



# High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific

Bangkok, Thailand; 8-9 December 2015

## Proceedings



### *Organizers*

Asia-Pacific Association of Agricultural Research Institutions (APAARI)  
Australian Centre for International Agricultural Research (ACIAR)  
Department of Agriculture (DOA), Thailand  
Food and Agriculture Organization of the United Nations - Regional Office  
for Asia and the Pacific (FAO RAP)  
Global Forum on Agricultural Research (GFAR)  
International Food Policy Research Institute (IFPRI)



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## PROCEEDINGS

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**J.L. Karihaloo, Bhag Mal, Martina Spisiakova and  
Raghunath Ghodake**

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The Asia-Pacific Association of Agricultural Research Institutions (APAARI), with its headquarters in Bangkok, is a unique voluntary, membership-based, self-mandated, apolitical and multi-stakeholder regional organization in the Asia-Pacific region. It promotes and strengthens agriculture and agri-food research and innovation systems through partnerships and collaboration, capacity development and advocacy for sustainable agricultural development in the region. Since its establishment in 1990, APAARI has significantly contributed towards addressing agricultural research needs and enhancing food and nutritional security in the region. The close links, networks, partnerships and collaboration with stakeholders that APAARI has developed over the years, as well as its goodwill, authority and focus on results, make the Association an important actor in the region. The ultimate aim of APAARI is to help realising sustainable development goals in Asia and the Pacific. For more details, please visit: [www.apaari.org](http://www.apaari.org)

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The Global Forum on Agricultural Research (GFAR) is a multi stakeholder-led initiative that serves as a neutral forum for dialogue and action on strategic issues in agricultural research for development (ARD). It facilitates and promotes cost-effective partnerships and strategic alliances among ARD stakeholders in their efforts to alleviate poverty, increase food security and promote the sustainable use of natural resources. GFAR is comprised of the following groups of stakeholders: the national agricultural research systems from the south (Southern NARS), national agricultural research systems from the north (Northern NARS), the Consultative Group on International Agricultural Research Centers (CGIAR), non-CGIAR international agricultural research centres, farmers' organizations (FOs), non-governmental organizations (NGOs), the private sector, donors and development agencies. To find out more about GFAR, please visit the website: <http://www.egfar.org/egfar/>

### **International Food Policy Research Institute (IFPRI)**

The International Food Policy Research Institute (IFPRI) is one of the 15 Centers supported by CGIAR, an alliance of 64 governments, private foundations, and international and regional organizations. IFPRI's vision to have the world free of hunger and malnutrition is based on human rights to adequate food and freedom from hunger, and the recognition of the dignity inherent in all human beings. IFPRI has a mission to provide research-based policy solutions that sustainably reduce poverty and end hunger and malnutrition. It flows from the CGIAR mission: "To achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, livestock, forestry, fisheries, policy, and natural resources management." The two key premises that underlie IFPRI's mission are: i) sound and appropriate local, national, and international public policies are essential to achieving sustainable food security and nutritional improvement, and ii) research and the dissemination of its results are critical inputs into the process of raising the quality of food policy debate and formulating sound and appropriate policies. IFPRI prioritises activities that benefit the largest number of poor people in greatest need in the developing world. In carrying out its activities, IFPRI seeks to focus on vulnerable groups, as influenced by class, religion, ethnicity, agroecological location, and gender. Given the large body of national and international food policy research, IFPRI's added-value derives from its own cutting-edge research linked with academic excellence in other institutions, such as other CGIAR centres, universities, other research institutes, and from its application of this knowledge to national and international food policy problems. For details, please visit: [www.ifpri.org](http://www.ifpri.org)

# High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific

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I do hope that the recommendations of this important High Level Policy Dialogue will draw attention of policy makers, administrators, researchers, farmers and other stakeholders towards increasing investments in agricultural research for sustainable development in Asia and the Pacific region.

**Raghunath Ghodake**  
Executive Secretary, APAARI &  
Chair, Organizing Committee,  
High Level Policy Dialogue

## Acronyms and Abbreviations

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ADG	Assistant Director General
AFA	Asian Farmers' Association
AGRI	Agricultural Growth of Rural India
AGRINATURA	Alliance of European Institutions Working Together for Agricultural Research and Education for Development
AIEF	Agricultural Innovation and Enterprise Facility
AIRCA	Association of International Research and Development Centres for Agriculture
AIS	Agricultural Innovation System
ANGOC	Asian NGO Coalition for Agrarian Reform and Rural Development
ANU	Australian National University
APAARI	Asia-Pacific Association of Agricultural Research Institutions
APCoAB	Asia-Pacific Consortium on Agricultural Biotechnology
API	Indonesian Peasant Alliance
APR	Asia-Pacific Region
APIRAS	Asia-Pacific Islands Rural Advisory Services
APSA	Asia and Pacific Seed Association
AR4D	Agricultural Research for Development
AREEO	Agricultural Research, Education and Extension Organization
ARI4D	Agricultural Research and Innovation for Development
ASEAN	Association of Southeast Asian Nations
ASF	Animal-Sourced Food
ASFN	ASEAN Social Forestry Network
ASTI	Agricultural Science and Technology Indicators
ATRI	Agricultural Technology Research Institute
AVRDC	Asian Vegetable Research and Development Center
BARC	Bangladesh Agricultural Research Council
BMGF	Bill and Melinda Gates Foundation
CABI	Center for Agricultural Bioscience International
CARDI	Cambodian Agricultural Research and Development Institute
CARP	Council for Agricultural Research Policy
CBD	Convention on Biological Diversity
CCAFS	Climate Change, Agriculture and Food Security
CD	Capacity Development

CDAIS	Capacity Development for Agricultural Innovation Systems
CFF	Crops for the Future
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center
COP	Conference of the Parties
CRP	CGIAR Research Programs
CSA	Climate-Smart Agriculture
CSO	Civil Society Organization
CSO	Chief Scientific Officer
CTCF	Central Tea Cooperative Federation Limited
DARE	Department of Agricultural Research & Education
DFAT	Australian Department of Foreign Affairs and Trade
DMC	Developing Member Countries
DOA	Department of Agriculture
DOST	Department of Science and Technology
EAS	Extension and Advisory Services
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAO RAP	Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific
FO	Farmers' Organization
FSA	Farm Sustainability Assessment
GAPAD	Global Action Plan for Agricultural Diversification
GCARD3	Third Global Conference on Agriculture Research for Development
GCF	Green Climate Fund
GDP	Gross Domestic Product
GFAR	Global Forum on Agricultural Research
GFRAS	Global Forum for Rural Advisory Services
GHG	Greenhouse Gas
GIS	Geographic Information System
GMO	Genetically Modified Organism
GNHC	Gross National Happiness Commission
GODAN	Global Open Data for Agriculture and Nutrition
HLPD	High Level Policy Dialogue
IAC	Institut Agronomique Neo-Caledonien
IAUA	Indian Agricultural Universities Association
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas

