowledge bases, innovation triggers and champions, reworking the existing stock of knowledge, institutional learning and capacity development, and social responsibility. Donors and research organizations are beginning to direct more support to building the capacity of local systems to generate, diffuse and use new technology, recognizing that capacity development in the systems is the route to more effective impact from research investments (Science Council, 2005).

With support from GFAR, the proposed Regional Synthesis of Research Needs in Asia-Pacific shall bring together key stakeholders in the three sub-regions, with the involvement of NARS, NGOs, farmers' and Private Sector organizations. The Workshop shall be conducted with the aim of: (1) synthesizing regional research needs and identifying commonalities among sub-regions, and (2) identify regional priority collaborative research and development programs and specifying the role of different stakeholders. This is consistent with the aim of both APAARI and GFAR to broaden partnership both at the regional and global levels. In order to have a more meaningful outcome, pre-workshop activities including on-line interaction with key stakeholders in the region will be ensured.

### DESCRIPTION OF ACTIVITIES

**1. Pre-workshop :** APAARI shall commission an expert to : (a) synthesize and critically examine the outputs of the three sub- regional research needs assessments and identify commonalities across sub-regions (**15 June – 15 July 2006)**; and (b) conduct on-line

validation with selected NARS and other stakeholders such as NGOs, farmers' and Private Sector organizations (**15 July -31 July 2006**). The result of the synthesis work shall be reported to serve as main basis of discussions during the 18-19 August 2006 workshop.

**2. Regional Workshop.** APAARI shall conduct a "Workshop on Regional Synthesis of Research Needs in the Asia-Pacific region" to discuss results of pre-workshop and recommend regional priority collaborative research and development programs (**18-19 August 2006).**

**DEFINITION OF OUTPUTS**

1. Synthesis Report on Research needs, indicating (a) common research needs among sub-regions and (b) list of regional research needs as validated by selected NARS and other stakeholders (NGOs, farmers' and Private Sector organizations), and (c) regional priority collaborative research and development programs; and

2. Proceedings of Workshop on Regional Synthesis of Research Needs in the Asia-Pacific region, highlighting mutually agreed upon regional priority collaborative research and development programs.

**Duration and Timing**

1. Synthesis of three sub- regional research needs assessment by an expert commissioned by APAARI: **15 June-15 July 2006;**

2. On-line validation of regional research needs with selected NARS and other stakeholders (NGOs, farmers' and Private Sector organizations)- to be conducted by the same expert-**15 July -31 July 2006;** and

3. Regional Workshop: **18-19 August 2006.**

## ANNEX 2

**Working Groups**

**Group 1: South and West Asia**
Chair: Mr. R.C. Jain, NIA
Co-Chair: Dr. C.L.L. Gowda, ICRISAT
Members:
1. Prof. H.P. M. Gunasena
2. Dr. Ramesh Chand
3. Dr. Doug Gray
4. Dr. Rod Lefroy
5. Dr. N.S. Jodha
6. Prof. Sena De Silva
7. Dr. Jerry L. Flint
8. Dr. J.L. Karihaloo

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**Group 2 Southeast and East Asia**
Chair: Dir. Nicomedes Eleazar, BAR
Co-Chair: Dr. Nienke Beintema, IFPRI-ISNAR
Members:
1. Mr. Joel Lales
2. Dr. William G. Padolina
3. Mr. Nathaniel Don Marquez
4. Ms. Panida Vanichanont
5. Mr. Raul Montemayor
6. Dr. Sim Heok-Choh
7. Dr. Sahdev Singh
8. Dr. Ellie Osir
9. Mr. Pen Suwannarat
10. Dr. Satoru Miyata
11. Dr. Sampan Campiranon
12. Mr. Pongsak Thamrongratnasilp
13. Mr. Phanuwat Wanruway
14. Ms. Chiraporn Sunpakit
15. Dr. Sivramiah Shantaram
16. Dr. Balasubramanian Ramani

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**Group 3 Pacific**
Chair: Dr. R. Ghodake, NARI
Co-Chair: Mr. Thierry Mennesson, IAC
Members:
1. Dr. Raj Paroda
2. Dr. Betty del Rosario
3. Mr. P.K. Saha

**ANNEX 3**

***Workshop on Regional Synthesis of Research Needs in the Asia-Pacific Region***

*Rama Gardens Hotel, Bangkok, Thailand*
*18-19 August, 2006*

***AGENDA***

***18 August (Friday)***

| | | |
|---|---|---|
| **8:00-08:30** | Registration | |
| | ***Inaugural Session*** | |
| **08:30-08:40** | Welcome and Opening Remarks | Prof. H.P.M. Gunasena, Chairman, APAARI |
| **08:40-08:50** | Background and Rationale | Dr. Raj Paroda, Executive Secretary, APAARI |
| | ***Technical Session 1: Global/International Research for Development Agenda, R&D Investments and other Developments***<br>*Chair : Dr. William Padolina, IRRI*<br>*Co- Chair : Dr. Sim Heok-Choh, APAFRI* | |
| **08:50-09:20** | CGIAR System Priorities | Dr. C.C.L Gowda<br>Global Theme Leader<br>Crop Improvement<br>ICRISAT |
| **09:20-09:50** | GFAR- Priorities and Programs | Dr. Ola Smith,<br>Executive Secretary, GFAR |
| **09:50-10:10** | *Coffee Break and Group Photograp*h | |
| **10:10-10:40** | Investments in Agricultural R&D (Global and Regional) | Dr. Nienke Beintema, IFRI-ASTI |
| **10:40-11:20** | The Young Professionals Platform For Agricultural Research for Development (YPARD) | Dr. Balasubramanian Ramani<br>Coordinator, YPARD |
| **11:20-12:10** | **General Discussion: Discussants** | Dr. Satoru Miyata, JIRCAS<br>Dr. Ellie Osir, IDRC |
| **12:10- 12:30** | Synthesis and Conclusion by the Chair | Dr. William Padolina |
| **12:30-14:00** | *Lunch Break* | |

***Technical Session 2: Stakeholders Perspectives on Priority Research Needs***
*Chair : Prof. H. P. M. Gunasena, CARP*
*Co-Chair : Mr. Raul Montemayor, IFAP*

| | | |
|---|---|---|
| **14:00-14:45** | Presentation of Regional Synthesis Report on Research Needs | Dr. R. D. Ghodake, NARI |
| | ***Discussants: (15 minutes each*)** | |
| **14:45-15:30** | NARS: India<br>Philippines<br>New Caledonia | Dr. Ramesh Chand, ICAR<br>Dir. Nicomedes Eleazar, BAR<br>Mr. Thierry Mennesson, IAC |
| **15:30-15:45** | NGO | Mr. Nathaniel Don Marquez, ANGOC |
| **15:45-16:00** | *Coffee Break* | |
| **16:00-16:15** | Farmers /Farmers' Organization | Mr. Phongsak Thamrongratanasilp, Thailand |
| **16:15-16:30** | Private Sector | Dr. Sampan Campiranon, APSA |
| **16:30-16:45** | CGIAR and ILRI | Dr. Douglas Gray, ILRI |
| **16:45-17:00** | ARI-ICIMOD | Dr. N.S. Jodha, ICIMOD |
| **17:00-17:15** | Youth | Dr. Balasubramanian, YPARD |
| **1715-1730** | Technical Assistance Provider | Dr. Sivramiah Shantharam Mekong Agri. Project (ADB) |
| **17:30-17:45** | Concluding Remarks by the Chair | Prof. H. P. M. Gunasena |

**1900** ***Welcome Reception by APAARI: Jit Pochana Restaurant, Jatuchak***
***(Please be at the lobby by 6:25pm. The hotel shuttle bus will leave for the restaurant at exactly 6:30 pm)***.

