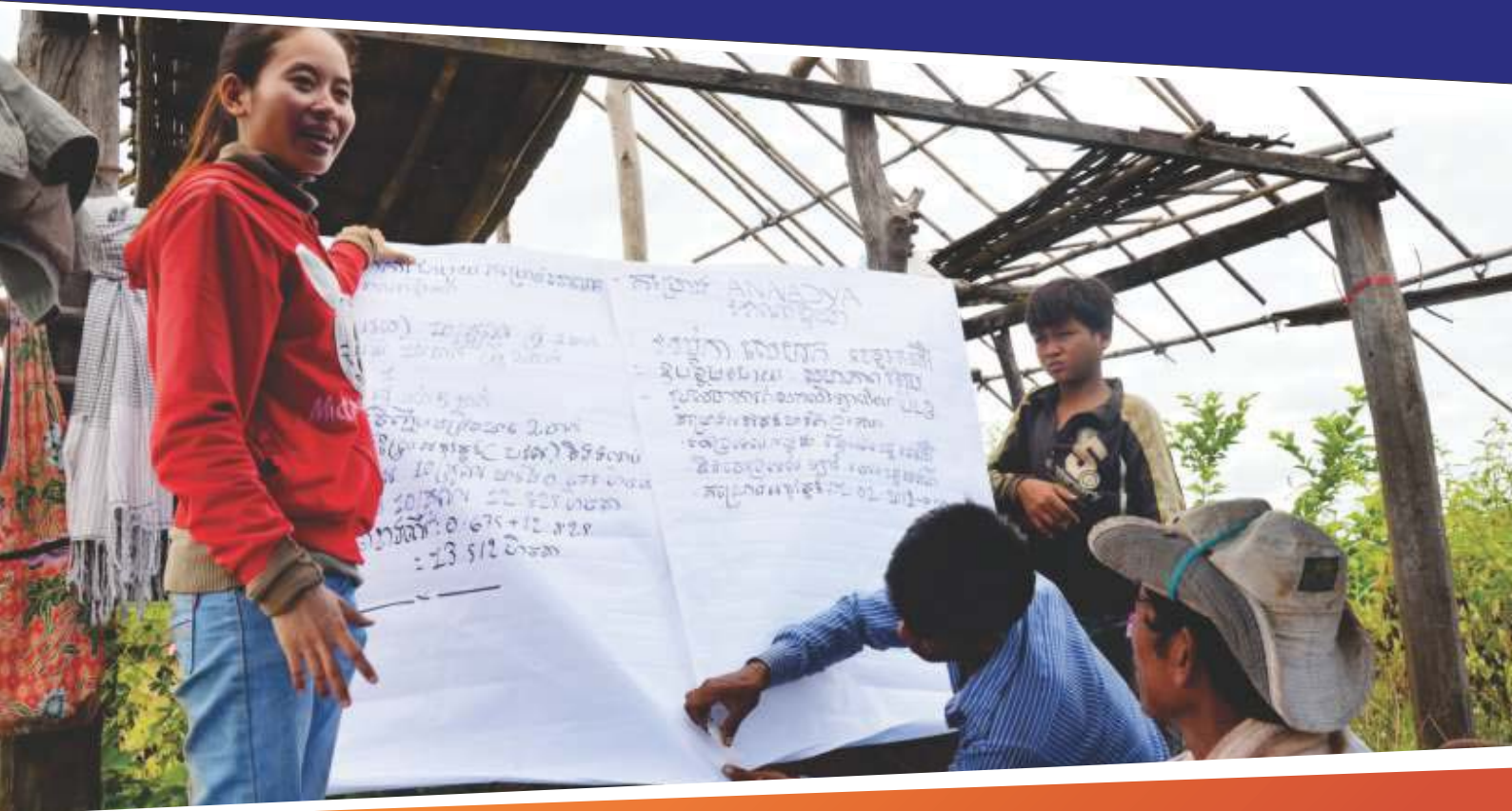


Expert Consultation on Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security

11-12 December 2013, Bangkok, Thailand



In Collaboration with



This project is funded by the European Union

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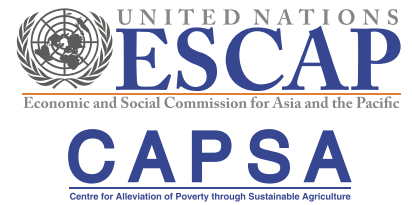
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Abbreviations

APAARI	Asia-Pacific Association of Agricultural Research Institutions
ATMA	Agricultural Technology Management Agency
AR4D	Agricultural Research for Development
BARC	Bangladesh Agricultural Research Council
CAPSA	Centre for Alleviation of Poverty through Sustainable Agriculture
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Center
DOA	Department of Agriculture
DOAE	Department of Agricultural Extension
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
EWS	East-West Seed
FAO	Food and Agriculture Organization of the United Nations
FAO-RAP	FAO Regional Office for Asia and the Pacific
FBA	Farm Business Advisor
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GFRAS	Global Forum for Rural Advisory Services
Ha	Hectare
HDI	Human Development Index
IAARD	Indonesian Agency for Agricultural Research and Development
IAeRI	Indian Agriculture Extension Research Institute
ICT	Information and Communications Technology
ICAR	Indian Council of Agricultural Research
ICATAD	Indonesian Center for Agricultural Technology Assessment and Development
iDE	International Development Enterprises
IDRC	International Development Research Centre
INHERE	Institute of Himalayan Environmental Research and Education
IPM	Integrated Pest Management
KVK	Krishi Vigyan Kendra
LSP	Local Service Provider
MAF	Ministry of Agriculture and Fisheries
MARDI	Malaysian Agricultural Research and Development Institute
MOU	Memorandum of Understanding
NARI	National Agricultural Research Institute
NARS	National Agricultural Research System
PARC	Pakistan Agricultural Research Council
R4D	Research for Development
R&D	Research and Development
R&D&C	Research and Development and Commercialization
SATNET	Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia
SAU	State Agriculture University
SMEs	Small and Medium Enterprises

Executive summary

The Food and Agriculture Organization of the United Nations – Regional Office for Asia and the Pacific (FAO-RAP) and the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) organized a two-day 'Expert Consultation on Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security' in Bangkok, Thailand, on 11 and 12 December 2013. Over 50 participants including national leaders in agricultural research and extension, and representatives from civil society and the private sector from 14 Asia-Pacific countries as well as representatives from various international organizations took part in the event. The Asia-Pacific Association of Agricultural Research Institutions (APAARI) along with the European Union (EU) funded 'Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia' (SATNET Asia) project also contributed to the Consultation.

Participants assessed linkages between research and extension systems in various countries of the region in order to identify opportunities for enhanced integration. Examples of successful research-extension systems led by the private sector and non-governmental organizations (NGOs) were also showcased, underscoring the important role of farmers' groups, civil society and private enterprise in strengthening research-extension linkages. The meeting was further enriched by two panel discussions on the role of research-extension systems in promoting food and nutrition security, and the evolving role of extension services, including information and communications technology (ICT) service providers as knowledge brokers between researchers and farmers.

The meeting agreed upon an Action Framework to guide stakeholders in enhancing research-extension partnerships in the region. As a key outcome, the Assistant Director-General of FAO-RAP announced support for incubation of an Asia-Pacific regional network for agricultural extension services based on the APAARI model. The network would include government, international/regional organizations, NGOs/CSOs (civil society organizations) and private sector actors involved in rural advisory services, regulatory actions, ICT applications and other extension services. CAPSA's SATNET Asia project could provide useful linkages with existing networks and capacity-building activities. The Framework is expected to contribute to more sustainable food systems and help improve farm productivity in Asia and the Pacific.

There was a vibrant exchange of ideas and enthusiastic deliberation among participants in the presentations, panel discussions and working groups. An overview of the key deliberations is provided below.

Adapting to a new research-extension environment

New and emerging challenges such as climate change and land degradation are leading to a paradigm shift from input-intensive to knowledge-intensive agriculture. In this context, there is a need to reorient the institutional capacity of extension systems to better align with the change in research focus towards climate-smart agriculture and sustainable practices. It is also necessary for extension systems to move beyond a narrow commodity focus on advisory services and adopt a broader focus on diversified farming systems, sustainable value-chains and industries. This, in turn, requires innovative thinking and out-of-the-box solutions.

Creating space for research-extension interface

Research-extension linkages need to be institutionalized more effectively through coordinated agriculture sector programmes. In order to achieve this, extension and outreach can be built into research projects so that there is a research-to-adoption continuum instead of research and extension working as separate entities. The concept of Research and Development and Commercialization (R&D&C) in agricultural development can be introduced to take science to commercialization. The increased involvement of researchers in farmers' fields must also be encouraged to provide opportunities for them to be extension agents, better assess farmers' needs and socioeconomic constraints, and to undertake adaptive research.

Furthermore, farmers need to be regarded as clients undertaking science rather than as beneficiaries. Their engagement can be promoted through mechanisms such as participatory on-farm research and farmer-led extension. Institutional support for farmer-led research and farmer-driven innovations should be made available.

Building of national and regional consortia of research-extension organizations, as well as establishment of a dedicated 'Extension Research Institute' is suggested to facilitate closer linkages between research and extension.

Enhancing quality of extension services

Extension systems must deliver up-to-date, accurate and location-specific information and services to farmers, but are often not up to the required standards in many countries and areas. In this context, development of legal frameworks defining roles and responsibilities of all extension stakeholders should be assessed. In addition, professionalizing capacity-building of extension agents through regular skill development programmes including improved university education and refresher courses, must be prioritized. The training should ensure that the knowledge of extension agents keeps ahead of that of their clientele and must address the shift

in emphasis in their role from technology transfer to facilitating knowledge-sharing as 'knowledge brokers'. The potential for introduction of a certification programme for trained extension workers (both public and private sector) for quality assurance can be explored. Moreover, to enhance the quality of services in areas with an excessively high ratio of farmers' households per extension worker, more extension workers can be hired if permitted by availability of financial resources.

The use of ICT in delivery of extension services must be promoted to expedite outcomes in a cost-effective manner. A regional ICT research centre for development and training on ICT applications for agriculture was recommended for inclusion in the Action Framework and regional extension networking efforts. The establishment and/or empowerment of local service providers including farmers' and fishermen's associations should also be facilitated, especially in areas where they can provide extension services more efficiently.

Mobilizing resources and establishing stakeholder partnerships

Increased investment in strengthening research-extension systems is necessary to meet new and difficult challenges facing the agriculture sector. Innovative mechanisms to leverage additional resources like creation of a competitive investment fund for agricultural extension and innovation to support entrepreneurial ideas should thus be explored to address the frequent budgetary constraints faced by these systems. The engagement of other stakeholders such as the private sector and civil society organizations in delivery of integrated research-extension services, of which successful examples are already available in many countries, needs to be further strengthened and institutionalized. The possibility of organizing 'National Consultations' to allow private sector and civil society organizations to undertake advocacy, pitch new ideas to governments, share knowledge and enable review of market distortions and subsidies, should be evaluated.

Fostering enabling policy initiatives

The public sector has a central role in providing integrated research-extension services in most countries of the region while also enabling access to knowledge and undertaking overall regulation and monitoring. At the same time, government policy initiatives can be leveraged to promote a market-alignment and technology-provider role for the private sector, a community-mobilization role for NGOs, and a cost-sharing and change-facilitator role for development agencies.

Policy interventions can also be used to support innovation by small and medium enterprises (SME) in the agricultural sector, investment in research and extension systems, increased use of ICT, and sharing of experiences on implementation of national agricultural extension policies and impacts via an official platform.

Documenting evidence

It is important to initiate studies to enable better understanding of the impact of research-extension linkages on agricultural growth. Documenting this impact and spreading greater awareness about impact pathways and potential returns from agricultural innovation can facilitate advocacy initiatives and attract investors. A meta-study at the regional level to provide a firm empirical basis for further promoting integration of research and extension is required.

Overall, The Expert Consultation provided a valuable opportunity to take stock of the current state of agricultural research and extension systems in Asia and the Pacific and develop an Action Framework to make research-extension systems more efficient and relevant to the food security and nutritional needs of the region.

About the event

The Asia-Pacific region faces increasing demand for diverse and quality food production and processing. This is in view of an emerging and growing middle class in many countries of the region which is also home to the largest number of poor people, most of them living in rural areas. Climate change, diminishing natural resources, increasing urbanization and continuing global economic uncertainty are also putting pressure on food systems that need to produce more food more sustainably to end hunger and poverty in our lifetime.

Sustainable intensification of agricultural production requires efficient research and extension systems that support development and absorption of innovative practices and technologies. To create such an enabling environment, government research and extension systems need to enhance coordination and efficiency. This requires investment in research, incorporation of best practices and enhanced integration with the work of farmers' groups, civil society organizations and the private sector, including ICT service providers.

The Expert Consultation on 'Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security' brought together national leaders in research and extension as well as representatives of civil society, private sector and international organizations to discuss effective means to meet these challenges. It aimed to assess existing research-extension system linkages in the light of these challenges, identify opportunities and gaps and explore how research-extension services can contribute to present and future food and nutrition security for the region's growing population with changing dietary demands.

Outputs

The consultation delivered the following outputs:

- Country status on research-extension linkages was assessed and opportunities for further development, including engagement of civil society and the private sector as well as use of ICT, were identified.
- Mechanisms to support improvement of research-extension linkages by stakeholders in the region were discussed for follow-up action.
- An Action Framework was developed for strengthening research-extension integration in the region for sustainable food systems and increased farm productivity, thus contributing to the goals of the United Nations 'Zero Hunger Challenge'.

Organization

The Consultation was jointly organized by the Food and Agriculture Organization of the United Nations (FAO) and the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA), a regional institute of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), with additional support from the Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the European Union funded project 'Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia' (SATNET Asia). The full agenda is presented in **Annex 1**.