ICRAF	The World Agroforestry Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
INDC	Intended Nationally Determined Contributions
InHERE	Institute of Himalayan Environmental Research and Education
IP	Intellectual Property
IPR	Intellectual Property Rights
IRR	Internal Rate of Return
ISAAA	International Service for the Acquisition of Agri-biotech Applications
IWMI	International Water Management Institute
IWMI-SEA	International Water Management Institute-Southeast-Asia Office
JIRCAS	Japan International Research Center for Agricultural Sciences
KM	Knowledge Management
LRD	Land Resources Division
M&E	Monitoring and Evaluation
MARD	Ministry of Agriculture and Rural Development
MARDI	Malaysian Agricultural Research and Development Institute
MCB	Malaysian Cocoa Board
MDG	Millennium Development Goals
MOAF	Ministry of Agriculture and Forests
MPOB	Malaysian Palm Oil Board
MRB	Malaysian Rubber Board
NAARM	National Academy of Agricultural Research Management
NACAP	Network of Aquaculture Centres in Asia Pacific
NAFRI	National Agriculture and Forestry Research Institute
NAIP	National Agricultural Innovation Project
NAMAC	National Association of Mangolian Agricultural Cooperatives
NARC	Nepal Agricultural Research Council
NARI	National Agricultural Research Institute
NARO	National Agricultural Research Organization
NARS	National Agricultural Research Systems
NASC	National Agricultural Science Complex
NBSS&LUP	National Bureau of Soil Survey and Land Use Planning
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organizations
NRM	Natural Resource Management
NTU	Nanyang Technological University

NZAID	New Zealand Aid Programme
ODA	Official Development Assistance
PAKISAMA	Pambansang Kilusan ng mga Samahang Magsasaka (National Movement and Confederation of Family Farmer Organizations)
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PDR	People's Democratic Republic
PNG	Papua New Guinea
PNGWiADF	Papua New Guinea Women in Agriculture Development Foundation
POMS	Plantwise Online Management System
R&D	Research and Development
RBI	Rice Bowl Index
RDA	Rural Development Administration
RDC	Australian Rural Research and Development Corporation
RECOFTC	The Center for People and Forests
RLN	Rainfed Livestock Network
SAARC	South Asian Association for Regional Cooperation
SAI	Sustainable Agriculture Initiative
SBSTA	Subsidiary Body for Scientific and Technological Advice
SDG	Sustainable Development Goal
SEARCA	Southeast Asia Regional Center for Graduate Study and Research in Agriculture
SHIATS	Sam Higginbottom Institute of Agriculture, Technology and Sciences
SLCARP	Sri Lanka Council for Agricultural Research Policy
SME	Small and Medium Enterprises
SMS	Short Message Services
SPC	South-Pacific Communities
SWCA	South, West & Central Asia
TAP	Tropical Agriculture Platform
TARI	Taiwan Agricultural Research Institute
TCO	Technology Commercialization Office
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
Unitech	University of Technology
UPLB	University of the Philippines Los Banos
WIN	Women, Income and Nutrition
WLE	Water, Land and Ecosystems
WWF	World Wide Fund for Nature
YPARD	Young Professionals for Agricultural Development

## Executive Summary

Several countries in Asia and the Pacific have achieved very rapid and high rates of economic and social development. As a result, national food security has almost been attained and poverty significantly reduced. However, many challenges to the region's agriculture still remain to be addressed as it is evolving economically, socially, politically, technologically and in its physical environment. These challenges include poor productivity, low affordability of and access to food, high food inflation, weak household and community food and nutritional security, persistent malnutrition and lack of assurance in food safety. Unsustainable use of natural resources and energy, environmental degradation, loss of forests and biodiversity as well as climate change, present further threats. Moreover, poor value addition to agricultural commodities and weak linkages of farmers to markets mean that farmers have to operate on smaller scales and mainly on subsistence basis. Farmers also have limited technical skills and poor access to information and capacity development opportunities to improve their production, processing and marketing practices.

Keeping the needs of renewed advocacy in view, the Asia-Pacific Association of Agricultural Research Institutions (APAARI) in collaboration with the Australian Centre for International Agricultural Research (ACIAR), Department of Agriculture (DOA), Thailand, Food and Agriculture Organization of the United Nations – Regional Office for Asia and the Pacific (FAO RAP), Global Forum on Agricultural Research (GFAR) and International Food Policy Research Institute (IFPRI), organized a High Level Policy Dialogue (HLPD) on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific on 8-9 December 2015 in Bangkok, Thailand. The event was also supported by Syngenta and Agricultural Research Technology Institute (ARTI), Chinese Taipei.

A total of 130 participants attended the Policy Dialogue representing the national and international policy bodies, national agricultural research institutions (NARIs), national agricultural research organizations (NAROs), higher education institutions (universities), civil society organizations (CSOs) including non-governmental organizations (NGOs) and farmer organizations (FOs), Young Professionals for Agricultural Development (YPARD), inter-governmental organizations, the private sector, Consultative Group on International Agricultural Research (CGIAR) Centers, Association of International Research and Development Centers for Agriculture (AIRCA), regional and international fora, and international development agencies.

The technical program was organized into six theme-based plenary and parallel sessions involving resource paper presentations and panel discussions: Session I: Status and Outlook for Investment in Agricultural Research and Innovation; Session II: Scoping Investments in Agricultural Research and Innovation - Addressing Current and Emerging Challenges; Parallel Session III: Scoping Investments in Agricultural Research and Innovation – (A) Climate Smart and Sustainable Agriculture; (B) Knowledge Management for Sustainable Agriculture; (C) Capacity Development for Sustainable Agriculture; Session IV: Plenary – Scoping Investments (Themes of Sessions II & III); Session V: Impact Expectations from Investment in Agricultural Research and Innovation; and Session VI: Innovative Funding Mechanisms. Outputs and recommendations of

each session were further discussed and finalized in the Final Plenary Session VII: Presentation of Reports from Thematic Sessions I, IV, V, & VI. .

The presentations in Session I highlighted the investments made by national and international agencies in agricultural research and development in the Asia-Pacific countries, priority areas of investments and its impact on food security and poverty alleviation. In Session II, speakers highlighted the current and emerging challenges and strategies to address agricultural research and innovations including biotechnological innovations. In Session III, the speakers dealt with scoping investments in agricultural research and innovation in three parallel sessions: i) climate-smart and sustainable agriculture, ii) knowledge management, and iii) capacity development. Dealing with investment needs in agriculture research and innovation, speakers in Session IV highlighted the reasons for inadequate investment, provided estimates of future investment needs, and guiding principles for arriving at these figures. In Session V, the expected development impacts from investment in agricultural research and innovation were presented which also highlighted that lack of information on impact investment in terms of livelihood benefits is a serious constraint to attracting investment. Speakers in Session VI gave examples of some innovative funding ways and new sources of funding to enhance and diversify investment in agricultural research and innovation.

## **Synthesis and Implications**

The outputs and outcomes from the Policy Dialogue are analysed and categorised as: i) immediate reflections drawn by David Shearer on the Dialogue, ii) assessment of what was scoped, achieved and remains to be achieved, iii) assessment of theme-wise outcomes, and iv) implications for further actions.