***<u>19 August 2006 (Saturday)</u>***

***Technical Session 3: Regional Research Collaboration on Priority Programs***

**08:30-10:30** Group Discussion (3 groups: by sub-region)

***Group 1: South and West Asia***
*Chair : Mr. R.C. Jain, NIA*
*Co-Chair : Dr. C.L.L. Gowda, ICRISAT*

***Group 2: Southeast and East Asia***
*Chair : Dir. Nicomedes Eleazar, BAR*
*Co-Chair : Dr. Nienke Bientema, IFPRI-ISNAR*

***Group 3: Pacific***
*Chair : Dr. R. Ghodake, NARI*
*Co-Chair : Mr. Thierry Mennesson, IAC*

**10:30-10:45** *Coffee Break*

***Technical Session 4: Joint Priorities across Sub-Regions***
*Chair : Dr. N.S. Jodha, ICIMOD*
*Co-Chair : Dr. Douglas Gray, ILRI*

**10:45-11:45** Sub-regional Recommendations (20 minutes each)
*Group 1:* Mr. R.C.A Jain
*Group 2:* Dir. Nicomedes Eleazar
*Group 3:* Mr. Thierry Mennesson

**11:45-12:30** General Discussion and Synthesis by the Chair — Dr. N.S. Jodha

**12:30-14:00** *Lunch Break*

***Session 5: Future Road Map***
*Chair : Dr. Raj Paroda, APAARI*
*Co-Chair : Mr. Nathaniel Don Marquez, ANGOC*

**14:00-15:20** Next steps for specific actions (10 minutes each)

| | |
|---|---|
| NARS | Dr. R. Ghodake |
| CGIAR | Dr. William Padolina |
| Private Sector | Dr. Sampan Campiranon |
| | Dr. Jerry L. Flint |
| NGO/ANGOC | Mr. Nathaniel Don Marquez |
| Youth/YPARD | Dr. Balasubramanian Ramani |
| Farmers' Organization | Mr. Raul Montemayor |
| Donor | Dr. Ellie Osir |
| APAARI | Dr. Raj Paroda |

**15:40-15:50** Concluding Remarks — Dr. Raj Paroda

**16:00** Adjournment of the Meeting

**ANNEX 4**

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# Annex 5
# SYNTHESIS OF REGIONAL AGRICULTURAL RESEARCH NEEDS AND PRIORITIES FOR THE ASIA-PACIFIC REGION

## Contents

# SYNTHESIS OF REGIONAL AGRICULTURAL RESEARCH NEEDS AND PRIORITIES IN THE ASIA-PACIFIC REGION

Raghunath D. Ghodake[1]

## 1. Agricultural Research for Development

### 1.1 Research Focus

Agriculture, being based on renewable resources, has been and will continue to be the major source of socio-economic development in the most developing countries, including the developing countries in the Asia-Pacific region. The sector continues to be and will remain the prime contributor to food security, income generation, improved livelihoods, self-reliance, and overall prosperity in the region. Agricultural research has played very significant role over the past five decades in terms of growth and sustainability of this sector, help reducing poverty and improving overall welfare of people.

In general, investment in agricultural research has proven to be very attractive. It gives as much as 30% real rate of return per annum (Evenson et al. 1999). Many research successes have been achieved worldwide both in developed and developing countries. However, investment in agricultural research has been nowhere near the stipulated rate of 2 percent of agricultural gross domestic product. On the other hand it has been on decline in most of the developing countries in the Asia-Pacific region. Research resources have become scarce.

Under the environment of limited research resources and research capacity, it is important to optimise returns to research investment by focussing on high priority research agenda that has potential to make greater, wider, quicker and relevant development impacts. Such impacts need to address issues such as food security, income distribution, poverty alleviation, and rural development, and problems of less developed and neglected areas. Therefore, while developing priority research agenda, it is necessary to consider development issues at both macro and micro (local) levels within individual countries, and also to account for demand and supply parameters at the national and international levels.

### 1.2 Emerging Challenges

In the recent past the process of agricultural research for development has been more challenging, inclusive, consultative and participatory. Opportunities and options for research are identified jointly by different stakeholders with broader range of agenda and priorities. Increasingly, research is focusing on partnerships, multiple knowledge bases, innovation triggers and champions, reworking the existing stock of knowledge, institutional learning and capacity development, and social responsibility. Donors and research organizations are beginning to direct more support to building the capacity of local systems to generate, diffuse and use new

[1] Director General, National Agricultural Research Institute, Sir Alkan Tololo Research Centre, P.O. Box 4415, Lae, Papua New Guinea. The author wishes to express his sincere thanks to Ms Norah Omot and Mr Jesse Anjen for their assistance in compiling the data and information, and to various stakeholders and workshop participants for their comments and suggestions.

technology; and recognizing that capacity development in the systems is the route to more effective impact from research investments (CGIAR Science Council 2005).

Research agenda must be prioritised based on the assessment of the needs of local communities in the overall complex environment and also on the assessment of gaps so that research programmes become focussed in generating high and relevant impacts on target populations. For an effective impact of research results, it is also crucial to seek involvement and participation of important stakeholders such as farming community, farmer organizations, NGOs, development workers, the private sector, processors, traders and consumers in developing research priorities and implementing research programmes. This participation is now not limited to the national boundaries but also encompasses regional and international dimensions.

## 2. Agricultural Research Priorities in the Asia-Pacific Region

### 2.1 The 2001 Research Priority Setting Exercise

As part of its mandated responsibility, the Asia-Pacific Association of Agricultural Research Institutions (APAARI) in collaboration with the Global Forum on Agricultural Research (GFAR), National Agricultural Research Systems (NARS), International Agricultural Research Centers (IARCs) and other stakeholders, has provided a platform for regional priority setting exercise based on the needs identified by the different stakeholders in the region. This initiative goes back to 1996 when APAARI undertook the research priority setting exercise in the Asia-Pacific region. This was followed by the first consultative exercise during 2001. This exercise had two phases. The first phase involved research priority setting exercise by the individual (three) sub-regions – South and West Asia, Southeast Asia and the Pacific. While in the second phase, an expert consultation on regional research priority setting was held in November 2001 to synthesise and aggregate research priorities in the Asia-Pacific region (APAARI 2001). The synthesised research priorities in the region and its three sub-regions are presented in Annex 1.

The 2001 regional priorities helped shaping up global perspectives and priorities for agricultural science and technology in making their contribution to meeting the Millennium Development Goals (MDGs**).** The regional priority areas were inputted into the Challenge Programmes initiated by the Consultative Group on International Agricultural Research (CGIAR). These also formed new research priorities as identified by the Science Council of CGIAR. The regional priorities and research needs assessment also resulted into the establishment of some regional programmes supported by donors and APAARI, namely the Asia-Pacific Consortium for Agricultural Biotechnology (APCoAB), the Asia-Pacific Regional Information System (APARIS), the Post-Harvest initiative, CLAN and INCANA. Based on these priorities, work is also in progress on Linking Farmers to Market Global Partnership Programme (GPP) facilitated by GFAR.

### 2.2 Sub-Regional Research Needs Assessments and Research Priorities (2004-2005)

Although a number of outcomes were accomplished, the 2001 priority setting exercise was of a limited value because a) priorities established were aggregate and broad and did not reflect micro (local level) needs; b) there was only a limited participation by the key stakeholders such as farmers, NGOs, farmer organizations, development workers, the private sector, traders and processors and consumers; and c) many of new and emerging issues and challenges were not reflected in these priorities.

Therefore, a second set of research priority setting exercise was undertaken in the three sub-regions of the Asia-Pacific region during 2004 and 2005. Three workshops – one in each sub-region - were conducted during 2004 and 2005 to review and validate the research needs identified during the 2001 exercise, identify gaps and prioritise research for respective sub-regions. The two main objectives were:

- to identify research needs based on gap analysis by national programmes in each of these sub-regions; and

- to synthesize research needs and priorities for the sub-regions and draw up a set of recommendations on research priorities that may influence the regional and global research agenda.

Annex 2 provides details of these workshops, including locations, host organisations, participating countries, and participating organisations. It may be noted that this exercise has a variable participation by various stakeholders such as farmers, NGOs, farmer organizations, development workers, the private sector, traders and processors and consumers. Participation by international research organizations and donors also varied among the sub-regions. The South and West Asia exercise involved a number of such organizations; the Southeast exercise attracted a reasonable participation while the Pacific region exercise did not have much.

## 3. Synthesis of the Previous Research Priorities

The purpose of this synthesis (exercise) was to critically examine the outputs of the three sub-regional research need assessments and priorities and identify high priority common research areas across these sub-regions, and also to highlight research areas that are specific to the individual sub-regions.