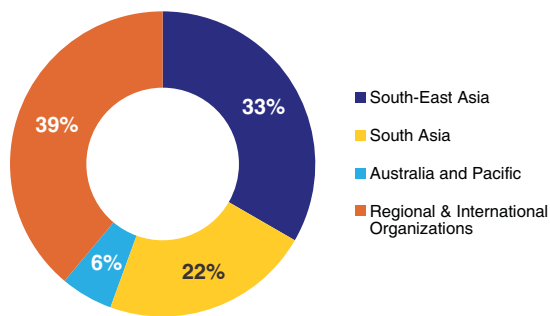
About the participants

A total of 54 persons participated in the event (see Annex 2 for list of participants). They included 33 government and NGO/private sector representatives from 14 countries as follows: Afghanistan (1), Australia (1), Bangladesh (4), Cambodia (3), India (4), Indonesia (3), Malaysia (1), Myanmar (1), Pakistan (1), Papua New Guinea (2), the Philippines (1), Sri Lanka (2), Thailand (7), and Timor-Leste (2). Twenty-one representatives from regional/international organizations (39 per cent) also participated.

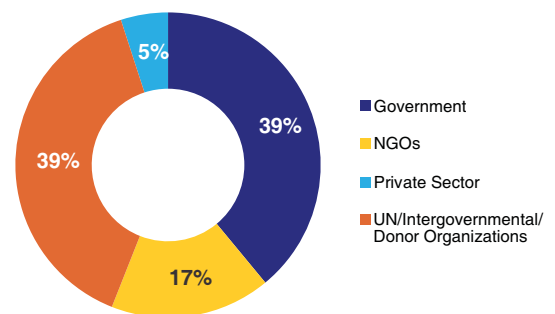
The majority of participants came from South-East Asia (18), followed by South Asia (12), and Australia and the Pacific (3). The rest (21) came from regional and international organizations. In terms of gender, 69 per cent (37) of all participants were men and 31 per cent (17) were women.

Regarding organizational type, 39 per cent of participants (21) represented governments (staff from ministries and national research centres). Seventeen per cent (9) came from NGOs, 39 per cent (21) from United Nations/intergovernmental/donor organizations and 5 per cent (3) represented the private sector. The complete list of participants is contained in **Annex 2**.

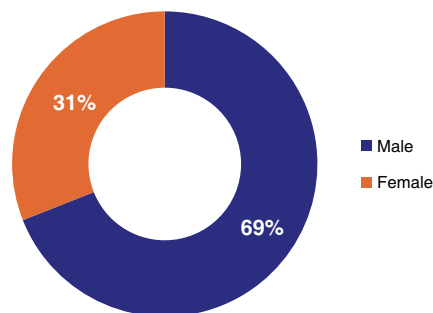
Representation of participants



Organizational type of participants



Participants by gender



Setting the stage: Opening the consultation



Although the Asia-Pacific region has achieved rapid economic growth, it continues to be home to the majority of the world's poor, most of them living in rural areas. Hunger and malnutrition affect an estimated 533 million people in Asia and the Pacific. Food and nutrition security, therefore, ranks high on the region's development agenda. Agriculture can play a powerful role in reducing poverty. Improved agricultural productivity increases incomes of the rural poor and also the availability of food, thereby enhancing global food security.

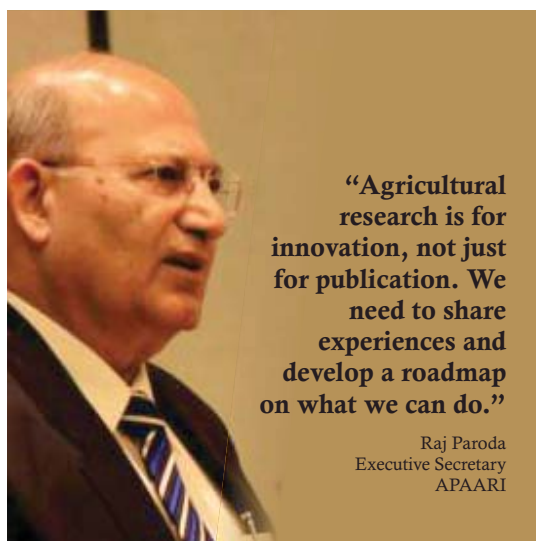
The successes of the Green Revolution generated a perception that agricultural production had become easy, which contributed to the decline of agricultural investment. However, the food price crisis of 2008 was a wake-up call to the world, reminding us of the importance of investing in the agriculture sector. In his inaugural statement to the Expert Consultation on Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security, Mr. Shun-ichi Murata, Deputy Executive Secretary of ESCAP, accordingly highlighted the need to reverse this decade-long decline in investment in agriculture.

The challenges facing the Asia-Pacific region have become even greater with increasing demand for quality and safe food production and processing under the constraints of population growth, urbanization, an emerging and growing middle class with changing consumption patterns, climate change and global economic uncertainty. Furthermore, shrinking agricultural land calls for intensification of production.



Mr. Hiroyuki Konuma, Assistant Director-General and FAO Regional Representative for Asia and the Pacific, emphasized that there is a need to support the sustainable intensification of production through more effective and efficient research-extension services.

Effective research-extension services, however, require maximized interaction, collaboration and knowledge exchange between researchers and development practitioners. Knowledge acquired through research and extension and advisory services must be transferred to farmers in a practical way to help farmers cope with challenges and contribute to more sustainable farming systems. In this context, Dr. Raj Paroda,



Executive Secretary of APAARI, in his inaugural note, stressed the importance of research for innovation and experience sharing.

The speakers also highlighted the need for a new Green Revolution – a knowledge-intensive revolution as opposed to an input-intensive revolution. Strong research and extension systems are necessary to increase the capacities and skills of government and non-government agents such as farmers, civil society organizations and the private sector, and enable adoption of modern and sustainable technologies and innovations. These efforts must involve new stakeholders who are complementing government research and extension systems such as the private sector; national and international NGOs and ICT service providers. All these actors are enriching the research-extension landscape with opportunities for new linkages and better support to women, men and youth in the agriculture, forestry, fisheries and livestock sector.

Regional level overview of research-extension systems

A joint presentation by Dr. Katinka Weinberger, Director of CAPSA and Dr. Kevin Gallagher, Agriculture Research Extension and Education Officer, FAO-RAP, set out the issues before the Expert Consultation.

Challenges and farmers' expectations

About 75 per cent of the world's poor people live in rural areas of developing countries and most depend on agriculture for a living. There is irrefutable evidence that agricultural growth reduces poverty, in particular in rural areas, by increasing employment and real wages for workers as well as profits for net producers and by lowering prices for consumers.

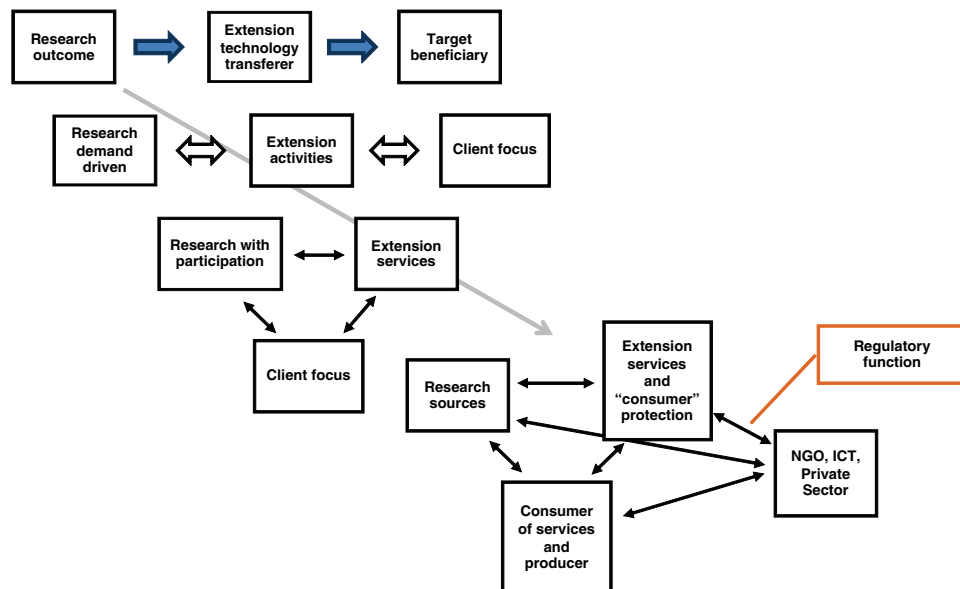


Globally, farming is dominated by smallholders. It is estimated that 93 per cent of all arable land is under smallholder cultivation, and some 80 per cent of the global food is produced by smallholders. However, small-scale farming is being challenged by increasing environmental degradation, more frequent extreme weather events and other adverse impacts of climate change. To feed the world's growing population and to meet the increasing demand for diverse

food, smallholder farmers are expected to produce more food on existing lands. At the same time, they are expected to contribute to environmental preservation through reduced resource intensity and improved natural resource management in order to produce more sustainably, create new economic opportunities for youth, reduce food loss and waste, and support the shift towards healthier diets. Achieving this requires a diverse set of skills, abilities and knowledge.

Given that these expectations require small farmers to adopt sustainable agricultural practices, this shift will be knowledge-intensive and requires changes in the way we operate – in other words, a second 'knowledge-based' revolution. This means focusing more on capacity-building and knowledge-exchange to address the needs of small farmers, including through enhanced linkages between research and extension, a strengthened extension and advisory system, and better quality extension training and education programmes. Figure 1 highlights some of these changes.

Figure 1: Changes in research-extension



Source: FAO

Research-extension gaps

The research and extension model has changed over time and is no longer a one-way communication from the research centre to the extension agency, followed by knowledge transfer to the beneficiary. It has become a more complicated system with interactive communication and many actors such as the private sector, NGOs and consumers. ICT has made sharing of information easier and more convenient. Timely communication between the diverse stakeholders would not be possible without access to ICT. Information services, using telecommunications and Internet, channel messages to improve the efficiency and effectiveness of rural service delivery. Rising ICT use enables stakeholders to make informed decisions about livelihood strategies and betters their reach to policymakers to influence policies and processes that directly impact them.

Nevertheless, huge gaps remain in the capacities of farmers, fishers, herders and foresters. Budget deficits have forced many governments to reduce expenditure on public services such as agricultural extension. Privatization of agricultural extension services is emerging as governments increasingly delegate this responsibility to organizations mobilizing their own budgets, e.g.

farmers' associations or commercial companies. Transferring governance, administration and management to the local level enhances the ability to respond to local problems and opportunities, increases accountability to clients and efficiency, and facilitates participation of diverse stakeholders. Such decentralization has been carried out for extension services in some countries. However, effective decentralization of extension services requires effective coordination and a comprehensive strategy to ensure service quality, capacities at all levels, and clear roles and responsibilities of local and national governments as well as user groups.

New directions and opportunities

Despite the numerous challenges contributing to the research-extension gap, some mentioned above, new opportunities are emerging. These include: intensified sustainable production, harnessing the potential of ICT, networking as well as opportunities to highlight burning issues with the United Nations declaration of 2014 as the International Year of Family Farming. The Zero Hunger Challenge – a global initiative that encourages all partners to scale up efforts to realize the vision of a hunger-free world – presents another opportunity to reduce the existing gap.

Panel discussion: Role of research-extension systems in promoting food and nutrition security

The first moderated discussion during the Expert Consultation focused on the role of research-extension systems in promoting food and nutrition security. The panel included five guests: Dr. Iftikhar Ahmad, Chairman, Pakistan Agricultural Research Council (PARC); Dr. Ir. Agung Hendriadi, Director, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD); Mr. Sopheap Pan, Executive Director, Farmer and Nature Net (Cambodia); Dr. Abdus Salam, Advisor, Agriculture and Food Security Program, BRAC, Bangladesh; and Dr. Annie Wesley, Senior Program Specialist, International Development Research Centre (IDRC), Canada. Dr. Raj Paroda, Executive Secretary of APAARI, moderated the discussion.

Contribution of agricultural research-extension systems to progress towards food security

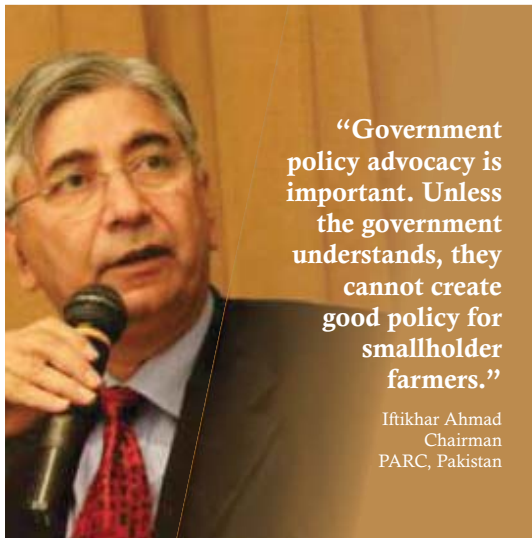
The panel agreed that research and extension systems are highly significant in the context of food security, and have contributed to it to a great extent. Unprecedented improvements, especially manifested through the 'Green Revolution' have

been seen, particularly in Asia and the Pacific. Yet, achievements in strengthening food security have been mixed. Although the number of poor people in the Asia-Pacific region has declined dramatically, the same is not true for malnourished people. Most progress has been made in enhancing food availability, with room for improvement, especially in the area of utilization.



Challenges in translating research outcomes into higher productivity and improved food security, and ways to overcome them

The panel acknowledged that notwithstanding progress, gaps remain between research and extension. To address this, extension needs to be integrated into the entire research-to-adoption continuum from the time of conceptualizing research projects. The extension system is not fully adept at translating research results into the language understood by farmers. Moreover, farmers should be regarded as scientists and extension workers themselves because they can be more effective in transferring knowledge to colleagues and the next generation of experts. At the same time, policy advocacy is important because unless the government understands



existing needs, it cannot develop good policies for smallholder farmers.