**Immediate reflections:** The immediate reflections from the outcomes of the Dialogue are centred around a few key issues. Investment in agricultural research needs to be enhanced to meet the challenges of feeding more than 9 billion people by 2050 and ensure the wellbeing of future generations. The nature of agricultural research must change to address sustainability more effectively. The agricultural researchers have to demonstrate effectiveness in implementing programs and activities with focus on both quantity and quality of research investment and not on seeking additional funding alone. Strengthened partnership and cooperation in agricultural research is extremely important in addressing the issue of sustainability more effectively. There is need for increased role of private sector and paradigm shift in funding and delivery mechanism for agricultural research. Collaboration with CGIAR Centres, other international organizations and regional organizations like SAARC, SAC and ASEAN needs to be strengthened.

There is need for clear, explicit and logical impact pathways that define the delivery of research outcomes through the end users with the right structural links to development actors. The region needs rapid innovation with well targeted research, effective communication and incentives for smallholder adoption. There is significantly low spending in agricultural research in most of the countries in the Asia-Pacific region which needs to be addressed. It is important to note that increasing total spending and research intensity, with targets being set to mobilize resources, should not be the end goals. Instead, the end goal should be the institutional capacity to maximize benefit of agricultural research. While the studies by the World Bank in Vietnam show that enhancing productivity might not be the right approach and the focus may need to change to farming system sustainability, there is clear evidence

that agricultural research has a positive impact on agricultural productivity, which has an effect on reducing poverty.

The livestock and fish play critical role in food security and livelihood improvement but suffer with under-investment in research. The very strong market demand in livestock and fisheries is having a substantial impact on the dynamics of the sector, whereas there is not the same market dynamics in the vegetable sector. Obviously in these two different situations, different policy settings are needed to support change. To achieve positive impact, there is a need for effective communications and the capacity to effectively communicate. A key aspect of effective communication, particularly at the smallholder farmer level, is the trust. To build these trusted relationships, participation of smallholder farmers is not enough as there is a need to create an environment of engagement, where the communication approach leads to the engagement in the right relationship.

**Assessment of the planned outputs and outcomes:** This includes: i) expected outputs that have been realised - current and future national, sub-regional and regional trends and capacities in investment assessed and validated; participants became more aware about current investments, their trends and future needs; quality information and databases made available through presentations; synthesis paper of country status reports on investments presented; dialogue proceedings brought out recommendations, action plan and way forward and the advocacy toolkit on improved and increased investment recommended; ii) expected outputs that remain inadequately addressed and efforts in these areas need to be effectively pursued - consensus on appropriate joint arrangements for public-private-community co-investments in research and innovation; perceptions of donors and policy makers; iii) the key issues discussed were in relation to the changing context of investment in agricultural research and innovation, and these brought out adequate materials to build on and pursue expected outcomes. In particular, these key issues referred to changes in needs for agricultural research and innovation for development (ARI4D), change in areas for investment, change in considering investment in ARI4D, and constraints in planning and evaluation of investments, and iv) salient points and recommendations were brought out for future focus and directions for investment in ARI4D for APAARI members, partners and stakeholders, so as to support the Sustainable Development Agenda (SDA).

**Assessment of theme-wise outcomes:** The assessment of theme-wise outcomes provides synthesis under key themes. Agricultural research is facing several challenges including the need for greater investment. In the future, producing more food will largely depend on increasing crop yields and cropping intensity on existing farmlands rather than by increasing the land area under agricultural production. Hence, much more efforts, investments, innovative technologies and improved practices along the value chains are needed to sustainably address the above-mentioned challenges. Declining investments in agricultural research does not provide a positive outlook for addressing key hunger, malnutrition, and poverty concerns of the region. Hence, enhancing agricultural investments are needed to have a positive impact on agricultural productivity.

There are good opportunities for agricultural research investment in specific areas relating to micronutrients, horticulture, livestock and fisheries, information communication technology, biotechnology, and climate change. To attract youth to agriculture and provide employment opportunities for both men and women, agriculture needs to be branded as a new sector for

growth in business opportunities, utilizing new ideas, innovations and ICTs, and prospering in an enabling and supportive environment. Making agriculture research profession gender affirmative would attract women and youth in agriculture and effectively address the issues of sustainability. Capacity development in agricultural research and innovation is crucial in achieving development impact because the lack of individual and institutional capacity of research and extension makes it difficult to provide the needed support to farmers for technology adoption and adaptation at scale. Investment is now needed not only in improving individual capacities in various areas of agricultural research and science to generate technologies, but also in changing institutions and creating new capacities in agricultural communities for both absorbing and creating new knowledge and innovations.

An analysis of the status of agricultural research and investment to support sustainable development in 22 countries of Asia and the Pacific revealed that food security, productivity improvement and sustainable natural resource management (NRM) are the major policy objectives to be addressed. The common strategies adopted for implementing policies include: R&D, generation of new knowledge, innovation in technology transfer and support services, and strengthening climate risk management, as well as capacity for improved NRM. Reducing hunger and poverty in the Asia-Pacific region requires diverse partnerships. The focus needs to be on innovative partnerships so as to help countries and actors to share agricultural technologies for the benefits of both farmers and consumers, especially the poor. Partnering with regional agricultural research related organizations, such as APAARI that have an important role to play in facilitating collaboration and partnership across regions, can help countries and actors share agricultural technologies for the benefits of both farmers and consumers, especially the poor.

Knowledge management (KM) is a critical area that presents an opportunity for making agriculture more attractive for the next generations and long-term impacts. It can attract investment and help mobilize investment. Data management, trusted communication, knowledge transfer and engagement are critical for the achievement of sustainable development outcomes. In the absence of conclusive studies suggesting specific amounts of required investment in agricultural research, policy makers take investment decisions and estimate impacts based on returns on investment compared to other sectors of the economy. Lack of information on impacts of investment in agricultural research in terms of livelihood benefits is a serious constraint to attracting investment and this needs to be addressed. To enhance investments in agricultural research requires innovative funding mechanisms and improving existing ones. Besides existing traditional public sector funding sources, which remain static, new sources of funding have been emerging that are critical to sustaining funding for agricultural R&D.

**Implications:** The implications highlighted the issues that have remained outside the scope of the dialogue and will need efforts to better reflect on the issues involved in perceiving and pursuing investments in agricultural research and innovation. The latter include: changing role of agriculture and development; status and outlook for investment in agricultural research and innovation; complexities of investing in agricultural research and innovations; changing scenario for enhanced investments; scoping investments in agricultural research and innovation; future of agricultural research and innovation; capacity to attract investments; investing in new and emerging areas of science, technology and innovation; investment in public, private and community sectors; national, sub-regional and regional partnerships and collaboration; renewed

political will; specific investments; impact expectations; why, what, where and how investments are being made; and expected outputs, intermediate outcomes and outcomes based on theory of change.