The draft synthesis was shared with NGOs, farmer/producer organisations, and the private sector in the Asia-Pacific region for their comments, inputs and validation. Some of these feedbacks were consolidated to arrive at broadly agreed research needs that were common to the region and also that are specific to individual sub-regions. Specific emphasis was placed on identification of research needed based on the present gaps.

The consolidated synthesis was further presented at the workshop organised by APAARI on Synthesis of Regional Research Needs in the Asia-Pacific Region on 18-19 August 2006, in Bangkok. Thus the presentation became the basis for deliberations at the workshop. The ensuring deliberations and arising outcomes at the workshop further helped distilling further the research needs and deciding high priority areas for research and development programmes in the region. These outcomes have been presented in the proceedings of the workshop on the regional research needs.

The deliberations at the workshop and agreed programmes were intended to help building new partnerships in addressing the research gaps and needs, harmonization of the CGIAR Science Council and GFAR priorities to meet the MDGs, overcome any inter-sector imbalances (crops, livestock, fishery, forestry, etc.), and address any complimentary and subsidiary issues.

### 3.1 Synthesis Methodology

- Major effort was made to comprehend and specify the research areas from research needs that were identified and prioritized by the three sub-regions through their independently organized but uniformly framed workshops.

- This was done by considering research priorities identified by the countries participating at these workshops. There were 5 countries - Bangladesh, India, Iran, Nepal and Sri Lanka at the South and West Asia exercise; 8 countries - Cambodia, Indonesia, Laos, Myanmar, the Philippines, Singapore, Thailand, and Vietnam at the Southeast Asia Exercise; and 7 countries - Fiji, French Polynesia, New Caledonia, Papua New Guinea, Kiribati, Vanuatu, and Samoa at the Pacific Exercise (Annex 2).

- Also considered were the research priorities identified and summarised by various working groups formed during the sub-regional workshops. The South and West Asia workshop organised four working groups, each on the major four agro-ecosystems such as costal, hill and mountains, irrigated, and rainfed /arid. Research priorities identified for these agro-ecosystems appeared to be relevant to other sub-regions. The Southeast Asia workshop worked through two working groups for groups of countries; one covering Indonesia, the Philippines, Singapore, and Thailand; while the other covering Cambodia, Laos, Myanmar, and Vietnam. While the Pacific workshop had only one group involving all the participants.

- Research priorities identified by CGIAR for the South and West Asia region were mostly thematic and appeared to be relevant to other sub-regions and therefore were included in the synthesis process.

- However, research priorities highlighted by specialized (commodity) international research organisations such as IRRI, ICRISAT, IWMI, and ILRI were not considered because their priorities were within their mandated areas of responsibilities and may be difficult to rationalise in the context of overall research and development issues. Furthermore, consideration of such priorities might create some degree of bias, as priorities of these organisations are available only for one sub-region, the South and West Asia and not other two sub-regions.

- It needs to be noted that some presentations and outcomes highlighted research considerations such as rural poverty, demand-driven technology, and globalisation. While others highlighted the research objectives such as food security, people empowerment, and protecting environment. Also pointed out in the outcomes of these workshops were research and development strategies and some suggested collaboration/co-operation activities. These are not the research areas and therefore were not considered.

- Many of the priority research areas identified by the sub-regional exercises, though named differently, are focused on same or similar research and development issues. These therefore needed to be aggregated and specified for the common understanding and synthesis purposes. All such specified research areas as categorised in seven research themes and eleven sub-themes are given in Table 1. The key words and phrases provide the overall scope of these research themes and research areas.

- Further suggestions and comments were received during the synthesis workshop held in Bangkok in August. These suggestions were also considered to arrive at the synthesis as presented in the next section.

### 3.2 Feedback from On-line Consultations

The initial draft document was circulated by the APAARI Secretariat to key stakeholders, including farmer organizations, NGOs, IARCs, NARS, and some international organizations. By the end of second week of August 2006, s a few feedbacks were received. These responses are discussed and reflected as below.

1. The Executive Secretary of APPARI provided valuable suggestions with respect to coverage, focus, potential, etc. of the research priority setting exercise undertaken by APAARI. These suggestions significantly improved the synthesis work.

2. The Indian Council of Agricultural Research (ICAR) in India suggested additional areas based on emerging needs and issues. These included the resource conservation technologies, soil nutrient balance; land use planning, market predictions and intelligence and energy generation and use in agriculture.

3. YPARD suggested that the involvement and engagement of young agriculture professionals (researchers) be considered as high priority in all the processes of R &D, including planning. Obviously, this would also require identifying agricultural higher education as a priority research area.

4. A suggestion from the International Rice Research Institute (IRRI) was that biotechnology should be treated as an independent area of thrust rather than being clubbed with Genetic Resources. This is because biotechnology has applications in many other areas such as NRM, food processing, post-harvest, etc.

5. The Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC) suggested priority research areas including natural resource management, land reform and resource rights, statistical tools and methods, research approaches, research institutions, policy, poverty reduction studies, rural enterprise and markets, and solidarity enterprises. By comparing research priorities identified in the draft synthesis and ANGOC suggestions, ANGOC indicated that the synthesized priorities were heavy on bio-physical and technical aspects and were thin on social aspects. Specific areas they suggested included poverty reduction strategies, land reform, research investment, voices o the poor, indigenous knowledge and IPR.

6. CIRAD in France provided very comprehensive comments, suggesting that this exercise needed to highlight the enormous challenges of the next 50 years, faced by the World and more particularly by countries of the Asia Pacific region. The comments were supported by the following facts: 1) three billion people some 50 years ago were helped through green revolution practices which have now reached its limits; 2) currently the environmental problems becoming enormous and the agricultural production becoming relatively costly to farmers, especially with subsidies being removed; 3) serious threats existed to biodiversity, biosphere eco-systems, and forest lands couple with climate

change and desertification; and 4) additional three billion people needed to be fed over the next 50 years, with some 520 million people in the region without access to adequate food, meaning a need for doubling of food world food supply. Therefore, there is a need for new agricultural systems called eco-agriculture, adapted to each specific region and country and viable in the context of globalization, mainly through research and development.

To address the above situation, CIRAD suggested three research priority sets, which could be customized for each specific sub-region and each country according to the local situation and site conditions. These were: 1) the sustainable approach of agricultural production, 2) the sustainable management of natural resources and environment, 3) the quality and biosafety of agricultural products. CIRAD further suggested that priority generic research themes for each of the above three priority sets.

1) Under the sustainable approach of agricultural production the themes suggested are:
    a) Integrated management of cultivated ecosystems including agroforestry models, agroecology techniques, integrated pest and diseases management,
    b) Improvement of plant varieties and local animal species, through appropriate breeding, marker assisted selection, functional genomics,
    c) Integrated management of water resources in the ecosystems,
    d) Methods for proper organization, for efficient management and of conflict negotiation among stakeholders (including multi agent systems),
    e) Representation of farming systems integrating economical, social and ecological data through modelling and geographic information systems (GIS), and
    f) Regulation modalities of commodity chains and markets at national, regional and international levels.
2) Under the sustainable management of natural resources and environment the themes suggested are:
    a) the role of agriculture and forestry in the carbon cycle (Carbon sequestration),
    b) the knowledge on tropical and subtropical biological resources in order to better manage and control biological diversity,
    c) the management of soil (biological process, use of suitable permanent cover crops), the fight against erosion, against agricultural pollutions (agricultural solid and water wastes), and against desertification,
    d) the prevention and treatment of health risks from plant and animal origins, especially emerging diseases, and
    e) the sustainable management of forest landscapes.

3) Under the quality and bio-safety of agricultural products, the suggested themes are:
    a) Agricultural, biological, technological and socio-economical factors of agrifood quality from production to post harvest and processing and to consumers,
    b) Development of tools for trace ability, for risk management in the quality control process, and
    c) Methods of elaborating and controlling quality adapted to tropical conditions and definition of quality standards and regulations.