In discussing the role of stakeholders in strengthening extension to fill gaps, the panel highlighted the need to develop four subsystems to make research and extension more effective in promoting food and nutrition security. These included institutional capacity-building, cooperative research and extension systems, translating scientific research into easy-to-understand language and enabling farmers' participation in research.

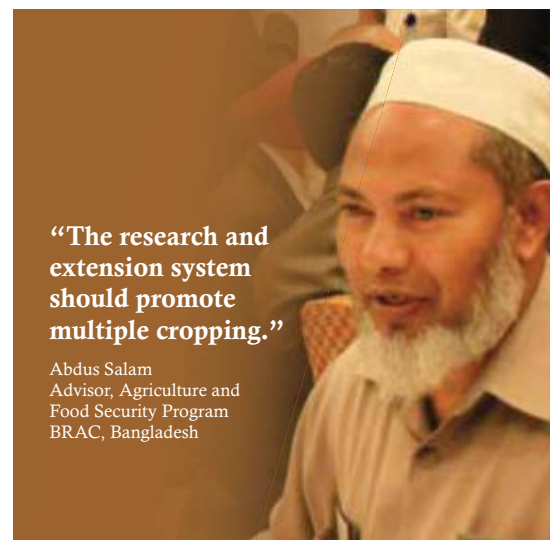
Mechanisms for resource mobilization for research and extension

The panel observed that agriculture must be seen holistically as an industry and not just as an issue of subsistence. Panel members agreed that public-private partnerships should be promoted given the budgetary constraints faced by many governments, and private sector involvement must be encouraged with new investment concepts such as 'minimizing external resources and utilizing local resources'. Stakeholders need to work together to develop a regulatory framework integrating such an approach. The panel also noted the current lack of empirical evidence on the role of extension for agricultural growth. Better information on impact pathways of extension could support advocacy for extension.

Enabling a change in mindset as agriculture transforms from an input-intensive to a knowledge-intensive activity

The panel noted the relevance of setting up a regional consortium that can work on advocacy to national governments on the needs and capacity-building requirements of smallholders.

The panel discussed the question of sustainability in context of knowledge-intensive agriculture and was of the view that research-extension linkages must be looked at from the perspective of sustainability of the entire system to produce more food to improve livelihoods, especially in marginalized areas. It was emphasized that farming should be considered as an industry and that it was necessary to focus on sustainable food value-chains as a whole rather than on farmers alone. Among other things, research systems should encourage knowledge transfer for multiple rather than single cropping for better sustainability. Furthermore, the panel underscored the value of attracting youth to research and extension, and integrating education in agriculture at all levels including school education.



Comments from the floor emphasized the importance of indigenous knowledge. The need to increase the number of farmers' organizations and enable constant upgrading of knowledge was expressed as well.

In conclusion, the panel reiterated the importance of extension and advisory services and advocated that national systems must be reoriented to link research and extension systems. This requires reorienting the research agenda to address small farmers' concerns. 'Farmer first' was the key message that emerged.

Current status of research-extension linkages in Asia and the Pacific

Representatives from Bangladesh, India, Indonesia, Malaysia, Sri Lanka, Papua New Guinea, Thailand and Timor-Leste offered an overview of current research-extension linkages in their countries, key gaps in these as well as plans to address the gaps in the short and long term.

Bangladesh

Presented by: Dr. Wais Kabir, Executive Chairman, Bangladesh Agricultural Research Council, Bangladesh

Country context and specific national issues

Agriculture accounts for 20 per cent of the Gross Domestic Product (GDP) of Bangladesh. This includes fisheries and livestock contributing 3.7 and 4 per cent, respectively, to national income. Agricultural growth has helped bring down the incidence of poverty in the country from more than 80 per cent in the 1970s to 31.5 per cent in 2010. Dominated by smallholders, the average farm size is currently 0.6 ha. The main agricultural produce in Bangladesh includes rice, jute, maize, potato, fruits, vegetables, pulses and spices. Rice covers approximately 75 per cent of cropped area.

The government ministries responsible for the agriculture sector include the Ministry of Agriculture (crops), Ministry of Fisheries and Livestock, and Ministry of Environment and Forests. The main challenge to the sector is rapidly increasing land degradation with depletion of soil and water resources. The focus of research and development (R&D) has, therefore, shifted to growing enough diversified quality food for a large and growing population with a shrinking land base. Annually, agricultural land is shrinking at 1 per cent while urbanization is growing at 12 per cent. Climate change, by increasing the likelihood of pest attacks, salinity, submergence and drought, is adding to existing challenges. Technology development and



“Climate SMART agriculture, value-chain development and capacity-building aspects can act as a tool in strengthening research and extension linkages at the national level.”

Wais Kabir
Executive Chairman
BARC, Bangladesh

institutions need to focus on safety and quality of food, nutrition and climate-smart agriculture, rather than higher production. However, technology dissemination also requires skills, time and logistical support.

Current status of research-extension systems and their linkages

There is a long history of agriculture research in Bangladesh starting in 1908. Agricultural research and extension is the responsibility of the Department of Agriculture, which has been linking research and extension through various initiatives involving both public and private organizations. For example, it organizes research review meetings of the National Agricultural Research System such as an annual regional research review and planning workshop. Other platforms through which research, extension and the private sector interact include the Governing Body of the Bangladesh Agricultural Research Council (BARC), Technical Committee on Seed, National Seed Board, National Fertilizer Standardization Committee and the Pesticide Technical Advisory Committee.

The National Agriculture Technology Project,

financed by the World Bank and the International Fund for Agricultural Development, is crucial for enhancing the research-extension-farmer linkage to promote farmer-to-farmer information exchange. The project focuses on revitalizing the agricultural technology system, which includes agricultural research, extension and development of supply chains, and increasing agricultural productivity in Bangladesh. The project involves research in extension planning and works on demand-based, on-farm technology validation. Its activities include demonstrations, field days and farmer exchange visits. It brings research and extension agencies together to strengthen farmer-market linkages, provide agriculture research support and enhance institutional efficiency. Project-based interventions are strengthened by technical and coordination committees at different levels – national, district and *upazila* (village).

Gaps in strengthening research-extension linkages

There are, however, some constraints to increasing the efficiency and effectiveness of agricultural research and extension systems. These include: low participation in joint planning, monitoring and evaluation activities, inadequate resource allocation for research and extension, inadequate feedback mechanisms, lack of an operational mechanism for effective and efficient linkage between research and extension, lack of regular monitoring on the functioning of the linkage, as well as different institutional capacities in the areas of crops, fisheries and livestock. Other constraints faced by research-extension projects include a lack of mechanisms to ensure system sustainability, low private sector investment in agroprocessing and lack of sufficient skills in the latest technologies among extension staff.

Way forward

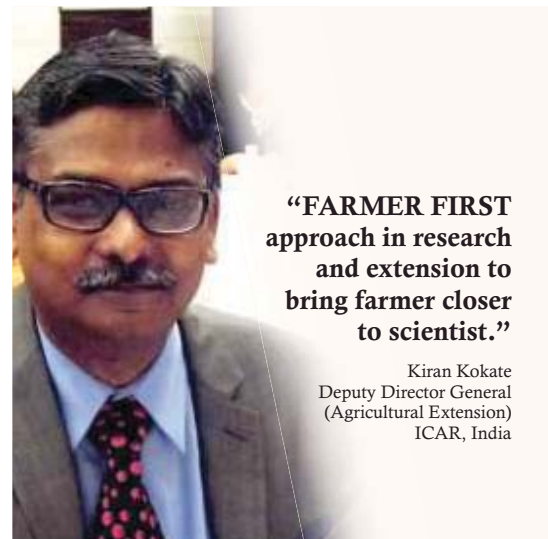
Overall, the country is shifting towards climate-smart agriculture, value-chains, and quality food products at lower cost. In this context, there is an urgent need for capacity-building at the national level in various agricultural sectors to strengthen and institutionalize research-extension linkages at all levels.

India

Presented by: Dr. Kiran Kokate, Deputy Director General (Agricultural Extension), Indian Council of Agricultural Research (ICAR), and Dr. Ramesh Chand, Director, National Centre for Agricultural Economics and Policy Research, ICAR, India

Country context and specific national issues

The agriculture sector is facing many challenges to ensuring food security for the nation. Regional imbalances in access to agricultural resources are a major constraint to bringing about significant increases in crop yield. In recent decades, population growth, declining average farm size and the increasing vulnerability of smallholder farmers are threatening the sustainability of agriculture. It is also noteworthy that public spending on agricultural extension as a percentage of GDP in agriculture has been much lower and also characterized by a higher degree of fluctuation as compared to public spending on research and education.



**“FARMER FIRST
approach in research
and extension to
bring farmer closer
to scientist.”**

Kiran Kokate
Deputy Director General
(Agricultural Extension)
ICAR, India

Current status of research-extension systems and their linkages

India's National Agricultural Research System (NARS) is one of the largest in the world with research institutes dedicated to almost every crop and commodity. Many agricultural research institutes undertake extension as well. Fifty-six agriculture universities have 'teaching research and extension functions', supported by research



“The Director General of the Indian Council of Agricultural Research, who is a technocrat, is also Secretary of the Department of Agricultural Research and Education, and that imparts great strength to our system.”

Ramesh Chand
 Director, National Centre
 for Agricultural Economics
 and Policy Research
 ICAR, India

stations and college campuses in almost every agroclimatic zone. Krishi Vigyan Kendras (KVKs) or agricultural science centres are India's key extension centres, responsible for technology testing, adaptation, integration and dissemination and are located in every district of the country. While input-flows from research to extension include technology and packages, seed and plant propagation material, technical advice and advisories, extension-to-research flows are in the form of feedback on technologies, and information on farmers' needs and emerging problems.

The Indian Council of Agricultural Research (ICAR) is an important part of the NARS and the national apex body for coordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences. The Director General of ICAR is also Secretary to the Government of India for the Department of Agricultural Research and Education which provides increased access to the political leadership. Moreover, there is a conscious overlap between the centre and the states in both research as well as extension. The ICAR organizational structure is a showcase of institution building and research-extension linkages, covering various agricultural disciplines.

Ways in which research-extension linkages are being strengthened

ICAR is giving top priority to capacity-building

programmes for research-extension linkages from the district to the national level, with annual agroadvisory and stakeholder meetings organized by KVKs. This has led to the establishment of an Agricultural Technology Management Agency (ATMA), District Annual Action Plan and State Extension Work Plan to provide technology inputs and updates to extension workers, scientists and farmers to strengthen their knowledge. The current research-extension linkage model also includes capacity-building of the extension system to enhance the knowledge of scientists and resource persons in state agriculture universities (SAUs), KVKs and ICAR. The research-extension linkage package is being improved to address gaps and issues. The ATMA, as a district-level convergence platform, facilitates and coordinates efforts to strengthen institutional capacities. The ATMA platform also involves farmers through research-extension links, using SAUs, block-level committees and district-level training programmes organized by government institutes. KVKs advise ATMA in the implementation of their national-level centrally-sponsored schemes.

Furthermore, KVKs provide technical guidance to Block Technology Teams in preparation of Block Action Plans, especially with regard to research-related issues, gaps and strategies. To assist farmers directly, KVK scientists provide technical backstopping in farm schools in progressive farmers' fields. ATMA and KVK coordinate field days and exhibitions to avoid duplication of efforts and ensure transfer of appropriate scientific practices to the field level.

At the KVK level, a partnership with the private sector already exists for seeds, pesticides, insecticides and mechanization. The National Agriculture Development Scheme also has a provision for identifying private players and focuses particularly on marketing aspects.

Way forward

To strengthen research-extension linkages, ICAR envisions the development of a dedicated Indian Agriculture Extension Research Institute (IAeRI) to assess gaps and issues in research-extension

linkages and to address them in a holistic and integrated manner. There is also a need to enhance research-extension linkages in India through collaboration with international organizations such as the International Maize and Wheat Improvement Center (CIMMYT) (e.g. for conservation agriculture) and the private sector (e.g. via the ICAR Agri Innovate Company). In addition, there is need for a paradigm shift from production to value-addition and profit orientation, growth to efficiency, and from an input-intensive to a knowledge-intensive approach.

Indonesia

*Presented by: Dr. Ir. Agung Hendriadi, Director,
Indonesian Center for Agricultural Technology
Assessment and Development, Ministry of Agriculture,
Indonesia*

Country context and specific national issues

In 2012, Indonesia was ranked as the world's 16th largest economy. Its Human Development Index (HDI) increased from 0.39 in 1980 to 0.63 in 2012. Yet, a growing population and changing food consumption patterns with a rising demand for quality food in the country, have increased challenges for the agriculture sector and the research-extension system. For example, during 1996-2010, rice yield in Indonesia grew at only 1.0 per cent annually, compared to annual population growth of 1.5 per cent. The country's agricultural labour force is also declining with the share of population working in agriculture falling from 64.2 per cent in 1970 to 33.3 per cent in 2011. The average age of farmers is now over 50 years. Another challenge is the asymmetric distribution of population. For example, Java, representing only 7 per cent of the country's total land area, is home to 57 per cent of Indonesia's people with a population density of 1,000 persons per km². On the other hand, Papua, occupying 22 per cent of Indonesia's total land area, is inhabited by less than 2 per cent of the country's population with a density of 7 persons per km². Indonesian farmers need technology and innovation to respond to these challenges.

The R&D programme of the Indonesian Agency for Agricultural Research and Development

(IAARD) is directed towards innovation and development of more efficient and effective technologies and superior varieties to meet national development targets. These targets include: sustainable self-sufficiency in prioritized commodities; food diversification; value-addition; export competitiveness of agriculture commodities; and, thereby, improvement in farmers' well-being. To meet these agricultural development targets in promoting sustainable self-sufficiency and improving farmers' welfare, IAARD has adopted two research-extension orientations including: science-based activities as upstream research, and impact-based activities as downstream research. The reach of the extension services ranges from the national to the village level.



The research-extension system in Indonesia covers three activities: research activities with technology components, assessment activities involving identification of specific technologies and design of development models, and extension activities applying agribusiness practices. To deliver technologies from researchers to farmers, IAARD has 33 Assessment Institutes for Agricultural Technology (AIATs) across all provinces in Indonesia.