## Recommendations

Based on the presentations and deliberations in the panel discussions, working groups, and plenary sessions, several important recommendations relating to enhanced and improved investment emerged. These recommendations are presented below under various categories:

**Research and innovation:** The research and innovation related recommendations include the need for greater investment for enhancing system based productivity; higher investment for crop diversification, supplementation and food fortification; greater focus on horticultural research; enhancing investments in research on livestock and fisheries; strengthening surveillance systems to detect disease emergence and control of diseases including trans-boundary diseases; use of biotechnology and nanotechnology with focus on development and promotion of widely adapted, climate resilient and nutritive crop varieties; investment in research for climate-smart agriculture (CSA) interventions based on climate risks and farming systems; greater focus on policy research on investment in the agriculture sector including adjustments in country specific policies and generating precise information on priority research areas and amount of investments required.

**Knowledge management:** Major recommendations include i) greater investment for collecting and sharing of data on successful research and innovation efforts, coordination and monitoring of R&D investments and assessing impacts; ii) use of universal databases such as farm sustainability assessment (FSA) and open data concept to increase transparency and openness in data sharing; iii) higher investment to build capacity to create and use new knowledge to facilitate mass innovations, build in-country capacity for agricultural research data collection, compilation, and synthesis, analyse multiple sources of information to create insights and make recommendations to policymakers; iv) enhanced investment for digitization of agricultural data and promoting dissemination and application of knowledge through digital means; v) use of social media to enhance learning, sharing and peer-to-peer assistance to young farmers; vi) enhanced investment in developing infrastructure and capacity building using ICT tools and models; vii) increased investments for building effective communication, trusted relationships and an environment of engagement with farmers; viii) institutionalize knowledge generated from diverse sources through innovative processes and make it accessible to stakeholders, and strengthen database on investments and human resources in extension and advisory services (EAS).

**Capacity development:** Salient recommendations include i) greater investment to strengthen the organizational and system capacity, functional capacity of extension professionals, and key individual competencies of advisory service providers; ii) improved investments for developing national extension platforms to share knowledge and skills, participate in innovation processes, transfer technologies, develop youth entrepreneurship, as well as advisory services and extension policies; iii) need for enhanced investment in agricultural research and innovation, including education, science and extension; iv) greater thrust to support agricultural innovation through increased package allocation and policy support in education-research-extension; v) need for developing impact-oriented strategy for a skill enhancement and capacity development

program and its implementation for research and innovation organizations; vi) need to develop capacities to demonstrate impact from investments in agricultural research on livelihoods, and also to strengthen capacity and simultaneously increase investments into agricultural innovation, both at national and international levels; vii) increased investments to enhance capacities in institutions, technologies and enabling communities to innovate; viii) need for higher investments and related policy support to address the age and research staff gap in agricultural research organizations and also the age and farmer gap in the farming community to reverse the flow of youth to cities; and ix) increased investment for strengthening human resources, especially in science, along with consumer education and public awareness on the safety of new products; and greater investment in infrastructure development and capacity building in climate-smart agriculture.

**Partnership and networking:** The recommendations relating to partnership and networking include the need for a paradigm shift in the funding and delivery mechanisms for agricultural research and innovation in partnership; encourage investment opportunities involving the private sector in terms of sustainable value chains; greater efforts for promoting and implementing new approaches to technical cooperation and joint investments between governments, businesses and agricultural organizations; concerted efforts to be made to address the needs of the private sector (industry, farmers' groups, civil society, etc.), which is a base for successful partnerships and increased investment for more efficient development and delivery of agricultural research and innovation; a framework of regional partnership for agricultural research and innovation involving multiple sectors to be developed; strengthen investments in strong partnerships to make new technologies available to smallholder farmers and producers; bring together all players with a shared vision through the participatory approach which can lead to accelerated learning process, more collaboration and access to new funding; strengthening innovative partnerships with CGIAR centres, international originations and regional networks; a regional platform/network of trusted partners to be established to ensure a continuum and consistency of efforts to enhance investment in research and innovation; develop and strengthen institutional innovations and partnerships for collective actions; bring new stakeholders for out-scaling and up-scaling of agricultural research and innovation and working together to continue to deliver benefits to smallholder farmers and consumers.

**Women and youth in agriculture:** The recommendations include greater efforts to address engagement of women and youth in innovation processes and agriculture to be branded as a new sector for growth in business opportunities, utilizing new ideas, innovations and ICTs; making agriculture research profession gender sensitive to attract women and youth in agriculture and effectively address the issues of sustainability; women smallholder farmers must be central to the agenda and the unique issues for women smallholder farmers and related investments need to be addressed effectively; passion and adaptation of youth to use innovative ideas and tools, such as ICTs, needs to be capitalized on. In addition, engagement of youth in agricultural research can help farmers use ICT tools, thereby improving farmers' access to information, collection and submission of data, as well as communication with each other.

**Funding:** The massive under-investment that exists must be addressed to improve the agricultural research intensity, which in turn can address key hunger and poverty concerns in the Asia-Pacific region. Countries with declining investment in agricultural research need to re-focus and re-prioritize agricultural research in order to leverage the new innovations

and adopt them to local conditions; sufficient resources to be made available in the Asia-Pacific region to build country capacity for agricultural research and innovation; agricultural researchers to demonstrate effectiveness in implementing research activities with the focus on both quantity and quality of investment in order to attract funding; investment plans should focus on the need-based priority research areas, reforms in research management and M&E; collective efforts of concerned stakeholders required for mobilizing investment; private sector can be an important vehicle for funding agricultural research and its funding contribution to agricultural research needs to be encouraged in terms of sustainable value chains; need for assessment and documentation of innovative funding mechanisms and mobilization for improved investments comprised of innovative approaches, policies and strategies; holistic approach for funding agricultural research needs to be adopted and country-specific investment plans need to be developed based on respective country analysis of policies and priorities; and intellectual property regimes are needed to attract the private investment and secure funding to support biotechnology innovations.

**Policies:** Enabling policies need to be in place for increasing strategic investment in agricultural research and innovation; create awareness and understanding of the importance of IPRs to enable researchers to commercialize their ideas and prevent others exploiting their research unfairly; adopt a holistic approach for creating an enabling policy environment for increased funding to agricultural research; establish resource groups for advocacy and assistance on enhanced funding, research and innovations systems in the region; need to have well-equipped and developed skills and capacities as part of the advocacy toolkit available in the region; reorient food policies from having a focus on staple food production towards the promotion of healthier, better-balanced diets and collection of better statistics to monitor the outcomes of such new practices; strengthen policy and monitoring frameworks to ensure safer use of pesticides and fertilizers; a policy of commons to be developed to prevent overgrazing and overfishing, as well as a water plantation regime focusing on livestock, while conserving biodiversity; supportive policies and regulatory frameworks needed to guide the development and deployment of new agri-biotechnologies, and provide a transparent regulatory approval process for new products; and policy makers need to focus on the whole system change and align policies with the sustainable development agenda.

## Way Forward

In the changing environment for agricultural research and innovation and the urgent need to contribute to the SDGs, APAARI and its partners can play a crucial role to nudge the ARI4D activities in the region in the right direction. APAARI, as a trusted broker and valued partner, needs to focus efforts on advocacy and capacity development to address the challenges of the region and build a network of trusted partners that can operate effectively together. Looking at the needs of the Asia-Pacific region during the next 15 years, APAARI has recently developed Vision 2030 and is in the process of developing its first Strategic Plan 2017-22.