### 3.3 Synthesis of Regional and Sub-regional Research Priorities

By using the best possible comprehension of the available information, the synthesis exercise identified 85 research areas, which are specific to the context of research and development issues, agro-ecologies, commodities, disciplines, and some policy and cross cutting issues. These areas are categorized into main research themes and sub-themes as given in Annex 3 (Base synthesis of agricultural research needs and priorities for the Asia-Pacific region: 2004- 05 priority setting exercise).

This exercise was taken further to identify research areas that are common to all the sub-regions of the Asia-Pacific region. This has given 40 areas common to all the regions (Table 2). All main themes and sub-themes have some common research areas across the sub-regions.

Besides understanding of the common areas, it was also important to know common research priority areas among any two of the three sub-regions. The outcome of this exercise is given in Table 3. There are as many as 13 common research areas among the South and West Asia, and the Southeast Asia, 3 common research areas among the South and West Asia, and the Pacific. While the Southeast Asia and the Pacific regions do not share any area. Furthermore, there are typical research issues and areas that are specific only to the individual sub-regions. Such specific areas are isolated and given in Table 4. The South and West Asia region has 16 specific areas in, while the Southeast Asia and the Pacific regions have 6 specific and typical research areas each.

## 4. High Priority Research Needs

As part of the synthesis exercise, an attempt was also made to identify high priority research and development issues from those arising as common and specific issues. These are presented in Tables 5, 6 and 7,

## 5. Limitations and Qualifications of the Synthesis

- Any limitations of sub-regional research priority setting exercises, in terms of coverage of geographical areas, degree of consultations with stakeholders, gap analysis, etc., remain limitations of this synthesis. For instance, the Southeast and Pacific sub-regional exercises did not have adequate representations by the private sector, farmer organizations, NGOs, traders, and other stakeholders. Similarly, gap analysis was not explicitly done and expressed in the final outcomes of the sub-regional workshops, except by the Pacific sub-region. These limitations were recognized, considered and addressed during the on-line consultations with the other key stakeholders and by the synthesis workshop held in August 2006.

- In the process of specifying research areas and identifying the common areas for the purposes of this synthesis, adequate care was taken to maintain as many originally named research areas as possible. Where possible and obvious, some research areas were re-specified and aggregated. This aggregation process may have resulted in losing some information. Therefore, it has been suggested that information available from individual countries and sub-regions be kept intact for planning and implementation of R&D programmes at disaggregate levels such as agro-ecological zones within a country, national level, and sub-regional levels.

## 6. Towards Development of Research and Development Programmes

The advanced draft of synthesis of research needs and priorities for the Asia-Pacific region was presented at the workshop on the Synthesis of Regional Research Needs and Priorities, held from 18-19 August 2006 in Bangkok. The workshop also included a number of presentations by various stakeholders such as IARCs, NGOs, farmer organizations, and the private sector. All these presentation were discussed and deliberated through working groups for each of the three sub-regions – the South and West Asia, the Southeast Asia and the Pacific. The outcomes of these deliberations in terms of summarized research priorities, regional research priorities in short to medium terms, and anticipatory research priorities have been reported in the proceedings of the August workshop. These outcomes also allowed the workshop to develop roadmap suggesting future course of actions by various stakeholders to design and implement collaborative research and development projects/ programmes for implementation at the regional and sub-regional and national levels.

**Table 1. Specification of research areas as categorized into research themes and sub-themes: synthesis of agricultural research priorities for the Asia-Pacific Region**

| Research Themes and Sub Themes | Research Areas | Key Words Specifying Research Areas and Sub Themes |
|---|---|---|
| **1. Natural Resources Management** | | |
| 1.1 Land, Soil, Climate and Water Management | Developing viable options for shifting cultivation | Land, water, soils and climatic resources management practices and options to manage, improve and develop the land resource base in the overall context of broader agro-ecosystems. |
| | Avoiding seawater ingress, water pollution and coral reef destruction in coastal agro-ecosystems | |
| | Water quantity and quality issues in irrigated ecosystems | |
| | Land restoration in degraded areas, especially affected by mining | |
| | Maintaining soil health and soil fertility in coastal agro-ecosystems | |
| | Management of soil degradation in irrigated ecosystems | |
| | Improvement of soil health and fertility in rained/arid ecosystems | |
| 1.2 Integrated Watershed Management | Watershed management in catchment areas | Natural resource management and use in an integrated way, especially rainwater, soil nutrients, sunlight and other natural resources in natural watershed areas and catchments for optimal production of agricultural systems and commodities. |
| | Rainwater harvesting and management of ground water in coastal agro-ecosystems | |
| | Assessment of watershed as functional unit in hills and mountains | |
| | Harvesting of surface runoff on a watershed basis in rainfed/arid ecosystems | |
| 1.3 Integrated Management | Integrated NRM, PM, CM and agro-ecology, including policy issues | Integrated natural resources management, pest and crop management through various practices (use of fertilizers, pesticides, other inputs) and enterprises (crops, livestock, tree) so as to develop and use of resources. |
| | Atoll resources management | |
| **2. Genetic Resources and Biodiversity** | | |
| | Germplasm collection, conservation and use of crop biodiversity | Collection, conservation (in situ, ex situ, in vitro), characterisation, evaluation, management, dissemination, exchange of plant and animal genetic resources/agro-biodiversity for food and agriculture, including natural biodiversity useful to agriculture (like micro-organisms, insects, etc.) |
| | Enhancing and augmentation of germplasm through genetic improvement, identifying new sources of resistance and creation of new parental lines | |
| | Enhance and sustain the use of forest biodiversity | |
| | Biodiversity of natural systems including microbial | |
| | Enhance and sustain the conservation and use of animal biodiversity | |
| | Manage and sustain fisheries genetic resources | |

**Table 1. Specification of research areas as categorized into research themes and sub-themes: synthesis of agricultural research priorities for the Asia-Pacific Region (Continued)**

| Research Themes and Sub Themes | Research Areas | Key Words Specifying Research Areas and Sub Themes |
|---|---|---|
| **3. Biotechnology** | | |
| | Identifying new sources of resistance to biotic and a-biotic stresses for individual species/systems through biotechnology | Enhancement and expansion of genetic resources and biodiversity for current and potential use by using available genetic resources, including wild genetic resources, and by applying conventional and modern methods of plant breeding including advanced methods of biotechnology. |
| | Biotechnology research in crops, animals and fisheries | |
| | Construction of new genes in crops | |
| | New diagnostic tools and vaccines for animal diseases | |
| | Livestock genetic improvement | |
| **4. Enterprise Improvement** | | |
| 4.1 Systems Improvement | Coconut based cropping system in coastal agro-ecosystems | Improvement in and through integrated systems involving crops, livestock, agro-forestry, social forestry, fisheries, aquaculture and various on-farm and off-farm activities to increase overall productivity and production and to minimise losses from pests and diseases and other biotic and a-biotic factors in various agro-eco systems. These include rational use of pest and crop management practices, husbandry methods, optimal use of various resources, inputs and activities so as to get optimal outputs. |
| | Integrated crop production technologies | |
| | Intensification of crop production systems | |
| | Integrated crop and livestock systems | |
| | Agricultural systems for drought-prone areas | |
| | Agro-forestry and community forestry systems | |
| | Diversification (on farm and off farm) activities in all ecosystems | |
| | Improvement and management of aquaculture systems | |
| | Fisheries enterprise and mangroves in coastal agro-ecosystems | |
| | Up-scaling the use of integrated pest, disease and crop management | |
| | Improving small farm viability | |
| | Livestock feed formulation and feeding systems | |
| | Zoonoses - monitoring, surveillance and management | |
| 4.2 Commodity Improvement | Improvement of high value, low volume and low weight locally produced (horticultural, food and medicinal plants) and commodity value chains in hills/mountains | Improvement and development of specific commodities such as crops and livestock species, through husbandry techniques/practices and value adding to increase productivity and improve quality/value on a sustainable basis. These include optimum use of various resources, inputs and activities, and genetic improvement by applying conventional and modern methods of breeding, and biotechnology for specific commodities and purposes. |
| | Improvement (breeding) of commercially important and under-utilised crops | |
| | Crop management and organic production system | |
| | Resistant varieties for extreme environments | |