There are several research-extension programmes in Indonesia. The Integrated Crop Management programme under IAARD,

operating on 3.4 million ha, uses the field school for an integrated crop management approach. Results show that farmer participation in research has contributed to the relevance, appropriateness, adoption and positive impact of new technologies for rice, corn and soybean. The second example is the Sustainable Household Food Security programme involving use of home yards by women to cultivate vegetables and fruits, and raise poultry. Free waste crop-livestock integrated system as well as fertilization, biofertilizers, biotechnology, comprehensive pest management, agricultural tools and machinery, and post-harvest activities are other examples through which research-extension linkages are being strengthened. Lastly, farmer-managed extension activities have been introduced in Indonesia, involving technology development and training for farmers, and collaboration with agricultural input suppliers with assistance from extension and research institutions. Farmers are also introduced to ICT to improve their access to information and marketing networks.

Gaps in strengthening research-extension linkages

A crucial research-extension issue in Indonesia is the capacity of extension workers. The research-extension workforce of about 54,000 comprises 3,000 researchers with 21,000 skilled and 30,000 unskilled extensionists. The limited linkage between research-extension programmes at national and regional levels results in poor dissemination and technology transfer. A limited number of publications on latest agricultural innovations are disseminated through multimedia channels such as Cyber Agriculture Extension, television and radio.

Way forward

In the context of the role of research-extension initiatives in addressing climate change, it was pointed out that Indonesia is committed to reducing agricultural greenhouse emissions by about 40 per cent by 2020. Climate change is a priority for agricultural research and extension in the country, especially in rice production.

Malaysia

Presented by: Dr. Tapsir bin Serin, Deputy Director, Economic and Technology Management Research Center, Malaysian Agricultural Research and Development Institute, Malaysia

Country context and specific national issues

To achieve its vision of reaching a per capita Gross National Income of \$15,000 by 2020, meet the needs of its current population without compromising those of future generations and enable all communities to benefit from the wealth of the country, Malaysia has been implementing its National Agro-Food Policy. Both R&D and extension are among seven strategic directions of the policy. The Malaysian Agricultural Research and Development Institute (MARDI), which is a key part of the Malaysian NARS, believes that to meet the country's economic targets, development of the agricultural sector needs to go hand in hand with other sectors of the economy.

Current status of research-extension systems and their linkages

To strengthen R&D, innovations and technology practices in agriculture, the Government of Malaysia aims to create a conducive environment to stimulate creativity and innovation, enhance the commercialization of R&D and develop innovative products, and expand mechanization, automation and effective technology transfer to farmers. The R&D strategy has complemented government efforts to strengthen the delivery of agricultural services and extension systems. A part of the government's extension strategy is clarifying the functions and roles of agricultural agencies, enhancing the role of agricultural organizations, establishing a Development Council of strategic industries and strengthening the delivery of agricultural services through the involvement of various stakeholders.

Malaysia has introduced the concept of R&D&C in agricultural development to take science to commercialization. During 2005-2010, MARDI generated 896 technologies, 14.3 per cent of which have been commercialized. MARDI is



successfully implementing R&D&C through many projects. It recommends selective implementation of R&D&C, based on customer needs, and with a focus on products and appropriate technologies. The driving force in R&D&C is, therefore, the MARDI belief that technology is successfully adopted only if it fulfils users' needs.

Technology transfer through extension services is a combination of knowledge, skills, techniques and expertise covering crop, livestock, fisheries and aquaculture production, and food processing. The beneficiaries are not only farmers but also the scientific community, small and medium industry, and the private sector. MARDI transfers technology to beneficiaries using publications, exhibitions, technology incubators, technical training, seminars, 'guided entrepreneurs' schemes and trouble-shooting activities.

Gaps in strengthening research-extension linkages, and ways in which they are being addressed

There are still many challenges to strengthening research-extension linkages in Malaysia. Smallholder farmers cannot adopt high-cost technologies unless these are subsidized. Technologies should not only be cost-effective but also easily understood by farmers. In case of a sophisticated technology, it is better for the

researcher to be involved in the extension process as an extension agent. The competency of extension agents is another challenge.

More needs to be done to improve technology transfer mechanisms. A lack of understanding among extension agents themselves causes a leakage of information before it reaches farmers. Bureaucratic bottlenecks in research and extension agencies, limited collaboration, overlapping functions and the tendency to work in silos are additional constraints. Malaysia is restructuring its agricultural agencies with the establishment of one-stop centres to provide agricultural services under one roof and to decentralize expertise to the district level. The roles of these agencies will be reviewed to avoid duplication of functions and direct competition with the private sector in business activities.

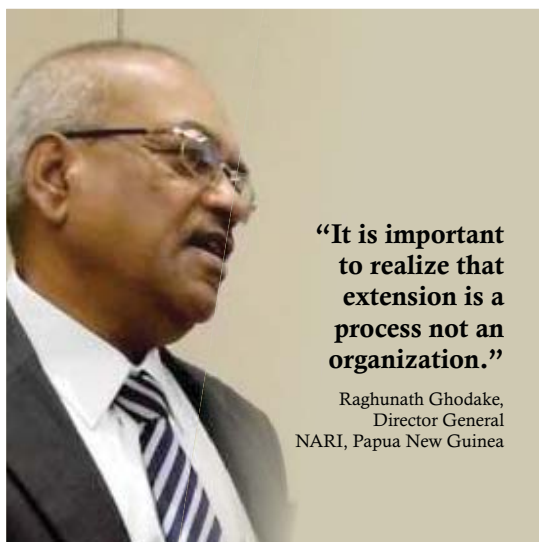
Lessons learned and way forward

Over the years, Malaysia has learned from its research-extension experience. For example, MARDI researchers understand that they sometimes need to act as 'temporary' extension agents for technology transfer, especially when it comes to transferring knowledge and skills in sophisticated technologies. Secondly, application of the R&D&C approach can save costs in planting, harvesting, post-harvest and processing whenever new technology is based on customer needs. MARDI has also learned that the use and transfer of technologies such as precision farming, ICT, biotechnology and mechanization has the potential to modernize and transform the agrofood industry. To complement these activities, farmers' and fishermen associations need to be empowered and private sector participation encouraged in providing extension and agricultural support services.

With regard to research-extension roles in addressing climate change, Malaysia is conducting research on less water-intensive rice breeds. Urban agriculture is also being introduced to cope with climate change.

Papua New Guinea

Presented by: Dr. Raghunath Ghodake, Director General, National Agricultural Research Institute, Papua New Guinea



“It is important to realize that extension is a process not an organization.”

Raghunath Ghodake,
Director General
NARI, Papua New Guinea

Country context and specific national issues

Although a resource-rich country, Papua New Guinea faces major challenges to promoting food security and nutrition. The country has an estimated 7 million food-insecure people with 80 per cent of the population dependent on agriculture. The key crops in Papua New Guinea include root crops, banana, vegetables, fruits and nuts, livestock and export tree crops. There are complex interactions between smallholder agriculture and other sectors such as commerce and manufacturing, infrastructure and facilities as well as health, and law and order. There are also challenges with regard to policy coordination, and the use of ICT and other infrastructure in the interest of all stakeholders.

Current status of research-extension systems and their linkages

Research-extension linkages involve bridging the work of research organizations with that of others providing extension services. The key national research institutes include: National Agricultural Research Institute (NARI), National Research Institute, Institute of Medical Research, Oil Palm Research Association, Forestry Research Institute, University of Technology, University of

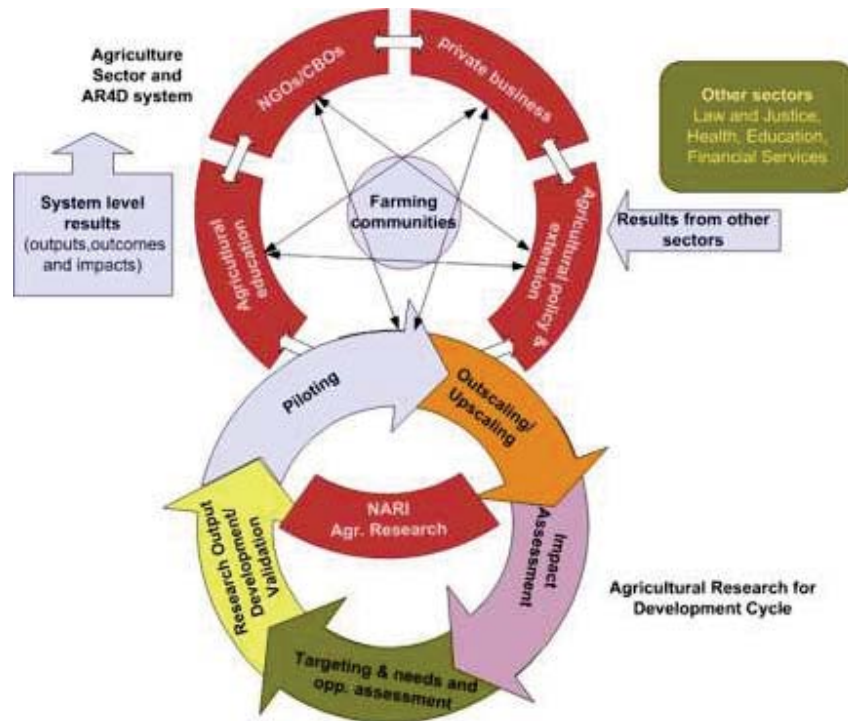
Natural Resources and Environment, and University of Papua New Guinea. Some organizations such as the Chamber of Commerce and Industry and Coffee Industry Corporation also have an extension arm. The country's key extension organizations include the Provincial Department of Primary Industries, Fresh Produce Development Agency, Oil Palm Industry Corporation, Cocoa Board, Kokonas Industri Koporasen, Smallholder Support Services Extension Programme and Department of Agriculture and Livestock. Trukai Industries and Ramu Agricultural Industries are among the private R&D-focused organizations in the country.

The main knowledge-transfer mechanisms facilitating technology transfer from research to farmers in Papua New Guinea include field and open days, on-station and on-farm demonstrations, agricultural innovation shows and information and community-based resource centres. Regional research and development advisory committees and commodity committees as well as various technology transfer projects are among other examples. Figure 2 presents research-extension linkages in Papua New Guinea.

Strengthening research-extension linkages, and way forward

In recognition of the complex and sometimes non-linear trajectory of development, NARI aims to be a facilitator of innovation rather than follow more traditional extension roles focused only on supplying technologies and knowledge. For extension to be demand-driven and focused on outcome and impact, rather than only inputs and outputs, it is important to perceive extension as a process. To ensure that extension leads to yield gains, Papua New Guinea has launched the Agricultural Research for Development (AR4D) initiative whereby research output is dedicated to development impacts. To ensure AR4D success, Papua New Guinea emphasizes ownership-based and community-driven extension.

Figure 2: Research-extension linkages in Papua New Guinea



Source: NARI

Sri Lanka

Presented by: Mr. Wijesekara S. Rukunayaka, Director of Extension and Training Centre, Department of Agriculture, Sri Lanka

Country context and specific national issues

Agriculture contributes 11.1 per cent to Sri Lanka's GDP with an estimated annual growth rate of 5.8 per cent. The main food crops include rice, vegetables and fruits. Tea, coconut, rubber, spices and cashew are main plantation crops. The research-extension sector uses training, research-extension dialogue, technical working groups, adaptive research, crop clinics, and print and electronic media as the main tools to strengthen research-extension linkages.

Current status of research-extension systems and their linkages

Research and extension cover different agricultural sectors like paddy, vegetables, fruits, other crops and plantation crops, and the main activities include variety development and productivity improvement. The degree of private

sector and NGO participation varies. For example, in the paddy sector, research-extension linkages, including participation of both public and private sector, are evident in variety development (e.g. long rice or high-fibre, high-protein variety), productivity improvement, agronomy and mechanization, integrated pest management (IPM) as well as value-addition and export.

The most remarkable research-extension achievement is the initiative of permanent and mobile crop clinics. Crop clinics are physical establishments where farmers can bring disease-affected crops for diagnoses and advice. The clinics aim to enhance crop production, reduce production costs by avoiding abuse of agrochemicals and save crops from pests and disease.

To facilitate market avenues, the Department of Agriculture has established farm business schools with FAO support. Here, farmers learn about the entire farm business system, ranging



“We believe that good marketing means good extension.”

Wijesekara S. Rukunayaka
 Director, Extension and Training Centre
 Department of Agriculture,
 Sri Lanka

from making business plans, finding right markets and conducting market surveys to ensuring quality control when a market is found. This way, the farmer community can search its own market avenues. Extension workers can then help them grow the crops. However, extension is not directly involved in business development itself since business development comes under the private sector.

Gaps in strengthening research-extension linkages and way forward

Despite significant achievements in strengthening research-extension linkages in Sri Lanka, a lot still needs to be done to fill existing gaps. Extension workers need capacity-building support. There is also a need to enhance private sector participation and harness opportunities offered by ICT to facilitate communication between researchers, extension workers and farmers. Among suggestions for improvement, the Sri Lankan Department of Agriculture has identified an increased role for public-private partnerships, transfer of ICT knowledge to farmers and increase in field research activities.

Thailand

Presented by: Ms. Orasa Dissataporn, Senior Expert on Vegetable, Flowers and Herbal Crops Promotion and Management, Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, Thailand

Country context and specific national issues

Of the \$166 million government spending on R&D in 2009, \$109 million was directed to agricultural science (66 per cent). Crop production research is conducted by the Department of Agriculture (DOA) and research output is transferred to beneficiaries by the Department of Agricultural Extension (DOAE). Research and extension on livestock and fisheries are carried out by the Department of Livestock and Department of Fisheries, respectively. The Department of Agriculture is involved in research and development of crop varieties, after which improved varieties are passed on to DOAE. The DOAE disseminates new varieties at the regional, provincial and district level, down to the subdistrict level where technology is transferred to farmers.