Among the various thematic thrusts, two specific thrusts are more important in the context of theme of the Policy Dialogue: investment in and capacity building for agricultural research and innovation systems in the region; and self-sustaining governance and resource mobilization for APAARI. Both these thrusts are complementary and synergistic to each other.

The Policy Dialogue has begun a new process of steps, collective actions and partnerships in the 'Way Forward' towards realizing the SDGs in the region. Key areas of the way forward are as below.

**Dialogue results to GCARD 3:** The inputs to and results obtained from the Dialogue, have been fed into the regional and global event of the CGARD 3 process, being undertaken in partnership between GFAR and CGIAR in April 2016. Being the national, regional and global platform for addressing and chalking out future plans and processes, the enriching experience of the Policy Dialogue was shared for further enhancement of the Way Forward globally.

**Country reports:** Country reports from 22 countries in Asia and the Pacific and emerging synthesis report, are helpful in painting various comparable and unique scenarios, as well as in laying the foundation for baseline data, information and knowledge as part of knowledge continuum. These efforts are being consolidated through refinement of country reports and synthesis paper through independent print.

**Advocacy toolkit and resource group:** By considering various dimensions of enhanced and improved investment in AR&I, there is a need to organize a well-equipped and developed skills, methods and capacities as part of the advocacy toolkit as facilitated by a resource group in the region. Such advocacy toolkit and resource group in the region will help address the assessment of these key dimensions in helping facilitate appropriate recommendations to both the systems making investments and the systems needing investments.

**Platform for ongoing dialogue:** To ensure a continuum and consistency of efforts to enhance research investment, a platform for ongoing dialogue will need to be established and supported at the regional level. Such a special platform can look at foresight and visioning, emerging challenges and opportunities, as well as resource mobilization for supporting the platform initiative.

**Skills and capacity development:** Based on the impact-oriented strategy and plan, a skill enhancement and capacity development project/programme will need to be implemented for research and innovation organizations in help measuring up to accountability, and attracting and mobilizing investment. The areas can include: i) PM&E and outcome assessment; ii) good science, innovations, partnerships; iii) creating congenial internal and external environment; iv) improved ways of smallholder producers' participation in ARI4D; and v) public-private and community partnerships.

**Improved traction among global, regional and national agencies:** Efforts for mobilizing improved investment by research and innovation systems will need to be synergized through closer collaboration with global, regional, sub-regional and national agencies. Key areas can include knowledge sharing, databases, methods, tools, sharing of successful case studies, partnership, collaboration and assistance to research and innovation, as well as funding organizations.

**Enriching and sharing knowledge:** Another core area is to generate and share adequate data and information on successful research and innovation efforts, and results and impacts within and across the region. This can be done through the development of compendium of such efforts, which can be effectively shared amongst various stakeholders as per their needs and requirements.

**Coordination monitoring of R&D investment, capacity and impact:** The purpose of such a project with expanded coverage, training and in-country implementation, will be to reduce the knowledge and information gap on the performance, inputs, and outcomes/impacts of agricultural R&D systems in the region. Improved knowledge will assist policymakers and research managers to better manage agricultural research institutions, improve imbalances among research staff, enhance research prioritization, and improve the allocation and mobilization of funds for research. This project is proposed as a partnership initiative between, ASTI of IFPRI, ACIAR, APAARI and countries in the region.

**Documentation of innovative funding mechanisms:** Innovations in funding mechanisms and mobilization for improved investments comprised of innovative approaches, policies and strategies and can include: i) various policy initiatives; ii) the ‘why’ and ‘how’ of joint public-private and community co-investment; iii) public funding for ARI4D; iv) cost and benefit sharing, incentives, rewards and awards; v) case studies and experiences and successful examples; vi) future collaborative ARI4D efforts among CGIAR, AIRCA, CSOs, the private sector and regional NARIs/NAROs; vii) funding agency and research establishment relationships, obligations and joint IP management; and viii) policy perspectives and road map for mobilizing ARI4D.

**Scoping of investment options:** Besides the Dialogue’s limited coverage of scoping investment in some areas, a number of other areas need to be considered for developing comprehensive investment scoping options and priorities. These could be both generic and specific to various needs and scenarios.

**Demand-and partnership-based ARI4D planning:** Based on the above steps, actions, and preparations, efforts will be made in helping and assisting research and innovation programs in strategic ARI4D planning for both improved and effective investment and delivery of results and impacts. The basic consideration will be demand-driven and partnership-based efforts at the sub-national, national, sub-regional and regional levels.



# **High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific**

**Bangkok, Thailand, 8-9 December 2015**

## **Introduction**

The Asia-Pacific region is the most populated part of the world, with a large proportion of its population depending directly or indirectly on agriculture for livelihoods. Agriculture continues to remain one of its primary economic sectors. Any change, whether beneficial or harmful, in agriculture will impact significantly upon economic and social development of countries and communities in the region. In recent years, several countries in Asia and the Pacific have achieved very rapid and high rates of economic and social development. As a result, national food security has almost been attained and poverty significantly reduced. However, many challenges to the region's agriculture still remain as it evolves economically, socially, politically, technologically and in its physical environment. These challenges include poor productivity, low affordability of and access to food, high food inflation, weak household and community food and nutritional security, persistent malnutrition and lack of assurance in food safety. Unsustainable use of natural resources and energy, environmental degradation, loss of forests and biodiversity, as well as climate change, present further threats. Moreover, poor value addition to agricultural commodities and weak linkages of farmers to markets mean that farmers have to operate on smaller scales and mainly on subsistence basis. Farmers also have limited technical skills and poor access to information and capacity development opportunities to improve their production, processing and marketing practices.

To date, investments in agricultural research and innovation have been guided primarily by the need of governments in the region to attain national food security. These were to some extent also guided by the domestic and foreign agricultural development community that also lobbied for investment in agricultural research to generate, adapt and adopt new technologies in farming. Decision making on future investments in this area has now broadened to include political, economic and business considerations. These include: (i) benefits from competing demands, such as of health, education and infrastructure; (ii) importance attached to agriculture as a primary economic sector and its development through the use of technology; (iii) perception of agricultural research contributions to and impact on development and growth; (iv) perceptions of returns on investment in agriculture compared to investments in other sectors; and (v) the absorption capacity of investment by national research and development systems. This shift and competition for investment is expected to intensify further in the future. Therefore, new ways to advocate and attract investment in agricultural research and innovation are now required.

Keeping the needs of renewed advocacy in view, the Asia-Pacific Association of Agricultural Research Institutions (APAARI) in collaboration with the Australian Centre for International Agricultural Research (ACIAR), Department of Agriculture (DOA), Thailand, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific (FAO RAP), Global Forum on Agricultural Research (GFAR) and International Food Policy Research Institute (IFPRI), organized a High Level Policy Dialogue (HLPD) on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific on 8-9 December 2015 in Bangkok, Thailand. The event was also supported by Syngenta and Agricultural Technology Research Institute (ATRI), Chinese Taipei.