**Table 1. Specification of research areas as categorized into research themes and sub-themes: synthesis of agricultural research priorities for the Asia-Pacific Region (Continued)**

| Research Themes and Sub Themes | Research Areas | Key Words Specifying Research Areas and Sub Themes |
|---|---|---|
| **5. Post-Harvest, Value Adding and Food Safety·** | | |
| | Value adding, profitability, food safety and quality through processing and other means to agriculture, fisheries and forest products | Including post-harvest, down stream processing, preservation, storage, transportation, packaging, product quality and food safety requirements for market oriented products. |
| **6. Policy and Institutions** | | |
| 6.1 Policy issues | Food safety, food quality, GMOs, biotechnology, market changes | Research and analysis of policies and implications in various areas of research and development so as to improve, modify, change, and develop appropriate policies for effective R&D impacts. |
| | Post-harvest value addition and processing | |
| | Food procurement / pricing in irrigated ecosystems | |
| | Input price distortions in rainfed/arid ecosystems | |
| | Processing, cold chain, anchorage and landing facilities in coastal agro-ecosystems | |
| | Participatory irrigation management in irrigated ecosystems | |
| | Credit support to fishermen in coastal agro-ecosystems | |
| | Review, change, and validate policies in hills and mountains | |
| | Emerging R&D issues for disaster induced agriculture, fisheries and forestry | |
| | Extension systems and research-extension interface in coastal agro-ecosystems | |
| | Alternative livelihood opportunities and safety net mechanisms in rainfed/arid ecosystems | |
| 6.2 Institutional reform | Institutional development and change management | Analysis and assessment of institutional arrangements and mechanisms so as to bring in institutional changes and reforms to help improve institutional performance supporting and developing agriculture in specific focussed areas. |
| | Identification of institutions and programmes in hills and mountains | |
| | Sustainable financing mechanisms | |
| | Recognition and harnessing of traditional knowledge and practice | |
| | Increasing outreach of financial services in rural areas | |
| | Collective action in rainfed/arid ecosystems | |
| | Suitable public-private partnerships in rainfed/arid ecosystems | |

**Table 1. Specification of research areas as categorized into research themes and sub-themes: synthesis of agricultural research priorities for the Asia-Pacific Region (Continued)**

| Research Themes and Sub Themes | Research Areas | Key Words Specifying Research Areas and Sub Themes |
|---|---|---|
| **7. Cross-cutting** | | |
| 7.1 Research Issue | Monitoring and socio-economics impact assessment of technology transfer/adoption | Cross-cutting research issues in the areas of monitoring, impact assessment, research tools, and techniques, mechanisation, market studies, research and information resource bases, etc. |
| | Development of new research tools (biotechnology and genomics) | |
| | Farm tools and selective agricultural mechanisation | |
| | Biotechnology research in crops, animals and fisheries | |
| | Identifying and mapping of poverty areas | |
| | Markets, marketing systems and enterprise development in both domestic and international markets | |
| | Research with better and stronger impact in and on systems | |
| | Poverty reduction studies and strategies | |
| | Land reforms | |
| | Research investment | |
| | Voices of the poor | |
| | Research with better and stronger impact in and on systems | |
| 7.2 Capacity Development | Pest and disease surveillance, monitoring and border control | Capacity development (assessment, training, methods, processes, arrangements, etc.) for effective R&D activities, including targeted to specific groups. |
| | Supply chain analysis (improving market access) | |
| | Addressing R&D issues of rural women and ethnic groups | |
| | Interdisciplinary, multi-sectoral and participatory R&D activities | |
| | Monitoring, evaluation and impact assessment | |
| | Building the organization and management capacity of NARS | |
| | Building capacity in trade, outlook, market intelligence and IPR issues | |
| | Enhancing community-based knowledge management capacity | |
| | Entrepreneurial development of farmers and fisherfolk | |
| 7.3 Information, Communication and Technology Transfer | Information, communication technology, knowledge management and exchange | Development, use and management of information and communication technologies/ tools, and management and exchange/sharing of information and knowledge. |
| | Development of new information and communication tools/techniques | |
| 7.4 Allied areas | Participation of people in linking NRM with enterprise improvement | Closely related and complementary activities and actions to help developing agriculture. |
| | Tourism and mountain handicrafts in hills and mountains | |

**Table 2. Synthesized research needs and priorities common for the three Asia-Pacific (South and West Asia, Southeast Asia and the Pacific) regions: 2004- 05 priority setting exercise**

| Research Themes and Sub Themes | Research Areas | |
|---|---|---|
| **1. Natural Resources Management** | | |
| 1.1 Land, Soil, Climate and Water Management | 1 | Maintaining soil health and soil fertility in coastal agro-ecosystems |
| 1.2 Integrated Watershed Management | 2 | Watershed management in catchment areas |
| 1.3 Integrated Management | 3 | Integrated NRM, PM, CM and agro-ecology, including policy issues |
| **2. Genetic Resources and Biodiversity** | | |
| | 4 | Germplasm collection, conservation and use of crop biodiversity |
| | 5 | Enhancing and augmentation of germplasm through genetic improvement, identifying new sources of resistance and creation of new parental lines |
| | 6 | Enhance and sustain the use of forest biodiversity |
| | 7 | Biodiversity of natural systems including microbial |
| **3. Biotechnology** | | |
| | 8 | Identifying new sources of resistance to biotic and a-biotic stresses for individual species/systems through biotechnology |
| | 9 | Biotechnology research in crops, animals and fisheries |
| **4. Enterprise Improvement** | | |
| 4.1 Systems Improvement | 10 | Coconut based cropping system in coastal agro-ecosystems |
| | 11 | Integrated crop production technologies |
| | 12 | Agro-forestry and community forestry systems |
| | 13 | Fisheries enterprise and mangroves in coastal agro-ecosystems |
| | 14 | Up-scaling the use of integrated pest, disease and crop management |
| | 15 | Improving small farm viability |
| 4.2 Commodity Improvement | 16 | Improvement of high value, low volume and low weight locally produced (horticultural, food and medicinal plants) and commodity value chains in hills/mountains |
| **5. Post-Harvest, Value Adding and Food Safety·** | | |
| | 17 | Value adding, profitability, food safety and quality through processing and other means to agriculture, fisheries and forest products |
| **6. Policy and Institutions** | | |
| 6.1 Policy issues | 18 | Post-harvest value addition and processing |
| | 19 | Extension systems and research-extension interface in coastal agro-ecosystems |

**Table 2. Synthesized research needs and priorities common for the three Asia-Pacific (South and West Asia, Southeast Asia and the Pacific) regions: 2004- 05 priority setting exercise (Continued)**

| Research Themes and Sub Themes | Research Areas | |
|---|---|---|
| 6.2 Institutional reform | 20 | Sustainable financing mechanisms |
| | 21 | Recognition and harnessing of traditional knowledge and practice |
| | 22 | Increasing outreach of financial services in rural areas |
| | 23 | Collective action in rainfed/arid ecosystems |
| | 24 | Suitable public-private partnerships in rainfed/arid ecosystems |
| **7. Cross-cutting** | | |
| 7.1 Research Issue | 25 | Monitoring and socio-economics impact assessment of technology transfer/adoption |
| | 26 | Development of new research tools (biotechnology and genomics) |
| | 27 | Identifying and mapping of poverty areas |
| | 28 | Markets, marketing systems and enterprise development in both domestic and international markets |
| | 29 | Research with better and stronger impact in and on systems |
| | 30 | Poverty reduction studies and strategies |
| | 31 | Land reforms |
| | 32 | Research investment |
| | 33 | Voices of the poor |
| | 34 | Research with better and stronger impact in and on systems |
| 7.2 Capacity Development | 35 | Building the organization and management capacity of NARS |
| | 36 | Building capacity in trade, outlook, market intelligence and IPR issues |
| 7.3 Information, Communication and Technology Transfer | 37 | Information, communication technology, knowledge management and exchange |
| | 38 | Development of new information and communication tools/techniques |
| 7.4 Allied areas | 39 | Participation of people in linking NRM with enterprise improvement |
| | 40 | Tourism and mountain handicrafts in hills and mountains |