Current status of research-extension systems and their linkages

The Department of Agriculture regards farmers as end users of the research and innovation it develops and disseminates at the national, regional, provincial and district levels. Its transfer mechanisms include training courses, demonstration plots, exhibitions, field visits, joint field experiments, seminars and mobile extension clinics. DOAE usually identifies research topics though, in some cases, other research centres share their work with DOAE for transfer to farmers. Committees are set up to look into specific problems.

A national workshop is organized once a year in which extension workers discuss policies and new technologies that should be transferred from DOA to DOAE and then to farmers. This is followed by regional, provincial and district workshops. DOAE simplifies research findings to make these accessible to farmers.

DOAE is emphasizing Good Agricultural Practices (GAP) in research-extension systems

on food security and nutrition and has signed a Memorandum of Understanding (MOU) with national research institutes to promote GAP at the farmer level. The MOU has set up a GAP Committee to formulate policies and identify pilot projects through provincial offices to train farmers in GAP.



Gaps in strengthening research-extension linkages

Agricultural practices are evaluated by GAP inspectors and farmers who pass the evaluation are eligible for a GAP certificate from the Department of Agriculture. Challenges to GAP implementation include insufficient extension agents, staff capacity and time to be devoted to field work. The inability of economic research to prove financial returns on GAP means that farmers have low incentive to adopt GAP.

Another issue is that the GAP online system in DOAE to register farmers is not linked to DOA, which means that the latter cannot follow progress in GAP work. The current research-extension linkage is also very top-down.

Lessons learned and way forward

There is a need to integrate all sectors in GAP research, include market promotion in the linkage, and support and develop knowledge of extension officers and farmers. In addition, the central committee should only be responsible for policies, while regional committees should focus

on problem solving. Inspection work could also be reduced by promoting group certification for GAP.

In the context of research-extension roles in relation to climate change, Thailand has conducted agricultural carbon footprint research focused on export-oriented products.

Timor-Leste

*Presented by: Mr. Mariano Fernando Xavier Malik,
Ministry of Agriculture and Fisheries, Timor-Leste*

Country context and specific national issues

The young mountainous nation of Timor-Leste is home to about 1.2 million people, with 80 per cent of its people relying on agriculture for a living. The agriculture sector accounts for about 30 per cent of the country's non-oil GDP. Rice, maize and cassava are the country's staple food crops, with coffee being a main export crop accounting for about 23 per cent of export earnings. Rice is among crops imported by the food-insecure country. Timor-Leste has one of the world's highest levels of chronic malnutrition.

Low farm productivity, high losses to pests, disease and post-harvest handling are key agricultural challenges. Furthermore, while an average of 0.8-1.2 ha land is cultivated per household, uncertain land rights are a constraint to commercial agricultural development.

An annual deforestation rate of 1.7 per cent and lack of private sector investment in agriculture are additional challenges.

Gaps in strengthening research-extension linkages, and ways in which they are being addressed


Established only in 2010, the extension system faces budgetary as well as technical capacity constraints. On average, one extension officer covers one village of about 500 households. In addition, there is a lack of communication between researchers and extension officers in the field as well as poor infrastructure and communication facilities.

The Ministry of Agriculture and Fisheries (MAF)

has been reorienting research and extension services towards identifying, promoting and delivering nutrition-rich crop varieties to its people. MAF is responsible for releasing and promoting high-yielding, improved varieties of maize, rice, peanuts, sweet potato and cassava. At the same time, it conducts on-station and on-farm evaluation of potential new varieties.

Lessons learned and way forward

The development and promotion of technologies in Timor-Leste remains a challenge. The Research Division needs to provide the Extension Division with scientifically-proven technologies appropriate for farmers such as adapted varieties, information on planting distance, fertilizer technology and soil cultivation practices. Better connections are needed between these two divisions. For example, extension officers need to pay more attention to collecting farmers' feedback and conveying it back to the research process to develop farmer-preferred varieties and techniques. The Research and Extension Divisions should also

A portrait of Mariano F. M. Xavier, a man with short dark hair, wearing a grey suit jacket, a white shirt, and a blue patterned tie. He is looking slightly to the left of the camera with a neutral expression.

“There is lack of communication between the researcher and extension officer in the field because of poor infrastructure and insufficient public investments.”

Mariano F. M. Xavier
Chief of Department of
Community Development
National Directorate of
Agriculture Extension &
Community Development
MAF, Timor-Leste

work together in promoting farmer-based research such as Farmer Field Schools and farm demonstration trials. Furthermore, to increase outreach of food and nutrition, MAF should collaborate with NGOs and the private sector. In this context, MAF has recently initiated some promising reorganization measures.

Panel discussion: Evolving role of extension systems, including ICT, as 'knowledge brokers' between researchers and farmers

The second panel discussion of the Expert Consultation focused on the evolving role of extension systems, including ICT, as knowledge brokers between researchers and farmers. ICT has become an important tool in promoting and facilitating agriculture development, and helping ensure food security.

The panelists included: Mr. Tim Bennett, Managing Director, Managed Growth Group, Australia; Dr. Fabrizio Bresciani, Senior Agriculture Economist, The World Bank Group, Indonesia Country Office; Dr. Ranny Chaidirsyah, Head, Farming Institution Empowerment, National Center for Agricultural Extension, Agency for Agricultural Extension and Human Resource Development, Ministry of Agriculture, Indonesia; Mr. Mohinder Grewal, Farmer group representative, India; and Dr. Kiran Kokate, ICAR, India.

ICT – facilitator of research-extension linkages

The first issue discussed was the perception of the ability of ICT to facilitate effective linkages between research and extension. It was pointed out that ICT has been particularly useful for crop diagnoses and assessing crop nutrition aspects, e.g. through photographs, as well as by facilitating access to expert views from different geographical areas. However, a more exciting development is possible if we start perceiving agriculture as an industry rather than as an entrepreneurial activity. Once viewed as an industry, ICT and mobile phone companies can be seen as avenues for transferring cash, dealing with remittances and better financing of agriculture. Increasingly, ICT systems are being used in other sectors of agriculture such as agroprocessing industries for quality checks and traceability of product market type by both small and large farmers in the Asia-Pacific region.

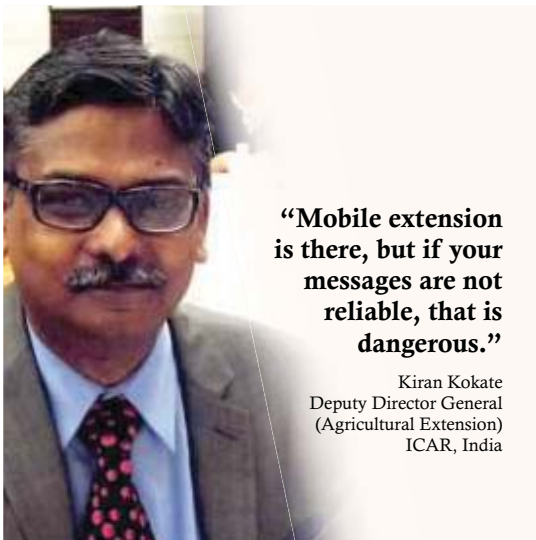


Opportunities are there, but constraints must be addressed

Recognizing the potential role of ICT in bridging the research and extension gap, the panelists noted that while ICT can indeed, facilitate another agricultural revolution, it needs to be used carefully to send the right information to farmers. Every technology has its limitations and there is need for more research on the use of ICT in agriculture. While the advantages of ICT are known, it is challenging to determine its usefulness for farmers. The panel stressed the need for striking a balance between institutions that develop applications for farmers, and their partnership development with the private sector such as mobile phone companies as well as farmers themselves. The Philippines, for example, has an ICT system for managing fertilizers and identifying soil conditions, but farmers need certain skills to use it (e.g. to enter numbers). Such constraints must be well understood.

Two-way communication that facilitates a learning process

The panel, however, pointed out that ICT should not only be used as media for information



“Mobile extension is there, but if your messages are not reliable, that is dangerous.”

Kiran Kokate
Deputy Director General
(Agricultural Extension)
ICAR, India

sharing but its potential to facilitate a learning process for all stakeholders should also be harnessed. Extension workers, who are intermediaries between researchers and farmers, need the capacity and knowledge to use various forms of ICT to facilitate interaction and ensure that correct and timely information is passed on to farmers. Panel members added that a trade-off needs to be made between specific information related to farmers' conditions as well as general information facilitated by ICT. Certain applications under development are by-passing extension workers.

The panel discussed the ICAR experience with ICT in agricultural extension in India. ICAR has initiated mobile advisory services for extension workers at KVKs and is developing an e-farm service to provide alerts to farmers. However, while ICT services work well in some parts of India, their use in remote locations where availability of electricity is limited, remains a challenge. It is difficult for farmers to charge mobile phones to receive crop advisories from KVKs. Nevertheless, ICT can play an important role as was evident during the recent cyclone in the state of Orissa when the early warning system saved thousands of lives.

Opportunities to work with youth and financing institutions

The skills, motivation and enthusiasm needed to take up opportunities related to ICT vary across

the globe. ICT is opening doors for young people who can start thinking of applying ICT tools to agriculture. As such, it was suggested to promote ICT use in agriculture by youth. ICT applications should also be used in the financial sector so that farmers can obtain information about how to get credit or repay bank loans using mobile phones. The panel added that microfinance institutions are very keen on using ICT applications as such institutions are increasingly interested in giving stronger advice and support to farmers with the objective of getting loans repaid.



“ICT is a tool to allow innovation in agriculture to really begin.”

Tim Bennet
Managing Director
Managed Growth Group,
Australia

Role of public-private partnership in ICT

Opportunities also exist to change regulations and policies to make ICT use easier for extension workers and farmers. In Indonesia, for example, the Central Bank is piloting an initiative that allows payments to be made using mobile phones. However, regulations need to be changed to provide such services to farmers on a wider basis. It was also emphasized that people at the grass roots need to be encouraged to collaborate in providing advisory services, market accessibility and electronic traceability.

Role of government

It is crucial that governments understand the potential of ICT in the agriculture sector. In India, for example, the Ministry of Agriculture is providing opportunities for stakeholders to come together to develop technologies, such as

'Agropedia' (a farmers' portal) for extension workers at KVKs. In Indonesia, the government is planning to open an ICT research centre to develop ICT applications specifically designed for farmers as a way of building trust.

Trust

Trust was again raised as an important issue in the use of ICT. It was pointed out that ICT-enabled information systems by themselves, do not guarantee the reliability of the information they provide to farmers. It is the role of extension workers to build trust by elaborating the messages transmitted to farmers in a format that farmers can interpret. Farmers often approach other farmers to help them interpret complex messages. Providing information on prices which can be verified by farmers could be proof for farmers that they can trust the system. However, trust is much easier to build when everyone shares common interests. It was mentioned that



“There is definitely a need for extension systems to rethink the work and interactions with farmers.”

Fabrizio Bresciani
Senior Agriculture Economist
The World Bank Group,
Indonesia Country Office

the level of trust in agricultural cooperatives is much higher than in other institutions.

Role of non-government actors

Public research and extension systems in developing Asia-Pacific countries face severe budget constraints. However, farmers today require well-integrated research and extension services more than ever. One of the strategy options to meet this challenge is greater involvement of non-government players (private sector and NGOs) in strengthening research and extension systems and linkages. CAPSA conducted an e-discussion titled 'Role of the Private Sector and Civil Society in Strengthening Research-Extension Linkages' from 13 to 27 September 2013 in preparation for the Expert Consultation. An overview of the outcomes of the e-discussion was presented by Mr. Anshuman Varma, Knowledge Management Coordinator, CAPSA.

The e-discussion identified a number of successful private and NGO-led research-extension systems from countries in the region such as Bangladesh, India, Nepal and Pakistan as well as some regional-level cases. Representatives from selected organizations were invited to showcase their work in the area of strengthening research-extension linkages at the Expert Consultation (as presented later in this section) to enable cross-learning and sharing of good practices.

The e-discussion participants enumerated various ways in which private enterprises and NGOs can strengthen research-extension linkages. These include generation of new technologies by the private sector and their testing through farmer-led experiments, development of high-quality seeds and sustainable practices which are then brought to farmers through large-scale participatory block demonstrations, capacity-building of farmers in the use of new technologies and practices, selection of suitable tools and machinery for farmers' group trials, and facilitating development of local service providers (comprising smallholder farmers) and their associations which can provide

affordable and quality services on agricultural technologies.

Among their unique strengths, it was felt that NGOs work closely with farmers and thus understand farmers' technology needs well. They can facilitate technology adoption, enabling open discussion on the effectiveness and efficacy of technologies by leveraging their good rapport with farmers. For the private sector, the availability of financial and human resources to contribute to research and extension on a long-term basis, greater result-orientation and efficiency in producing new technologies and outcomes, and strong marketing and communication skills, were mentioned as unique strengths.

On the other hand, their restricted capacity for agricultural technology development, constraints of short-term or project-based interventions, dependency on donors and lack of knowledge-sharing opportunities were cited as limitations of NGOs in strengthening research-extension linkages. Lack of a strong field-level presence, limited penetration in areas with a high percentage of small farmers, limited crop focus, and a high level of confidentiality were listed as limitations of the private sector.

On ways to further enhance the role of the private sector and NGOs in this area, contributors noted options such as building capacities of small input sellers and traders, offering incentives like recognition and remuneration to researchers for innovations and to extensionists for technology adoption, enabling more informal contact between small NGOs and private and public organizations to help build mutual trust, developing systems and processes to make extension services cheaper (e.g. through ICT), promotion of farmers' alumni networks, and establishment of a formal forum for facilitating interaction and joint planning of the research-extension agenda by all stakeholders.