## **About the Policy Dialogue**

The focus of the High Level Policy Dialogue was on discussing the direction, needs and mechanisms to enhance and improve investments in terms of financial resources, infrastructure, capacity development, partnerships and policy support that are needed to contribute to the region's improved agricultural research and innovation (including extension and education) and achieving the Sustainable Development Goals (SDGs). The immediate purpose of the Dialogue was to catalyse policy/decision makers, re-sensitise agricultural research and innovation systems and create an environment for increased resource allocation and congenial policy support for agricultural and agri-food research and innovation for sustainable development in Asia and the Pacific. The expectations from the Policy Dialogue were as follows:

- Drawing the direction, needs, and quantum of the present and future investment in agricultural research and innovation to contribute to improved agriculture and agri-food systems in the Asia-Pacific region and achievement of the SDGs.
- Discussing policy and funding mechanisms for continued and adequate investments in agriculture that could be used to achieve sustainable food production and delivery systems, food and nutrition security, as well as identifying the role for national and international players.
- Identifying the role of the private sector and the mechanisms for fostering improved public-private partnerships.
- Exploring ways of enhancing regional and international cooperation to increase investment in agri-food research and innovation systems, including in technological advancements.
- Assessing how the resources required for investment in agricultural research and innovation systems can be mobilised from both public and private sectors and what kind of incentives are needed.
- Incorporating the Dialogue's conclusions and recommendations into the GCARD3 event, APAARI Strategic Plan, programmes and activities.

The technical programme was organized into six theme-based plenary and parallel sessions as follows: Session I: Status and Outlook for Investment in Agricultural Research and Innovation; Session II: Scoping Investments in Agricultural Research and Innovation - Addressing Current and Emerging Challenges; Parallel Session III: Scoping Investments in Agricultural Research

and Innovation – (A) Climate Smart and Sustainable Agriculture; (B) Knowledge Management for Sustainable Agriculture; (C) Capacity Development for Sustainable Agriculture; Session IV: Plenary: Scoping Investments (themes of Sessions II & III); Session V: Impact Expectations from Investment in Agricultural Research and Innovation; Session VI: Innovative Funding Mechanisms; and Session VII: Presentation of Reports from Thematic Session I, IV, V, VI.

Twenty-six resource papers were presented and discussed at the Policy Dialogue. Besides, interventions were made by panelists and other participants during panel discussions. Outputs and recommendations of each session were further discussed and finalised in the Plenary Session. The poster displays covered agricultural research and innovation for development (ARI4D) endeavors of various countries, CGIAR research programmes, the private sector, civil society organizations (CSOs), higher education sector and other organizations.

## About the Participants

A total of 130 participants attended the Policy Dialogue representing the following national and international policy bodies, national agricultural research institutions (NARIs), national agricultural research organizations (NAROs), higher education institutions (universities), civil society organizations (CSOs) including non-governmental organizations (NGOs) and farmers' organizations (FOs), Young Professionals for Agricultural Development (YPARD), inter-governmental organizations, private sector, CGIAR centres, Association of International Research and Development Centres for Agriculture (AIRCA), regional and international fora, and international development agencies. Table 1 below shows the representation in terms of the number and percentage of the participants.

**Table 1.** Representation of participants according to institutional type

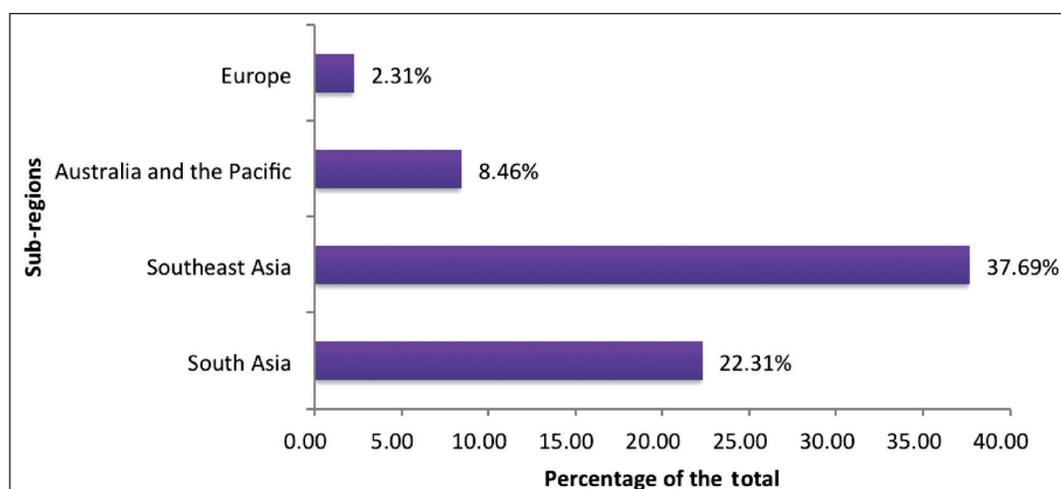
Policy bodies	NARIs	NAROs	Higher education sector	CSOs		YPARD	Inter-gov. org.	Private sector	CGIAR	AIRCA	Fora		Inter. dev. agencies
				NGOs	FOs						Reg.	Inter.	
10	6	27	9	6	13	10	1	10	14	6	10	2	6
(7.7)	(4.6)	(20.8)	(6.9)	(4.6)	(10)	(7.7)	(0.8)	(7.7)	(10.8)	(4.6)	(7.7)	(1.5)	(4.6)

Figures in parentheses are in percentage

Out of the 130 participants, 91 (70 per cent) were men and 39 (30 per cent) were women. In terms of sub-regions, Southeast Asia had the highest representation of women (23) or 18 per cent of the total.

The participants were further classified according to regions and sub-regions. Southeast Asia had the highest number of participants (49), followed by South Asia (29), Australia and the Pacific (11), and Europe (3). Figure 1 below provides the share of regions and sub-regions as a percentage of the total. Regional and international institutions representing 38 per cent and 29 per cent of total participants, respectively, were not included in this analysis.

Looking at the Asia-Pacific region alone (Table 2), 92 participants attended the event from the following countries: Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Iran, Japan, Lao People's Democratic Republic (PDR), Malaysia, Mongolia, Nepal, New Caledonia,



**Figure 1.** Regional and sub-regional representation of participants

Pakistan, Papua New Guinea, the Philippines, Republic of Korea, Singapore, Sri Lanka, Chinese Taipei, Thailand and Vietnam. The highest number of participants came from India, followed by Thailand and the Philippines.