**Table 3. Synthesized research needs and priorities common for two of the three regions: 2004- 05 priority setting exercise**

| Research Themes and Sub Themes | Research Sub-Themes | | Research Areas |
|---|---|---|---|
| **1. South and West Asia, and Southeast Asia** | | | |
| 3. Biotechnology | | | |
| | | 1 | Construction of new genes in crops |
| | | 2 | New diagnostic tools and vaccines for animal diseases |
| 4. Enterprise Improvement | | | |
| | 4.1 Systems Improvement | 3 | Integrated crop and livestock systems |
| | | 4 | Diversification (on farm and off farm) activities in all ecosystems |
| 6. Policy and Institutions | | | |
| | 6.1 Policy issues | 5 | Food safety, food quality, GMOs, biotechnology, market changes |
| | | 6 | Food procurement / pricing in irrigated ecosystems |
| | | 7 | Processing, cold chain, anchorage and landing facilities in coastal agro-ecosystems |
| | | 8 | Participatory irrigation management in irrigated ecosystems |
| | | 9 | Emerging R&D issues for disaster induced agriculture, fisheries and forestry |
| | 6.2 Institutional reform | 10 | Institutional development and change management |
| 7. Cross-cutting | | | |
| | 7.1 Research Issue | 11 | Biotechnology research in crops, animals and fisheries |
| | 7.2 Capacity Development | 12 | Addressing R&D issues of rural women and ethnic groups |
| | | 13 | Interdisciplinary, multi-sectoral and participatory R&D activities |
| **2. South and West Asia, and the Pacific** | | | |
| 4. Enterprise Improvement | | | |
| | 4.1 Systems Improvement | 1 | Improvement and management of aquaculture systems |
| | | 2 | Livestock feed formulation and feeding systems |
| 7. Cross-cutting | | | |
| | 7.1 Research Issue | 3 | Farm tools and selective agricultural mechanisation |

**Table 4. Synthesized research needs and priorities specific to individual sub-regions: 2004 - 05 priority setting exercise**

| Research Themes and Sub Themes | Research Areas | |
|---|---|---|
| **1. South and West Asia** | | |
| 1. Natural Resources Management | | |
| 1.1 Land, Soil, Climate and Water Management | 1 | Avoiding seawater ingress, water pollution and coral reef destruction in coastal agro-ecosystems |
| | 2 | Water quantity and quality issues in irrigated ecosystems |
| | 3 | Management of soil degradation in irrigated ecosystems |
| | 4 | Improvement of soil health and fertility in rained/arid ecosystems |
| 1.2 Integrated Watershed Management | 5 | Rainwater harvesting and management of ground water in coastal agro-ecosystems |
| | 6 | Assessment of watershed as functional unit in hills and mountains |
| | 7 | Harvesting of surface runoff on a watershed basis in rainfed/arid ecosystems |
| 4. Enterprise Improvement | | |
| 4.1 Systems Improvement | 8 | Intensification of crop production systems |
| | 9 | Agricultural systems for drought-prone areas |
| 4.2 Commodity Improvement | 10 | Improvement (breeding) of commercially important and under-utilised crops |
| | 11 | Resistant varieties for extreme environments |
| 6. Policy and Institutions | | |
| 6.1 Policy issues | 12 | Input price distortions in rainfed/arid ecosystems |
| | 13 | Credit support to fishermen in coastal agro-ecosystems |
| | 14 | Review, change, and validate policies in hills and mountains |
| | 15 | Alternative livelihood opportunities and safety net mechanisms in rainfed/arid ecosystems |
| 6.2 Institutional reform | 16 | Identification of institutions and programmes in hills and mountains |
| **2. Southeast Asia** | | |
| 1. Natural Resources Management | | |
| 1.1 Land, Soil, Climate and Water Management | 1 | Developing viable options for shifting cultivation |
| 2. Genetic Resources and Biodiversity | | |
| | 2 | Enhance and sustain the conservation and use of animal biodiversity |
| 7. Cross-cutting | | |
| 7.2 Capacity Development | 3 | Supply chain analysis (improving market access) |
| | 4 | Monitoring, evaluation and impact assessment |
| | 5 | Enhancing community-based knowledge management capacity |
| | 6 | Entrepreneurial development of farmers and fisherfolk |
| **3. The Pacific** | | |
| 1. Natural Resources Management | | |
| 1.1 Land, Soil, Climate and Water Management | 1 | Land restoration in degraded areas, especially affected by mining |
| 1.3 Integrated Management | 2 | Atoll resources management |

**Table 4. Synthesized research needs and priorities specific to individual sub-regions: 2004 - 05 priority setting exercise (Continued)**

| Research Themes and Sub Themes | Research Areas | |
|---|---|---|
| 2. Genetic Resources and Biodiversity | | |
| | 3 | Manage and sustain fisheries genetic resources |
| 4. Enterprise Improvement | | |
| 4.1 Systems Improvement | 4 | Zoonoses - monitoring, surveillance and management |
| 4.2 Commodity Improvement | 5 | Crop management and organic production system |
| 7. Cross-cutting | | |
| 7.2 Capacity Development | 6 | Pest and disease surveillance, monitoring and border control |

**Table 5. High priority common research needs in the Asia-Pacific Region**

| | Research areas |
|---|---|
| 1 | Integrated NRM, PM, CM and agro-ecology, including policy issues |
| 2 | Germplasm collection, conservation and use of crop biodiversity |
| 3 | Identifying new sources of resistance to biotic and a-biotic stresses for individual species/systems; and Enhancing and augmentation of germplasm through genetic improvement |
| 4 | Integrated crop production technologies; and agro-forestry and community forestry systems |
| 5 | Up-scaling the use of integrated pest, disease and crop management |
| 6 | Improvement of high value, low volume and low weight locally produced (horticultural, food and medicinal plants) and commodity value chains in hills/mountains |
| 7 | Value adding, profitability, food safety and quality through processing and other means to agriculture, fisheries and forest products |
| 8 | Monitoring and socio-economics impact assessment of technology transfer/adoption |
| 9 | Markets, marketing systems and enterprise development in both domestic and international markets |
| 10 | Information, communication technology, knowledge management and exchange; and Development of new information and communication tools/techniques |

**Table 6. High priority common research needs in two of the three sub-regions**

| **Research areas** | |
|---|---|
| **South and West Asia and Southeast Asia** | |
| 1 | Food safety, food quality, GMOs, biotechnology, market changes |
| 2 | Emerging R&D issues for disaster induced agriculture, fisheries and forestry |
| 3 | Interdisciplinary, multi-sectoral and participatory R&D activities |
| **South and West Asia and the Pacific** | |
| 1 | Improvement and management of aquaculture systems |
| 2 | Livestock feed formulation and feeding systems |

**Table 7. High priority research needs specific to individual Sub-Regions**

| **Research Areas** | |
|---|---|
| **South and West Asia** | |
| 1 | Management of soil degradation in irrigated ecosystems |
| 2 | Assessment of watershed as functional unit in hills and mountains; and Harvesting of surface runoff on a watershed basis in rainfed/arid ecosystems |
| 3 | Improvement (breeding) of commercially important and under-utilized crops |
| 4 | Alternative livelihood opportunities and safety net mechanisms in rainfed / arid ecosystems |
| **Southeast Asia** | |
| 1 | Enhance and sustain the conservation and use of animal biodiversity |
| 2 | Supply chain analysis (improving market access) |
| 3 | Entrepreneurial development of farmers and fisher-folk |
| **The Pacific** | |
| 1 | Atoll resources management |
| 2 | Crop management and organic production system |
| 3 | Pest and disease surveillance, monitoring and border control |