Case studies on research-extension systems led by NGOs

Local service provision – a trigger to improve farm production and marketing in Bangladesh and India

Presented by: Ms. Annet Witteveen, Head, Food Security and Livelihoods Unit, Concern Universal, Bangladesh

The NGO Concern Universal Bangladesh is implementing the European Union funded 'Cross-border Transfer of Agricultural Technology, Institutional and Market Development Project' to improve sustainable smallholder production in India's north-east border state of Assam and in Jamalpur district in north Bangladesh.

Limited transfer of best practices and technology, non-existent quality services for the poor and reliance on middlemen in commodities trade, resulting in low prices and farm investment by farmers, are major constraints to promoting sustainable smallholder production in both countries. The project provides rural services to small-scale farmers and focuses on the development of individual local service providers (LSPs), who serve as 'triggers' to improve farm production and marketing.

LSPs are selected by local communities, organized into associations at the subdistrict level and receive capacity-building support on agricultural technologies, marketing and business development under the project. LSPs are linked to a network of different actors and facilitate access to knowledge and support services from diverse public and private institutions. Service provision by LSPs to small-scale farmers has been initiated, based on organizing farmers around value-chains and collective action. For example, farmers growing the same crops are encouraged to explore new markets and sell produce collectively. Fish farmers learn to negotiate with private companies and buy fish feed in bulk. A group of



“Cross-border sharing of experiences in how to transfer knowledge on agricultural technologies and marketing to small-scale farmers through private rural services might give better opportunities to smallholder groups to improve their farm production and market spaces in business development in South Asia.”

Annet Witteveen
Head, Food Security and Livelihoods Unit
Concern Universal, Bangladesh

fruit farmers also explore and make deals with traders to sell their produce.

The resulting pool of male and female service providers at the community level provides accessible, affordable and quality services on agricultural technology, marketing and business development to small farmers. The sustainability of the LSP system relies to a large extent on the interaction between public and private sectors on technology, its practical implementation at the farmer level and working together to find local sustainable solutions. Through adoption of new skills, practices and technologies, small farmers are able to improve production, get better prices for their produce and invest in farm business activities that ultimately improve their livelihoods.

The increase in demand for services and the willingness of farmers to pay for services are major success factors. At the farmer level, access to local services has triggered private initiatives, showing an increase in small- and medium-scale agricultural enterprises. Many LSPs have developed their services and expanded their client base. Linkages between public institutions and LSPs are slowly becoming

more functional with government agencies proactively supporting LSPs as a result of their gap-filling roles in extension services.

Supporting farmer-led research in the Himalayas

Presented by: Ms. Sonali Bisht, Adviser, Institute of Himalayan Environmental Research and Education, India

Geography and a difficult environment limit the agricultural livelihood choices of poor rural people living in isolated and difficult to access settlements of the Himalayan region. Rain-fed cropping on terraced farms is the main agricultural activity. An average holding of less than one acre of land characterized by low productivity makes income generation difficult. Natural disasters, especially flash floods from cloud-bursts, as well as droughts, are also major challenges.

The Institute of Himalayan Environmental Research and Education (INHERE) – an NGO based in India – works with research institutions on validation and extension of successful practices through farmer mobilization and motivation. Farmers are encouraged to take part in comparative experiments and to adopt and adapt suitable technologies. INHERE is linking farmers with multi-stakeholder global networks such as Prolinnova to promote innovation and adaptation, and to share experiences. This network includes public organizations as well as private sector business and service providers. It is also linking up with the private sector to improve farmers' access to markets as well as for production and product development based on market demand and opportunity.

The INHERE Action Research Initiative-I provided support to farmers for action research. It also provided financial support to farmers to adopt innovative sustainable agriculture practices and initiated technical linkages to validate and support comparative research on crop productivity and new technologies. The Action Research Initiative-II promoted partnerships with research institutes, community mobilization and identification of community-based stakeholders,

development of socioeconomic statistics and feedback to research institutions and agriculture departments. Action Research Initiative-III is promoting own farm extension through community training in the classroom and on the field, community mobilization and organization, and linkages between farmers and research institutions and initiatives.



NGOs can play a vital role in strengthening agricultural research-extension linkages due to their proximity to and support among the farmer community, better knowledge of farmers' needs and a committed staff. Slow bureaucratic procedures and difficulty in mobilizing financial resources are major constraints to NGOs' role in strengthening research-extension links at the community level. Nevertheless, the confidence of farmers in and their support to INHERE development initiatives are encouraging more efforts and faster dissemination of technologies to farmers.

INHERE's suggestions to improve research-extension linkages include support for farmer-led research, multi-stakeholder research policy and strategy, longer term involvement of diverse stakeholders supported with sufficient resources, and more flexibility and openness in promoting innovation.

A value-chain approach to economic development in Cambodia

Presented by: Dr. Philip Charlesworth, Agricultural Program Director, iDE Cambodia

Cambodia meets two-thirds of its need for vegetables through imports while average rice yields in the country are among the lowest in Asia at around 2.8 tons per ha. Yet, with the right inputs and knowledge, yields and profits can easily be doubled. Most small farmers in Cambodia, however, lack adequate access to agricultural inputs, irrigation, agronomic know-how and market information. Furthermore, the public extension system is under-resourced and reaches few farmers while NGO extension systems have limited reach and are unsustainable after the funding stops. iDE Cambodia is addressing these gaps through a commercially viable model focused on delivering quality agricultural inputs and know-how to smallholders.

The NGO has established 'Lors Thmey' ('new growth' in the Khmer language) – a franchise company that generates value for smallholders through high-quality agricultural inputs, advice and services. The company provides centralized business, product, capacity-building and technical advisory services to the franchise network of Farm Business Advisors (FBAs) established by iDE. The network bundles high-quality agricultural inputs with an advance focus on technical advisory and customer services.

In addition, iDE is introducing new sustainable agriculture technologies to reduce risk for farmers in testing technologies at the farm level. FBAs are franchisees earning income by selling inputs and services to smallholder clients and providing advice as an embedded service at the time of sale and throughout the growing season. The product mix offered is designed to reduce risk, improve productivity, and increase income from rice and vegetable crops.

Since 2009, FBAs have sold \$500,000 worth of agricultural inputs to smallholders with an estimated 15,000 smallholders served by 150 FBAs. As a result, small farmers earned an average of \$150 additional net income in the first



year. Half of the smallholder clients are from the poorest third of the population.

The core strength of iDE is constantly seeking to improve and expand the range of services offered to clients. iDE is networking with R&D providers and private companies to ensure that fresh knowledge is extended to FBAs so that they remain competitive in the market. By using a professional, relationship-based sales approach, iDE and its partners are forging long-term client relationships, based on trust and exceptional results. Careful recruitment of commercially minded staff and FBAs, who are able to see the potential of the enterprise and devote time to developing their client base, is another success factor. Partnerships with microfinance institutions have supported FBAs since improved access to credit allows farmers access to new technologies with the ability to repay on flexible terms.

To reach the goal of becoming a self-sustaining enterprise, Lors Thmey continues to develop necessary systems, tools and processes that will enable efficient scaling up of the network to reach more farmers with high-quality information and services. For example, iDE is exploring the opportunity to outsource procurement and distribution logistics through partnership with a private supply chain specialist to improve existing systems. In addition, iDE is creating cost-effective training tools to reach a dispersed and growing network, and develop an information database.

Case studies on research-extension systems led by the private sector

To complement the perspectives presented by the NGOs, two private sector representatives from Bangladesh and Myanmar also offered their insights and case studies on the issue of linking research and extension.

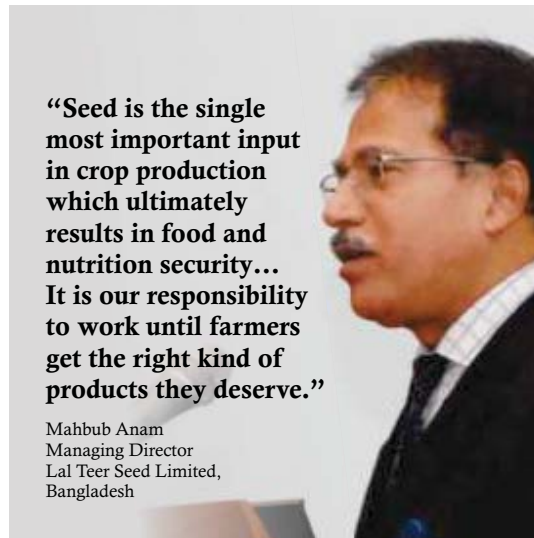
Seed – the most important input in crop production for food security

Presented by: Mr. Mahbub Anam, Managing Director, Lal Teer Seed Limited, Bangladesh

Lal Teer Seed Limited was established in 1995. Since then the company has conducted extensive research to develop hybrid seeds through acclimatization and assessing suitability for local soil types. Germplasm was collected from Bangladesh and abroad to obtain the most desired variety. The company has developed more than 56 hybrid vegetable varieties. As a result, vegetables can be cultivated all year round, helping mitigate nutritional deficiency in Bangladesh.

By approaching farmers at their doorsteps, the company's extension programme has brought improved seeds to 30 agroecological zones in the country. In the past 16 years, the company has trained farmers, retailers, seed dealers and agriculture supervisors through adaptation trials, result and method demonstrations, farmers' field days and community meetings. Thousands of farmers have been engaged in cultivation, from the sowing to post-harvest stages. To ensure quality products, the company also offers after-sales service to farmers and makes sure their feedback reaches the company's R&D department.

According to Lal Teer Seed Limited, the seed business requires a focus on quality standards, especially in the context of a changing climate. There is evidence that a variety which performed well in all regions five years ago, is now showing poor performance in one-third of the area where



it has been applied, due to climate change. The company also emphasizes the importance of corporate social responsibility for both farmers and the private sector. Its own social responsibility product called Mini Packet targets homestead farmers.

Some major challenges in research-extension linkages that the company faces include the high cost of continuous research and extension, adulteration of its seed packets, inadequate research skills, lack of intellectual property rights protection in Bangladesh, theft of parent seed material, absence of an internationally-certified seed testing laboratory in the country and lack of crop insurance.

The company's extension programme has been extended to other countries to benefit more farmers with trial programmes in China, Malaysia, Nepal, Sri Lanka, Pakistan and the Middle East showing positive results.



Extension – a precondition for developing market in Myanmar

Presented by: Mr. Stuart Morris, Extension Manager, East-West Seed, Myanmar

With every market having its preference, East-West Seed (EWS) – a private company working with small vegetable producers in developing countries such as Myanmar – focuses on research to develop varieties which meet the demands of consumers and the agronomic needs of farmers. Such market-driven solutions are resulting in higher yields of better quality vegetables and higher incomes.

In Myanmar, where the majority of vegetable producers are smallholders with little or no access to information and the lack of local R&D capacity means that all seeds must be imported, knowledge transfer has been identified as a precondition for opening and sustaining markets. However, dissemination of 'public goods' information has a high cost in Myanmar since knowledge transfer depends largely on trust. It is also sometimes challenging and time-consuming to change farmers' perception about farming practices and technologies.

EWS considers extension as an essential part of business, which has been integrated into its business strategy. The company also realizes that Myanmar's changing markets require local breeding programmes. As such, the company is aligning smallholders to market demands by helping them identify varieties suited to agronomic and market needs, enhancing their production know-how to increase competitiveness, conducting research across different agroclimatic zones, and building close rapport with farmers and markets.

EWS has adopted a peer learning approach in its extension service. The most significant extension activity is to showcase profitable cases to local farmers through demonstration farms because the major source of knowledge for farmers in Myanmar are neighbours, rather than formal extension programmes. Field days are also organized to disseminate technical, financial and marketing information. Sharing information with vegetable collectors and agroinput retailers and their inclusion in field days, leverages business incentives to advocate varieties and techniques best adapted to meet the needs of their markets.

To bridge the gap between education and market realities, EWS supports technology demonstrations and practical experience for students in Yezin Agricultural University. Through testing practices, which key farmers are initially hesitant to accept, and then transferring these to farmers, the demonstrations function as an outreach programme. EWS learned that facilitating improved dialogue between value-chain actors improves trust, lowers transaction costs and ensures fairer sharing of the value added with farmers.

EWS provides farmers with regular advice on all aspects of crop production from land preparation and seeding production to transplanting, correct fertilizer use, safe pest management and post-harvest handling. Simple and replicable technologies are the result of internal research and years of experience with smallholders in the region. Building up on existing practices and introducing technology step by step, allows a steady transition towards improved practices; first on farmers' own and later on neighbouring farms.

EWS emphasizes the need for the private sector to use market-aligned skills and technology to keep market-driven incentives for the service provider and the client. It is important for the private sector to understand that farmers are also entrepreneurs who would not utilize extension activities if these did not bring them income.

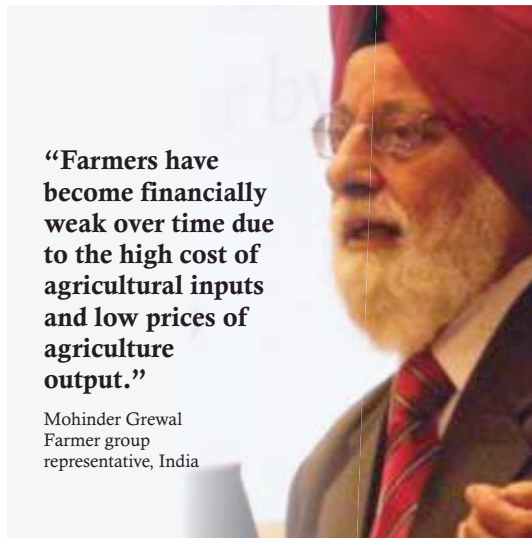
Farmers' perspective on research-extension linkages

Presented by: Mr. Mohinder Grewal, Farmer group representative, India

In addition to cases presented by NGOs and the private sector, a presentation titled 'Sustainable Profitability in Diversified Farming with Self-research Findings' was made by Mr. Mohinder Grewal, a progressive farmer from the state of Punjab in India, which captured perspectives of the farming community on the subject of research-extension linkages.