**Table 2.** Regional and sub-regional representation of the participants from Asia and the Pacific

<b>Southeast Asia</b>	<b>No &amp; % of participants</b>	<b>South Asia</b>	<b>No &amp; % of participants</b>	<b>Australia &amp; the Pacific</b>	<b>No &amp; % of participants</b>
Cambodia	1 (0.77)	Bangladesh	5 (3.85)	Australia	5 (3.85)
China	1 (0.77)	Bhutan	2 (1.54)	Fiji	2 (1.54)
Indonesia	5 (3.85)	India	15 (11.54)	New Caledonia	1 (0.77)
Japan	4 (3.08)	Iran	1 (0.77)	Papua New Guinea	3 (2.31)
Lao PDR	3 (2.31)	Nepal	3 (2.31)	<b>Sub-total</b>	<b>11 (8.46)</b>
Malaysia	2 (1.54)	Pakistan	1 (0.77)		
Mongolia	2 (1.54)	Sri Lanka	2 (1.54)		
Philippines	8 (6.15)	<b>Sub-total</b>	<b>29 (22.31)</b>		
Republic of Korea	1 (0.77)				
Singapore	3 (2.31)				
Taipei	2 (1.54)				
Thailand	13 (10)				
Vietnam	4 (3.08)				
<b>Sub-total</b>	<b>49 (37.69)</b>				

Figures in parentheses are in percentage

Participants from regional and international institutions represented CGIAR centres (11%), regional and international fora (9%), AIRCA (5%), as well as international development agencies (5%). A detailed list of participants is provided in Annex. VI and a detailed table with participants' representation in Annex. VII.

## Setting the Stage

The Policy Dialogue started with an inauguration session that set the stage for the two-day meeting. The Chief Guest, Dr Sakchai Sriboonsue, Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives, Government of Thailand, inaugurated the Policy Dialogue in the presence of the Guest of Honor, Dr Kundhavi Kadiresan, Assistant Director General (ADG), FAO RAP; Mr Somchai Charnnarongkul, Chairman, Executive Committee, APAARI, and Director General, DOA, Thailand; Dr Surmsuk Salakpetch, Member, Organizing Committee and Deputy Director General, DOA, Thailand; Dr Raghunath Ghodake, Chairman, Organizing Committee and Executive Secretary, APAARI, and other distinguished invitees and participants.

In his opening remarks, Dr Raghunath Ghodake stressed the importance of the Policy Dialogue to participants, stakeholders, as well as the development community in the Asia-Pacific region. The event aimed to create an enabling environment and policy advocacy on investment in



"I urge the delegates to ensure that the outputs from the dialogue are able to go forward and make a substantial contribution to the SDGs in the region," Dr Raghunath Ghodake, Chairman, Organizing Committee, and Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI), Thailand

agricultural research and innovation – an area that is crucial to the development of the agricultural sector. Enhanced investment in agricultural research and innovation for development (ARI4D) is a challenge that the Dialogue tried to address to set the APAARI community on the path towards sustainable development in Asia and the Pacific. Discussions on why investment in research and innovation is vital to

agricultural development, especially to develop the capacity and enabling environment for agricultural innovation, and how, where and when such investments occur, were some of the questions that aimed to inspire critical thinking and knowledge exchange among the participants.

Mr Somchai Charnnarongkul emphasized that one of the paramount challenges the world will be facing over the next three and a half decades is how to feed more than 9 billion people by 2050. This needs to be done in a manner that advances economic development and at the same time reduces pressure on the environment.

A great balancing act is needed to close the gap between the food available now and needed in the future. There is an urgent need for the agricultural sector to become more dynamic to contribute to inclusive economic and social growth and development, while minimising its adverse impact on the environment. Increasing

"A Substantial contribution to the SDGs in the region can only be achieved if we are able to effectively work together to reduce hunger and poverty in the Asia-Pacific region," Dr Somchai Charnnarongkul, Director General, Department of Agriculture, Government of Thailand, and Chairman of APAARI



agricultural production to feed the world's growing population requires improved investment in agricultural research and innovations, both the public and private.

Agricultural research has not paid off just in terms of higher financial rates of return according to Dr Kundhavi Kadiresan, but also in terms of poverty reduction. Evidence shows that while

public expenditure on agricultural research is lower in Asia and the Pacific than in other regions, and is in fact declining, China and India lead the way by increasing their research and development (R&D) efforts. Other complexities that agricultural research needs to address include: (i) climate change that threatens agricultural production; (ii) changing demand for food as consumers shift to more protein-based diets; and (iii) high levels of undernourished people that call for crop diversification to tackle micronutrient deficiencies. New technologies, such as biotechnology, nanotechnology, as well as a range of information and communication systems, will require significant capital investment that may be beyond the reach of agricultural research institutions. Investment is also needed in changing institutions and creating new capacities for both absorbing and creating new knowledge. APAARI, as well as other regional and sub-regional bodies, such as the Association of Southeast Asian Nations (ASEAN), South Asian Association for Regional Cooperation (SAARC), and South-Pacific Communities (SPC), have an important role to play in facilitating collaboration and partnership across regions, countries and actors to share agricultural technologies for the benefits of both farmers and consumers, especially the poor.



“Investment is now needed not only in generating technologies, but also in changing institutions and creating new capacities in agricultural communities for both absorbing and creating new knowledge,” Dr Kundhavi Kadiresan, Assistant Director General, Food and Agriculture Organization of the United Nations - Regional Office for Asia and the Pacific (FAO RAP), Thailand



“A roadmap is needed to mobilize resources in delivering the Sustainable Development Goals (SDGs) within the Asia-Pacific region,” Dr Sakchai Sriboonsue, Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives, Government of Thailand

In his inaugural address, Dr Sakchai Sriboonsue advised that enhanced attention and emphasis on agricultural research and innovation is critical to achieving the SDGs. This includes attaining food security, improving nutrition, promoting sustainability, restoring agricultural systems, and combating adverse impacts of climate change. While doing so, the rapidly transforming and evolving Asia-Pacific

region that is on the crossroads of significant changes in its agriculture and agri-food systems, needs to be taken into consideration.

Dr Surmsuk Salakpetch extended vote of thanks to the Chief Guest and other dignitaries on the dais, as well as the co-organizers, sponsors, chairs, co-chairs, moderators, panelists, speakers, poster presenters and the participants.

## **Status and Outlook for Investment in Agricultural Research and Innovation**

This session co-chaired by Simon Hearn (Australia) and Pramod Joshi (IFPRI), and documented by Norah Omot (PNGWiADF) and Dave Watson (CRP Maize), comprised of four presentations aimed to take a stock of current and past scenarios of agricultural research and innovation in Asia and the Pacific. This included policies, strategies, priorities, broad scope of the ARI4D,

and opportunities and challenges. Some efforts were also made to look at: (i) current levels, capacities, disparities and trends in levels (intensity and extensiveness) of investment and returns in various countries; (ii) indicators of systems' capacities and investment disparities; (iii) comparison against norms/recommended levels and also between developed and developing countries in the region and outside; and (iv) outcome indicators and investment priorities. This information helped suggest optimal level of investments that needs to be targeted.

### **Long-Term Agricultural Research and Innovation for Development: An ACIAR Perspective in the Asia-Pacific Region – Nick Austin (ACIAR), Australia**

ACIAR plays an important role in brokering agricultural research partnerships in the Asia-Pacific region and beyond, to promote prosperity, reduce poverty and enhance stability. It brings together Australian and international experts with developing country counterparts



“Transforming agri-food system requires rapid innovation driven by targeted research and new approaches for technical cooperation,” Dr Nick Austin, Chief Executive Officer, Australian Centre for International Agricultural Research (ACIAR), Australia

to find solutions to problems faced by smallholder farmers, fishers and foresters. The diversity and creativity of the selected partners serves to generate new ideas, technologies and approaches. Innovation, along with adaptability and flexibility, are essential requirements in today's context of rapid change, and ACIAR has built these features into its ways of working. An analysis of economic returns on 103 bilateral ACIAR research projects concluded that, in present value terms, the realised

benefits attributable to ACIAR from the 'convincing' benefit streams alone (the most conservative estimate) equated to AUD 2.4 billion (USD 1.83 billion).