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## Acronyms and Abbreviations

| | |
|---|---|
| ACIAR | Australian Centre for International Agricultural Research |
| ANGOC | Asian NGO Coalition |
| APAARI | Asia-Pacific Association of Agricultural Research Institutions |
| APARIS | Asia-Pacific Regional Information System |
| APCoAB | Asia-Pacific Consortium for Agricultural Biotechnology |
| AVRDC | Asian Vegetable Research and Development Centre |
| CGIAR | Consultative Group on International Agricultural Research |
| CIP | International Potato Centre |
| DFID | Department for International Development |
| FAO | Food and Agriculture Organization |
| GDP | Gross Domestic product |
| GFAR | Global Forum on Agricultural Research |
| GPP | Global Partnership Programme |
| IAC | Institut Agronomique neo-Caledonien |
| IARCs | International Agricultural Research Centers |
| ICIMOD | International Centre for Integrated Mountain Development |
| ICM | Integrated Crop Management |
| ICRAF | International Centre for Research in Agro-forestry |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| ILRI | International Livestock Research Institute |
| IPGRI | International Plant Genetic Resources Institute |
| IPM | Integrated Pest Management |
| IRRI | International Rice Research Institute |
| ISNAR | International Service for National Agricultural Research |
| IWMI | International Water Management Institute |
| MDGs | Millennium Development Goals |
| NARS | National Agricultural Research Systems |
| NGO | Non Governmental Organizations |
| NRM | Natural Resource Management |
| PICTs | Pacific Island Countries and Territories |
| POPACA | Project of Organization of Agricultural Producers for Associative Trading project in Vanuatu funded by EU and France. |
| SEARCA | SEAMEO Southeast Asia Regional Centre for Graduate Study and Research in Agriculture |
| SECURA | SECURA International Corporation |
| SPC | Secretariat of the South Pacific Community |
| WTO | World Trade Organization |

**Annex 1. Synthesized research priorities for the Asia Region and its three sub-regions: 2001 priority setting exercise**

| Area of Research Focus | | All Regions | South & West Asia | South east Asia | The Pacific |
|---|---|---|---|---|---|
| **1. Natural Resources Management** | | | | | |
| 1.1 | Integrated NRM and Integrated Crop Management (ICM)/(IPM) | √ | | | |
| 1.2 | Policy development and institutional issues related to NRM | | √ | | |
| 1.3 | Watershed management | √ | | | |
| 1.4 | Land management and soil fertility | √ | | | |
| 1.5 | Rehabilitation of degraded and marginal lands | | √ | | |
| **2. Genetic Resources and Agrobiodiversity Conservation** | | | | | |
| 2.1 | PGR conservation and improvement | √ | | | |
| 2.2 | Livestock selection and improvement (includes fisheries) | | | | √ |
| 2.3 | Microbial functional agrobiodiversity | | √ | √ | |
| 2.4 | Bio safety issues/policy/GMOs/IPRs | | | √ | |
| **3. Commodity Chain Development (linking farmers to markets)** | | | | | |
| 3.1 | Commercialisation, marketing and trade | √ | | | |
| 3.2 | Policy—international agreements | √ | | | |
| 3.3 | Input/supply and demand analysis (industry and macro level) | | | | √ |
| 3.4 | Production and marketing economic analysis (firm/farm and micro level) | √ | | | |
| 3.5 | Value adding | √ | | | |
| 3.6 | Competitiveness | √ | | | |
| 3.7 | Product/quality improvement and standards | √ | | | |
| 3.8 | Quarantine and bio safety | | | √ | √ |
| **4. Meeting the Protein Demand of a Growing Population (Animal)** | | | | | |
| 4.1 | Feed resources: fish, poultry, ruminants and non ruminants (forage, pasture, fodder, grain, constituted feedstock and crop residues) | √ | | | |
| 4.2 | Disease management (poultry, ruminants, non ruminants, aquaculture) | | √ | | √ |
| 4.3 | Production systems (crop/livestock, aquaculture, mariculture) | √ | | | |
| 4.4 | Waste management and by product utilization | | | | √ |
| **5. Meeting the Protein Demand of a Growing Population (Plants)** | | | | | |
| 5.1 | Grain legume productivity improvement | | √ | | √ |
| 5.2 | Legumes in farming systems | √ | | | |
| 5.3 | Quality and nutrition improvement (human) | | | √ | √ |

**Annex 1. Synthesized research priorities for the Asia Region and its three sub-regions: 2001 priority setting exercise (Continued)**

| Area of Research Focus | | All Regions | South & West Asia | South east Asia | The Pacific |
|---|---|---|---|---|---|
| 5.4 | Food safety: aflatoxins and anti nutrition factors | | | | √ |
| **6. Tree and Forest Management for Landholders** | | | | | |
| 6.1 | Natural forest management | | | | √ |
| ❖ | Harvesting regime and regeneration | | | | √ |
| ❖ | Cutting cycle analysis | | | | √ |
| 6.2 | Forest plantation, productivity and health | | | | √ |
| 6.3 | Agro forestry in production systems | | | | √ |
| **7. Cross Cutting Issue: Information Management for Agriculture Development** | | | | | |
| 7.1 | Packaging, access and use: research, methodologies and modalities | √ | | | |
| **8. Cross Cutting Issue: Capacity Building** | | | | | |
| 8.1 | Human Resources Development | √ | | | |
| ❖ | Research management, stakeholder management | √ | | | |
| ❖ | Technology transfer facilitation | √ | | | |
| 8.2 | Institutional development | √ | | | |
| 8.3 | Research policy development | √ | | | |
| ❖ | Food insecurity and poverty mapping | | √ | √ | |

## Annex 2. Details of sub-regional workshops on research needs assessment and agricultural priorities

| Details | Sub-regions | | |
|---|---|---|---|
| | **South and West Asia** | **Southeast Asia** | **The Pacific** |
| Workshop dates | 7-8 October 2004 | 27-28 October 2005 | 3-6 October 2005 |
| | | | |
| Location | ICRISAT, India | IRRI, Philippines | SPC, New Caledonia |
| | | | |
| Host Organisation | ICRISAT | IRRI | IAC, New Caledonia |
| | | | |
| Countries participated | 5 | 8 | 7 |
| | India | Cambodia | Fiji |
| | Sri Lanka | Indonesia | French Polynesia |
| | Bangladesh | Laos | New Caledonia |
| | Nepal | Myanmar | Papua New Guinea |
| | Iran | The Philippines | Kiribati |
| | | Singapore | Vanuatu |
| | | Thailand | Samoa |
| | | Vietnam | |
| International and | AVRDC | AVRDC | SPC |
| Regional Organisations | CIP | ICRAF | POPACA |
| | IFPRI | IFPRI | |
| | ICIMOD | ISNAR | |
| | ILRI | ILRI | |
| | IPGRI | IPGRI | |
| | IRRI | IRRI | |
| | IWMI | FAO | |
| | ACIAR | ACIAR | |
| | ICRSAT | SEARCA | |
| | APAARI | APAARI | APAARI |
| | DFID | | |
| Universities | Agri. Universities | | |
| | Research Institutions | | |
| Farmer Associations | Farmer Organisations | | |
| NGOs/Private Sector | NGOs | ANGOC | |
| | Private Sector | Biotechnology Coalition – Philippines | |
| | | ICDAI | |
| | | SECURA International Corporation | |
| | | Angat-Laguna | |

## Annex 3. Base synthesis of agricultural research needs and priorities for the Asia-Pacific region: 2004- 05 priority setting exercise

| Research Themes and Sub Themes | | Research Areas | All Sub Regions | South and West Asia | South-east Asia | The Pacific |
|---|---|---|---|---|---|---|
| **1. Natural Resources Management** | | | | | | |
| 1.1 Land, Soil, Climate and Water Management | 1 | Developing viable options for shifting cultivation | | | ✓ | |
| | | Avoiding seawater ingress, water pollution and coral reef destruction in coastal agro-ecosystems | | ✓ | | |
| | 3 | Water quantity and quality issues in irrigated ecosystems | | ✓ | | |
| | 4 | Land restoration in degraded areas, especially affected by mining | | | | ✓ |
| | 5 | Maintaining soil health and soil fertility in coastal agro-ecosystems | ✓ | | | |
| | 6 | Management of soil degradation in irrigated ecosystems | | ✓ | | |
| | 7 | Improvement of soil health and fertility in rained/arid ecosystems | | ✓ | | |
| 1.2 Integrated Watershed Management | 8 | Watershed management in catchment areas | ✓ | | | |
| | 9 | Rainwater harvesting and management of ground water in coastal agro-ecosystems | | ✓ | | |
| | 10 | Assessment of watershed as functional unit in hills and mountains | | ✓ | | |
| | 11 | Harvesting of surface runoff on a watershed basis in rainfed/arid ecosystems | | ✓ | | |
| 1.3 Integrated Management | 12 | Integrated NRM, PM, CM and agro-ecology, including policy issues | ✓ | | | |
| | 13 | Atoll resources management | | | | ✓ |
| **2. Genetic Resources and Biodiversity** | | | | | | |
| | 14 | Germplasm collection, conservation and use of crop biodiversity | ✓ | | | |
| | 15 | Enhancing and augmentation of germplasm through genetic improvement, identifying new sources of resistance and creation of new parental lines | ✓ | | | |
| | 16 | Enhance and sustain the use of forest biodiversity | ✓ | | | |
| | 17 | Biodiversity of natural systems including microbial | ✓ | | | |
| | 18 | Enhance and sustain the conservation and use of animal biodiversity | | | ✓ | |
| | 19 | Manage and sustain fisheries genetic resources | | | | ✓ |