A number of successful examples of farmers' self-driven research were presented, including inter-cropping of carrot with potato and improved practices/technologies for onion and garlic cultivation and harvesting. The potential of shifting from high-yielding to high-value crops to maintain soil health and productivity was also highlighted. However, it was pointed out that while progressive farmers play a vital role in agricultural research, their research findings are not well recognized by agricultural universities in most Asian countries and are not taken into account during dissemination of technologies.

As a specific case of research-extension linkage, various efforts of the Punjab Agricultural



University were highlighted such as farmers' fairs, books on packages of practices, coordination of activities by the University and the Department of Agriculture, and recognition/honour for progressive farmers. These also included leveraging ICT to promote extension through radio and television programmes for farmers, demonstration of audio and video tapes through 'Mobile Diagnostic and Exhibition Vans', mobile advisory services and ICT kiosks.

Working groups

Four working groups were set up to deliberate on the following topics:

1. Better connect research to demand
2. Strengthen extension and advisory services including regulation and monitoring
3. Improve private sector and civil society engagement in extension and advisory services at the national level
4. Improve regional cooperation and networking for strengthening extension roles

Each working group discussed a set of questions with reference to its assigned topic. Groups 1, 2 and 3 discussed priorities for action; main

challenges; ways to overcome them; actions to address needs of smallholders, women and youth; and actions to promote agricultural diversification. Group 4 discussed a slightly different set of questions, namely, priorities for action, main challenges; ways to overcome them; and roles for FAO and CAPSA.

A matrix of action items was developed, based on information and ideas presented by each group (contained in **Annex 3**). This matrix contributed to the development of an 'Action Framework for strengthening research-extension integration' presented in the next section.



Action Framework for strengthening research-extension integration

A key expected output of the Expert Consultation was the development of an Action Framework for strengthening research-extension integration in the region for promoting sustainable food systems and increasing the productivity of farmers. The deliberations during the regional and country presentations, panel discussions, NGO and private sector case presentations, and the four working groups, outlined a range of areas for further action presented below as a structured framework. The Action Framework is intended to serve as a key resource to guide different stakeholders including governments, civil society, private sector and development agencies in Asia and the Pacific towards achieving the goal of strengthening research-extension linkages.

Establishing a regional network for extension services

There is a need for an Asia-Pacific regional network for extension services (also addressing ICT use) which can promote active commitment to regional interactions between countries to facilitate sharing of knowledge and resources, and undertake advocacy with national organizations to support extension. FAO-RAP will support incubation of such a regional network following the APAARI model. The network would include government, international/regional organizations, NGOs/CSOs and private sector actors involved in rural advisory services, regulatory actions, ICT applications and other extension services. CAPSA's SATNET Asia project can provide useful links with existing networks and capacity-building activities.

Adapting to a new research-extension environment

New and emerging challenges such as climate change and land degradation are leading to a paradigm shift from input-intensive to knowledge-intensive agriculture. In this context, there is a need to reorient the institutional capacity of

extension systems to better align with the change in research focus towards climate-smart agriculture and sustainable practices. It is also necessary for extension systems to move beyond a narrow commodity focus on advisory services and adopt a broader focus on diversified farming systems, sustainable value-chains and industries. This, in turn, requires innovative thinking and out-of-the-box solutions.

Creating space for research-extension interface

Research-extension linkages need to be institutionalized more effectively through coordinated agriculture sector programmes. In order to achieve this, extension and outreach can be built into research projects so that there is a research-to-adoption continuum instead of research and extension working as separate entities. The concept of R&D&C in agricultural development can be introduced to take science to commercialization. The increased involvement of researchers in farmers' fields must also be encouraged to provide opportunities for them to be extension agents, better assess farmers' needs and socioeconomic constraints, and to undertake adaptive research.

Furthermore, farmers need to be regarded as clients undertaking science rather than as beneficiaries. Their engagement can be promoted through mechanisms such as participatory on-farm research and farmer-led extension. Institutional support for farmer-led research and farmer-driven innovations should be made available.

Building of national and regional consortia of research-extension organizations, as well as establishment of a dedicated 'Extension Research Institute' is suggested to facilitate closer linkages between research and extension.

Enhancing quality of extension services

Extension systems must deliver up-to-date, accurate and location-specific information and services to farmers, but are often not up to the required standards in many countries and areas. In this context, development of legal frameworks defining roles and responsibilities of all extension stakeholders should be assessed. In addition, professionalizing capacity-building of extension agents through regular skill development programmes including improved university education and refresher courses, must be prioritized. The training should ensure that the knowledge of extension agents keeps ahead of that of their clientele, and must address the shift in emphasis in their role from technology transfer to facilitating knowledge-sharing as 'knowledge brokers'. The potential for the introduction of a certification programme for trained extension workers (both public and private sector) for quality assurance can be explored. Moreover, to enhance the quality of services in areas with an excessively high ratio of farmers' households per extension worker, more extension workers can be hired if permitted by availability of financial resources.

The use of ICT in delivery of extension services must be promoted to expedite outcomes in a cost-effective manner. A regional ICT research centre for development and training on ICT applications for agriculture can be considered as a part of the regional extension networking efforts. The establishment and/or empowerment of local service providers, including farmers' and fishermen's associations, should also be facilitated, especially in areas where they can provide extension services more efficiently.

Mobilizing resources and establishing stakeholder partnerships

Increased investment in strengthening research-extension systems is necessary to meet new and difficult challenges facing the agriculture sector. Innovative mechanisms to leverage additional resources like creation of a competitive investment fund for agricultural extension and innovation to support entrepreneurial ideas should thus be explored to address the frequent budgetary constraints faced by these systems.

The engagement of other stakeholders such as the private sector and civil society organizations in delivery of integrated research-extension services, of which successful examples are already available in many countries, needs to be further strengthened and institutionalized. The possibility of organizing 'National Consultations' to allow private sector and civil society organizations to undertake advocacy, pitch new ideas to governments, share knowledge and enable review of market distortions and subsidies, should be evaluated.

Fostering enabling policy initiatives

The public sector has a central role in providing integrated research-extension services in most countries of the region while also enabling access to knowledge and undertaking overall regulation and monitoring. At the same time, government policy initiatives can be leveraged to promote a market-alignment and technology-provider role for the private sector, a community mobilization role for NGOs, and a cost-sharing and change-facilitator role for development agencies.

Policy interventions can also be used to support innovation by small and medium enterprises (SMEs) in the agricultural sector, investment in research and extension systems, increased use of ICT, and sharing of experiences on implementation of national agricultural extension policies and impacts via an official platform.

Documenting evidence

It is important to initiate studies to enable better understanding of the impact of research-extension linkages on agricultural growth. Documenting this impact and spreading greater awareness about impact pathways and potential returns from agricultural innovation can facilitate advocacy initiatives and attract investors. A meta-study at the regional level to provide a firm empirical basis for further promoting integration of research and extension is required.

The matrix in **Annex 3** represents an integral part of this Action Framework.

Annex 1. Agenda

Day 1: Wednesday, 11 December 2013

- 08:00 – 09:00 hrs Registration
- 09:00 – 09:45 hrs **Inaugural session**
- Mr. Shun-ichi Murata, Deputy Executive Secretary, Economic and Social Commission for Asia and the Pacific (ESCAP)
 - Mr. Hiroyuki Konuma, Assistant Director-General, FAO Regional Office for Asia and the Pacific (FAO-RAP)
 - Dr. Raj Paroda, Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI)
- 09:45 – 10:00 hrs Coffee break / Photo session
- 10:00 – 10:30 hrs **Meeting overview and theme presentation**
- Meeting overview, Dr. Katinka Weinberger, Director, Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA)
 - Overview of the research-extension system in the region, Dr. Kevin Gallagher, Agriculture Research, Extension and Education Officer, FAO-RAP
- 10:30 – 11:30 hrs **Panel discussion**
Moderator: Dr. Raj Paroda, APAARI
- Role of research-extension systems in promoting food and nutrition security**
- Dr. Iftikhar Ahmad, Chairman, Pakistan Agricultural Research Council, Pakistan
 - Dr. Ir. Agung Hendriadi, Director, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD), Indonesian Agency for Agricultural Research and Development (IAARD), Indonesia
 - Dr. Annie Wesley, Senior Program Specialist, International Development Research Centre
 - Dr. Abdus Salam, Advisor, Agriculture & Food Security Program, BRAC, Bangladesh
 - Mr. Sopheap Pan, Executive Director, Farmer and Nature Net, Cambodia
- 11:30 – 12:30 hrs **Country presentations – South Asia**
Chair: Dr. Javid Ahmad, Director General, Policy and Planning, Ministry of Agriculture, Irrigation and Livestock, Afghanistan
- Current country-level status of research-extension linkages, gaps, key initiatives to address the gaps and future plans**
- Dr. Wais Kabir, Executive Chairman, Bangladesh Agricultural Research Council (BARC), Bangladesh
 - Dr. Kiran Kokate, Deputy Director General (Agricultural Extension), Indian Council of Agricultural Research (ICAR) and Dr. Ramesh Chand, Director, National Centre for Agricultural Economics and Policy Research (NCAP), ICAR, India
 - Mr. Wijesekara Rukunayaka, Director, Extension and Training Centre, Department of Agriculture, Sri Lanka
- Discussion**
- 12:30 – 13:30 hrs Lunch

- 13:30 – 14:30 hrs **Country presentations – South-East Asia**
Chair: Mr. Anthony Obligado, Division Chief, Bureau of Agricultural Research, Philippines
- Current country-level status of research-extension linkages, gaps, key initiatives to address the gaps and future plans**
- Dr. Ir. Agung Hendriadi, ICATAD, Indonesia
 - Dr. Tapsir bin Serin, Deputy Director/ Principal Research Officer, Malaysian Agricultural Research and Development Institute, Malaysia
 - Ms. Orasa Dissataporn, Senior Expert on Vegetable, Flowers and Herbal Crops Promotion and Management, Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, Thailand
- Discussion**
- 14:30 – 15:30 hrs **Country presentations – Other subregions**
Chair: Dr. Wais Kabir, BARC, Bangladesh
- Current country-level status of research-extension linkages, gaps, key initiatives to address the gaps and future plans**
- Dr. Raghunath Ghodake, Director General, National Agricultural Research Institute, Papua New Guinea
 - Mr. Mariano Malik Xavier, Chief, Department of Community Development, National Directorate of Agriculture Extension and Community Development, Ministry of Agriculture and Fisheries, Timor-Leste
- Discussion**
- 15:30 – 15:45 hrs Coffee break
- 15:45 – 16:45 hrs **Panel discussion**
Moderator: Mr. Gerard Sylvester, Knowledge and Information Management Officer, FAO-RAP
- Evolving role of extension systems, including information and communications technologies (ICTs), as knowledge brokers between researchers and farmers**
- Dr. Kiran Kokate, ICAR, India
 - Dr. Ranny Chaidirsyah, Head, Farming Institution Empowerment, National Centre for Agriculture Extension, Agency for Agricultural Extension and Human Resource Development (AAEHRD), Ministry of Agriculture, Indonesia
 - Dr. Fabrizio Bresciani, Senior Agriculture Economist, The World Bank Group, Indonesia Country Office
 - Mr. Tim Bennett, Managing Director, Managed Growth Group, Australia
 - Mr. Mohinder Grewal, Farmer Group representative, India
- 16:45 – 17:00 hrs **Wrap up of Day 1**
Dr. Katinka Weinberger, CAPSA
- 17:15 – 18.30 hrs **Evening reception**
- Day 2: Thursday, 12 December 2013**
- 09:00 – 09:15 hrs **Overview of Day 1 and objectives for Day 2**
Dr. Katinka Weinberger, CAPSA
- 09:15 – 10:45 hrs **Role of non-government actors**
Chair: Dr. Ramesh Chand, NCAP, India

Research-extension systems led by non-governmental organizations (NGOs)

- Ms. Sonali Bisht, Adviser, Institute of Himalayan Environmental Research and Education, India
- Ms. Annet Witteveen, Head, Food Security and Livelihoods Unit, Concern Universal Bangladesh
- Dr. Philip Charlesworth, Agricultural Program Director, iDE Cambodia

Research-extension systems led by private enterprises

- Mr. Stuart Morris, Extension Manager, East-West Seed International, Myanmar
- Mr. Mahbub Anam, Managing Director, Lal Teer Seed Ltd, Bangladesh

Discussion on the role of non-government actors in research and extension

10:45 – 11:00 hrs Coffee break

11:00 – 12:30 hrs **Working groups**

Development of an Action Framework for strengthening research-extension linkages

- Discussions on how to:
 1. WG 1: Better connect research to demand
 2. WG 2: Strengthen extension and advisory services including regulation and monitoring
 3. WG 3: Improve private sector and civil society engagement in extension and advisory services at the national level, and
 4. WG 4: Improve regional cooperation and networking for strengthening extension roles

12:30 – 13:30 hrs Lunch

13:30 – 15:00 hrs **Presentations by working groups and discussion**
Chair: Dr. Robert Holmer, Regional Director, AVRDC – The World Vegetable Center, East and Southeast Asia
Co-chair: Dr. Rohan Wijekoon, Director General of Agriculture, Department of Agriculture, Sri Lanka

15:00 – 15:15 hrs Coffee break

15:15 – 15:45 hrs **Summary and recommendations**

- Dr. Katinka Weinberger, CAPSA
- Dr. Kevin Gallagher, FAO-RAP

15:45 – 16:00 hrs Meeting evaluation

16:00 hrs **Closing remarks**

- Dr. Katinka Weinberger, CAPSA
- Dr. Raj Paroda, APAARI
- Mr. Hiroyuki Konuma, FAO-RAP

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Annex 3. Outcome of working group discussions (matrix)

Goal →	BETTER CONNECTING RESEARCH TO DEMAND	STRENGTHENING EXTENSION AND ADVISORY SERVICES	IMPROVE PRIVATE SECTOR AND CIVIL SOCIETY ENGAGEMENT IN EXTENSION AND ADVISORY SERVICES	IMPROVE REGIONAL COOPERATION AND NETWORKING FOR STRENGTHENING EXTENSION ROLES
<p>Priorities for action</p>	<ul style="list-style-type: none"> ▪ Introduce concept of R&D&C in agricultural development to take science to commercialization. ▪ Promote investment in AR4D for application of existing research and support for new research. ▪ Create mechanism to establish connect between immediate needs and future opportunities. 	<ul style="list-style-type: none"> ▪ Develop a legal framework that defines roles and responsibilities among all extension stakeholders (such as a public coordinating/ regulatory body comprising various stakeholders). ▪ Ensure the process of decision-making includes academic analysis, consultations, legislation and decrees as necessary. ▪ Develop certification schemes of trained extension workers (both public and private sector) for quality assurance. 	<ul style="list-style-type: none"> ▪ Create a long-term vision for enhanced private sector and civil society engagement in extension and advisory services. ▪ Advocate positive economic and social benefits arising from enhanced opportunities for smallholders (e.g. attracting investment, evolving new pathways to market). ▪ Create space for exchange and interaction among diverse stakeholders, for instance by organizing 'National Consultations' to pitch new ideas to governments, share knowledge and enable review of market distortions and subsidies. 	<ul style="list-style-type: none"> ▪ Establish an Asia-Pacific regional network for extension (also addressing ICT use) with private sector, civil society, NGO and government membership and linked to allied professionals in primary health care, education and adult education. ▪ Enable policy exchange between countries through regional extension network. ▪ Undertake advocacy with national organizations through new regional extension network to support extension.

<p>Goal →</p>	<p>BETTER CONNECTING RESEARCH TO DEMAND</p>	<p>STRENGTHENING EXTENSION AND ADVISORY SERVICES</p>	<p>IMPROVE PRIVATE SECTOR AND CIVIL SOCIETY ENGAGEMENT IN EXTENSION AND ADVISORY SERVICES</p>	<p>IMPROVE REGIONAL COOPERATION AND NETWORKING FOR STRENGTHENING EXTENSION ROLES</p>
<p>Main challenges</p>	<ul style="list-style-type: none"> ▪ Lack of mechanism for coordination and articulation of demand. 	<ul style="list-style-type: none"> ▪ Budgetary constraints. 	<ul style="list-style-type: none"> ▪ Current mindset considers diversity as threat to the system. 	<ul style="list-style-type: none"> ▪ Generating interest from governments, CSOs, NGOs, and private sector. ▪ Ensuring financial sustainability of the regional extension network.
<p>Ways to overcome the challenges</p>	<ul style="list-style-type: none"> ▪ Create appropriate mechanisms for articulation and coordination of demand. ▪ Prioritize competing demands based on fair/balanced assessment. ▪ Enable coordination among stakeholders in agriculture including research, extension, NGOs, farmers, and private sector. 	<ul style="list-style-type: none"> ▪ Mobilize resources for capacity-building through taxes on exports or budget reallocation, public-private partnerships, and more cost-effective training such as e-learning. ▪ Monitor and measure the benefits of extension work. ▪ Encourage use of ICT for content support and structure needs, as well as local language access. 	<ul style="list-style-type: none"> ▪ Bring about change in mindset of different actors so that they see each other as potential partners. ▪ Keep a balance between commercial and public interests. ▪ Stimulate multisectoral cooperation and encourage corporate activity within and among nations. 	<ul style="list-style-type: none"> ▪ Enable professional development of extension through training services and sharing of best practices (including linkages to other sectors). ▪ Promote research on extension and sharing of findings. ▪ Assess various models of extension services (including government, CSO and private sector-led models).

Goal →	BETTER CONNECTING RESEARCH TO DEMAND	STRENGTHENING EXTENSION AND ADVISORY SERVICES	IMPROVE PRIVATE SECTOR AND CIVIL SOCIETY ENGAGEMENT IN EXTENSION AND ADVISORY SERVICES	IMPROVE REGIONAL COOPERATION AND NETWORKING FOR STRENGTHENING EXTENSION ROLES
<p>Actions to address needs of smallholder farmers, women and youth in the process</p>	<ul style="list-style-type: none"> Enable greater involvement of these stakeholders in all stages from programme planning to delivery. Promote investment to find solutions to problems which make agriculture unattractive (e.g. to reduce drudgery, increase incomes, mechanization). Hold consultations with these stakeholders. Provide incentives and encouragement to youth to innovate. 	<ul style="list-style-type: none"> Initiate schemes for farmers, women and youth to develop or engage in voluntary, sustainable businesses that strengthen research-extension linkages (e.g. services of cocoa doctors in Sulawesi, Indonesia which evolved into a self-sustaining paid service). 	<ul style="list-style-type: none"> Create competitive investment fund for extension and innovation. Encourage private investment in innovative entrepreneurial ideas for extension (e.g. through use of ICT and other new technologies). Facilitate recognition that working with women and youth is an economic opportunity rather than a challenge. Enhance education quality, particularly higher education, in agriculture. Open this topic for public debate. 	<ul style="list-style-type: none"> FAO support for incubation of new regional extension network. Collaboration with CAPSA/ESCAP's SATNET Asia project can facilitate networking (building upon existing network) and training activities. FAO and CAPSA/ESCAP to explore opportunities to address language and accessibility issues (e.g. research outputs are often in English whereas extension requires local language resources). Promote active commitment to interaction between nations in the region to facilitate sharing of knowledge and resources (e.g. introducing certification for the ASEAN subregion as a whole to attract commercial operators to smaller countries).
<p>Actions to promote diversification of the agricultural sector</p>	<ul style="list-style-type: none"> Adopt a farming systems approach to AR4D for improved opportunities, risk resilience, and value-chain options. Assess diversification at level of producer vs sector as a whole. Seek diversification of research by CGIAR to support agricultural diversification. Develop programmes to use home gardens optimally to cultivate vegetables and fruits for nutrition security. 	<ul style="list-style-type: none"> Educate farmers and extension workers on advantages of diversification (profitability, resilience to shocks). Strike balance between public and private interventions to protect genetic diversity. Highlight nutritional benefits of diversification in extension agents' training programmes as a starting point for promoting diversification. Support extensive training of extension workers including through internships and encouragement to farmer-to-farmer learning. 	<p>Role for FAO and CAPSA</p> <ul style="list-style-type: none"> Promote value addition and better integration across the value-chain in agriculture through extension, and let people see the opportunity. 	

Annex 4. Evaluation

Out of 54 participants, 32 completed the evaluation questionnaire, which consisted of two parts – General Feedback and a Knowledge, Attitude, Practice (KAP) Survey. The completed questionnaires provide a good baseline for improving similar events in future. The KAP survey will provide a basis for evaluating how much knowledge acquired in the meeting is actually planned to be put to practice and will be compared with results from a second, follow-up KAP survey to be conducted 6 to 12 months following this meeting. The current KAP survey results are, therefore, not included in this report.

Usefulness and quality of the meeting

Participants were invited to rank the usefulness and quality of the meeting in terms of its content, processes and logistics, from 'excellent' to 'poor'. Table 1 below shows results with four evaluation criteria (excellent, good, average and poor). In terms of content, participants evaluated each key session. The two sessions that half of the participants evaluated as 'excellent' include:

(i) regional-level overview of the research-extension system; and (ii) developing an Action Framework for Strengthening Research-Extension Linkages. More than half of the participants rated the other four key sessions as 'good' – Panel Discussion No. 1 (66 per cent), country presentations (61 per cent), presentations from NGOs and the private sector (55 per cent) and Panel Discussion No. 2 (53 per cent). Nobody rated any session as poor. The average score for all content was calculated as 3.3 (4 – the highest)¹.

Process and logistics

Most participants rated processes such as agenda and flow, knowledge-sharing, facilitation and feedback as 'good'. Logistics received the highest rating with pre-meeting communication, and food and administrative assistance during the event, rated as excellent by more than 50 per cent participants. The overall score for processes and logistics was calculated as 3.3 and 3.6, respectively.

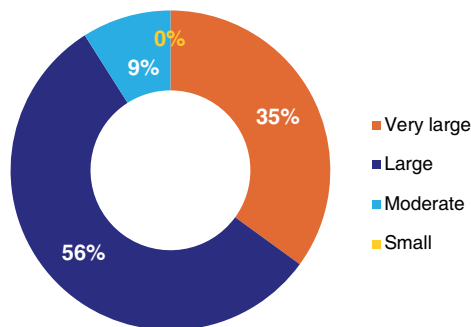
Table 1: Usefulness and quality of the meeting

Session		Excellent	Good	Average	Poor	Average score
Content	Regional level overview of research-extension systems	50%	50%		0%	3.5
	Panel discussion on: Role of research-extension systems in promoting food & nutrition security	31%	66%	3%	0%	3.3
	Presentations on: Current country-level status of the research-extension linkage, identification of gaps, key initiatives to address the gaps, future plans	29%	61%	10%	0%	3
	Panel discussion on: Evolving role of extension systems, including ICT, as 'Knowledge Brokers' between researchers and farmers	33%	53%	14%	0%	3.2
	Presentations on private or NGO-led research-extension systems	35%	55%	10%	0%	3.3
	Developing an Action Framework for strengthening research-extension linkages	50%	43%	7%	0%	3.4
Process	Agenda and flow	31%	69%		0%	3.3
	Facilitation and feedback	42%	52%	6%	0%	3.4
	Knowledge-sharing processes (e.g. discussions, working groups)	44%	47%	9%	0%	3.3
Logistics	Pre-meeting communication	55%	38%	7%	0%	3.5
	Meeting facilities	44%	56%		0%	3.4
	Food	75%	25%		0%	3.8
	Administrative assistance during the meeting	55%	45%		0%	3.6

¹ Score calculations are based on assigning values to evaluation criteria as follows: excellent – 4, good – 3, average – 2, and poor – 1.

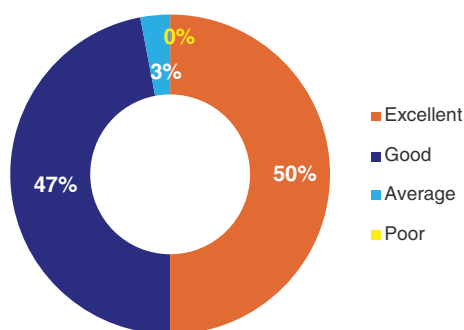
Expectations

Most participants (56 per cent) indicated that the meeting met their expectations to a large extent. For 35 per cent and 9 per cent of respondents, their expectations from the meeting were met to a very large and moderate extent, respectively.



Overall ranking of the meeting

Half of the participants ranked the meeting as 'excellent' while 47 per cent ranked it as 'good'. One person considered the meeting as 'average'. Nobody ranked it as poor.



Aspects to be improved in future

This section indicates key areas that will be taken into consideration in the organization of similar events by CAPSA and FAO in future. These areas are based on suggestions that participants expressed during the evaluation and relate to time management, content, logistics, participants and processes.

Time management

Eleven participants (34 per cent), out of the 32 who filled out the questionnaire, suggested improving time management in future

CAPSA/FAO events. Three participants felt that country presentations should be given more time to enable presenters to elaborate more on issues specific to their countries, as well as more time to develop the Action Framework. Two other participants suggested allocating more time for the question and answer/discussion portion. One specific suggestion was to increase time allocation for the meeting by 20 per cent. Two respondents also suggested reducing the number of (country) presentations, as there were too many.

Content

Ten participants (31 per cent), made suggestions related to content. Four participants felt there should be more focus on research-extension linkages and issues than on extension generally. The following individual suggestions were also made: more attention to the importance of extension – private, public and NGO led – with the potential role of the non-public sector highlighted further; extension in the context of ICT application, livestock and organic agriculture could be introduced; all countries should share best and worst practices to be replicated or avoided; the final outcome of the group presentation should include more details. One participant felt that the meeting concentrated on two aspects, namely, information (extension) and communication (ICT), while farmers need a complete package which should be emphasized in future meetings. One person also felt that the Pacific subregion received low priority in the meeting and suggested changing this in future.

Logistics

Improving logistics was another common suggestion referred to by nine participants (28 per cent). In particular, three participants felt there was little information provided prior to the meeting. They suggested advance circulation of information on the participants and papers to be presented in the meeting. Two participants suggested including details about the presenters and discussants, as well as their institutional affiliations in the meeting programme. Individual suggestions were also made to organize future meetings and participants' accommodation in the

same hotel, organize a dinner for participants to promote cooperation and networking, and to ensure better temperature control in the meeting room.

Participants

Seven respondents (22 per cent) commented on the participation, with two people feeling that there should be more farmers' representatives in this kind of meeting such as representatives of farmer federations, commercial farmers and/or others. One respondent suggested that CAPSA/FAO should bring more decision makers from various government bodies to the meeting to hear "real country report from most reliable sources." Three respondents suggested involving more private and non-governmental organizations, entrepreneurs in the agriculture sector, as well as the Global Forum for Rural Advisory Services (GFRAS). One respondent stressed the need to ensure a balance between participants from public, private and civil society organizations.

Processes

Three participants (9 per cent) suggested improvements in future meetings. In particular, suggestions were made to have more group discussions, ensure concise and focused

presentations, and facilitate more audience interaction.

Additional comments by participants

- "I like the diverse group, final discussion, and that in this meeting everyone was able to speak."
- "I liked participatory approach."
- "Generally the meeting was very good, many topics were discussed and many issues were highlighted."
- "It was a good composition of participants – research, extension, NGOs and farmers – that can share and learn from each other."
- "It was much better than expected as it provided a forum for very significant dialogue and side meetings."
- "Excellent work and very practical outcome."
- "Many good, new ideas and stimulating discussion. A worthwhile meeting."
- "A well-managed, enthusiastic, honest and sound base to address the imbalance between research and applied research."
- "Extension is an important topic that needs attention. It is good to see a good mix of public, private and civil participation."
- "Quite useful and productive meeting."
- "Really appreciate strong efforts of CAPSA."
- "All participants were in cooperation mood."

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