**Annex 3. Base synthesis of agricultural research needs and priorities for the Asia-Pacific region: 2004- 05 priority setting exercise (Continued)**

| Research Themes and Sub Themes | | Research Areas | All Sub Regions | South and West Asia | South-east Asia | The Pacific |
|---|---|---|---|---|---|---|
| **3. Biotechnology** | | | | | | |
| | 20 | Identifying new sources of resistance to biotic and a-biotic stresses for individual species/systems through biotechnology | ✓ | | | |
| | 21 | Biotechnology research in crops, animals and fisheries | ✓ | | | |
| | 22 | Construction of new genes in crops | | ✓ | ✓ | |
| | 23 | New diagnostic tools and vaccines for animal diseases | | ✓ | ✓ | |
| | 24 | Livestock genetic improvement | | ✓ | | ✓ |
| **4. Enterprise Improvement** | | | | | | |
| 4.1 Systems Improvement | 25 | Coconut based cropping system in coastal agro-ecosystems | ✓ | | | |
| | 26 | Integrated crop production technologies | ✓ | | | |
| | 27 | Intensification of crop production systems | | ✓ | | |
| | 28 | Integrated crop and livestock systems | | ✓ | ✓ | |
| | 29 | Agricultural systems for drought-prone areas | | ✓ | | |
| | 30 | Agro-forestry and community forestry systems | ✓ | | | |
| | 31 | Diversification (on-farm and off-farm) activities in all ecosystems | | ✓ | ✓ | |
| | 32 | Improvement and management of aquaculture systems | | ✓ | | ✓ |
| | 33 | Fisheries enterprise and mangroves in coastal agro-ecosystems | ✓ | | | |
| | 34 | Up-scaling the use of integrated pest, disease and crop management | ✓ | | | |
| | 35 | Improving small farm viability | ✓ | | | |
| | 36 | Livestock feed formulation and feeding systems | | ✓ | | ✓ |
| | 37 | Zoonoses - monitoring, surveillance and management | | | | ✓ |
| 4.2 Commodity Improvement | 38 | Improvement of high value, low volume and low weight locally produced (horticultural, food and medicinal plants) and commodity value chains in hills/mountains | ✓ | | | |
| | 39 | Improvement (breeding) of commercially important and under-utilised crops | | ✓ | | |
| | 40 | Crop management and organic production system | | | | ✓ |
| | 41 | Resistant varieties for extreme environments | | ✓ | | |

**Annex 3. Base synthesis of agricultural research needs and priorities for the Asia-Pacific region: 2004- 05 priority setting exercise (Continued)**

| Research Themes and Sub Themes | | Research Areas | All Sub Regions | South and West Asia | South-east Asia | The Pacific |
|---|---|---|---|---|---|---|
| **5. Post-Harvest, Value Adding and Food Safety·** | | | | | | |
| | 42 | Value adding, profitability, food safety and quality through processing and other means to agriculture, fisheries and forest products | ✓ | | | |
| **6. Policy and Institutions** | | | | | | |
| 6.1 Policy issues | 43 | Food safety, food quality, GMOs, biotechnology, market changes | | ✓ | ✓ | |
| | 44 | Post-harvest value addition and processing | ✓ | | | |
| | 45 | Food procurement / pricing in irrigated ecosystems | | ✓ | ✓ | |
| | 46 | Input price distortions in rainfed/arid ecosystems | | ✓ | | |
| | 47 | Processing, cold chain, anchorage and landing facilities in coastal agro-ecosystems | | ✓ | ✓ | |
| | 48 | Participatory irrigation management in irrigated ecosystems | | ✓ | ✓ | |
| | 49 | Credit support to fishermen in coastal agro-ecosystems | | ✓ | | |
| | 50 | Review, change, and validate policies in hills and mountains | | ✓ | | |
| | 51 | Emerging R&D issues for disaster induced agriculture, fisheries and forestry | | ✓ | ✓ | |
| | 52 | Extension systems and research-extension interface in coastal agro-ecosystems | ✓ | | | |
| | 53 | Alternative livelihood opportunities and safety net mechanisms in rainfed/arid ecosystems | | ✓ | | |
| 6.2 Institutional reform | 54 | Institutional development and change management | | ✓ | ✓ | |
| | 55 | Identification of institutions and programmes in hills and mountains | | ✓ | | |
| | 56 | Sustainable financing mechanisms | ✓ | | | |
| | 57 | Recognition and harnessing of traditional knowledge and practice | ✓ | | | |
| | 58 | Increasing outreach of financial services in rural areas | ✓ | | | |
| | 59 | Collective action in rainfed/arid ecosystems | ✓ | | | |
| | 60 | Suitable public-private partnerships in rainfed/arid ecosystems | ✓ | | | |

**Annex 3. Base synthesis of agricultural research needs and priorities for the Asia-Pacific region: 2004- 05 priority setting exercise (Continued)**

| Research Themes and Sub Themes | | Research Areas | All Sub Regions | South and West Asia | South-east Asia | The Pacific |
|---|---|---|---|---|---|---|
| **7. Cross-cutting** | | | | | | |
| 7.1 Research Issue | 61 | Monitoring and socio-economics impact assessment of technology transfer/adoption | ✓ | | | |
| | 62 | Development of new research tools (biotechnology and genomics) | ✓ | | | |
| | 63 | Farm tools and selective agricultural mechanisation | | ✓ | | ✓ |
| | 64 | Biotechnology research in crops, animals and fisheries | | ✓ | ✓ | |
| | 65 | Identifying and mapping of poverty areas | ✓ | | | |
| | 66 | Markets, marketing systems and enterprise development in both domestic and international markets | ✓ | | | |
| | 67 | Research with better and stronger impact in and on systems | ✓ | | | |
| | 68 | Poverty reduction studies and strategies | ✓ | | | |
| | 69 | Land reforms | ✓ | | | |
| | 70 | Research investment | ✓ | | | |
| | 71 | Voices of the poor | . | | | |
| | 72 | Research with better and stronger impact in and on systems | ✓ | | | |
| 7.2 Capacity Development | 73 | Pest and disease surveillance, monitoring and border control | | | | ✓ |
| | 74 | Supply chain analysis (improving market access) | | | ✓ | |
| | 75 | Addressing R&D issues of rural women and ethnic groups | | ✓ | ✓ | |
| | 76 | Interdisciplinary, multi-sectoral and participatory R&D activities | | ✓ | ✓ | |
| | 77 | Monitoring, evaluation and impact assessment | | . | ✓ | |
| | 78 | Building the organization and management capacity of NARS | ✓ | | | |
| | 79 | Building capacity in trade, outlook, market intelligence and IPR issues | ✓ | | | |
| | 80 | Enhancing community-based knowledge management capacity | | | ✓ | |
| | 81 | Entrepreneurial development of farmers and fisherfolk | | | ✓ | |
| 7.3 Information, Communication and Technology Transfer | 82 | Information, communication technology, knowledge management and exchange | ✓ | | | |
| | 83 | Development of new information and communication tools/techniques | ✓ | | | |
| 7.4 Allied areas | 84 | Participation of people in linking NRM with enterprise improvement | ✓ | | | |
| | 85 | Tourism and mountain handicrafts in hills and mountains | ✓ | | | |