ACIAR's long-term engagement within the region has generated important insights about agricultural research and innovation for development (ARI4D). These include nurturing and management of relationships, flexibility and adaptability within partnerships, and engagement of project partners. At the times when developed countries are facing new and emerging demands on their aid budget, different ways of working with stakeholders are needed. A new aid paradigm is emerging, with the private sector playing a far more significant role in emerging Asia, and to a lesser extent in the Pacific. Top three challenges in 5-10 years' time will include: i) economic growth, ii) agriculture and resource management, and iii) climate change adaptability and environmental management. Hence, the region is at the threshold of a new era. Economic growth and increasing investment in science and research are opening up new opportunities. The regions agri-food systems are transforming and that transformation will require rapid innovation, driven by targeted research.

### **Agricultural R&D in Asia: Recent Investment and Capacity Trends – Gert-Jan Stads (IFPRI), United States**

Agricultural Science and Technology Indicators (ASTI) project provides trusted open-source data on agricultural research systems across the developing world. Led by IFPRI, ASTI works

with a large network of national collaborators to collect, compile, and disseminate information on financial, human, and institutional resources at both country and regional levels across government, higher education, non-profit, and (where possible) private for-profit agricultural research agencies. ASTI datasets are fairly up-to-date and of high quality covering most developing regions around the world. Funding constraints, however, have prevented ASTI from maintaining datasets with the same level of quality and detail for Southeast Asia (and the Pacific). Until recently, data were severely outdated for many countries in the region. Long-term funding from the Bill and Melinda Gates Foundation (BMGF) has enabled ASTI to establish sustainable, institutionalised systems of data compilation, synthesis, and frequent analysis in South Asia. The project conducted a study on trends in agricultural R&D capacity, investments and outputs in twelve Asian countries: Bangladesh, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam. Both China and India have recorded considerable growth in agricultural research investment since 2000, and so have their respective agricultural GDP levels. Nonetheless, this ratio has shown an enormous decline in recent years as a result of a drop in agricultural research expenditures (in real terms) coupled with a rapid increase in agricultural output. In terms of employment in agricultural research, the study found that India employs the highest share of researchers in Asia possessing Ph.D. degree and the trend is increasing in other countries too. While women form a significant share of agricultural researchers in many Asian countries, for some countries, such as Bangladesh, Nepal and Pakistan, this share remains low. The study found that in addition to other factors, unequal salaries between institutes make this profession unattractive. Such information will be available only if datasets are collected and maintained. To generate the evidence required to improve the levels of investments in agricultural research, there is a need for continued close monitoring of agricultural research expenditures, capacity and outputs in Asia in the long run. Similar systems need to be established in other parts of the Asia-Pacific region.

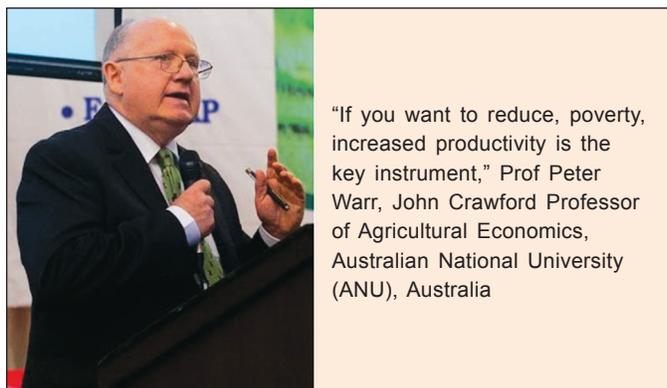
### **A Synthesis of the Status of Agricultural Research and Investment to Support Sustainable Development in Countries of Asia and the Pacific – Mohammad A. Jabbar, Consultant (APAARI), Bangladesh**

APAARI has recently conducted a study to assess future needs and directions for investments in agricultural research and innovation needed to achieve sustainable development. The study focused on individual countries in the Asia-Pacific region, as well as on the region as a whole. Status reports were received from 22 countries primarily covering aspects such as current policies and strategies on agricultural research for development; priorities for agricultural research and innovation; institutional roles, responsibilities and partnerships; infrastructure and financial investment; major challenges and opportunities ahead; and short to medium-term plans. Analysis of the reports reveals that food security, productivity improvements and sustainable natural resource management (NRM) are the major policy objectives across the countries of all income groups. The three key strategies that have been adopted for implementing these three policies include: innovation in technology transfer and support services, R&D and generation of new knowledge, and strengthening climate risk management/NRM capacity. The assessment further found that public funds are the primary source of investment in agricultural research. Research agencies face major issues related to aging staff, insufficient training and a low share of researchers with Ph.D. Alignment of research programmes with SDGs, structural changes in the agricultural sector in the region, strategic

investment in research, and collaboration with regional bodies, require urgent attention of policy makers.

### **Agricultural Research Raises Productivity and Reduces Rural Poverty: Empirical Evidence from Indonesia and Thailand – Peter Warr (Australian National University), Australia**

A study has been conducted by the Australian National University (ANU) to test the hypothesis that raising agricultural productivity is important for reducing poverty in developing countries, especially among people living in rural areas. The study examined this issue empirically, in the context of Indonesia and Thailand, where reduction of poverty incidence in both rural and



urban areas has been an extraordinary success story. Empirical evidence shows that Indonesia’s publicly-funded research contributes significantly to productivity growth. The return to this public investment is 27 per cent for Indonesia and 29 per cent for Thailand. In Indonesia, there was a 32 per cent decline in rural poverty incidence, of which one eighth of the observed decline is attributable to government-sponsored agricultural research. Out of a rural population of 121 million in 2006, 4.8

million people were non-poor because of the increased real level of agricultural research that had occurred since 1975. It is not suggested that Indonesia’s agricultural research establishment is world class, a casual inspection of the research facilities in place suggests otherwise. However, the activity of taking the output of the international agricultural research community and adapting it to local circumstances is so productive that even a modest commitment of skilled professionals and research facilities can generate a high payoff. The study also examined the effect of agricultural productivity growth on economic inequality in rural Indonesia and again finds the effects to be highly significant.

### **Session Summary**

The Official Development Assistance (ODA) halved between the mid-1980s and the mid-2000s. Following the food price crisis in 2007-2008, aid to agriculture and global agriculture systems increased. However, developed countries now face new and emerging demands on their aid budgets. The private sector is becoming an increasingly important investor in agriculture even in developing countries. Partnerships need to have a greater focus on working with the private sector to achieve sustainable economic growth and poverty reduction in developing countries. Targeted research focused on impacts and new approaches to technical cooperation are, therefore, new requirements to transforming the agri-food sector.

An analysis of economic returns on 103 bilateral ACIAR research projects implemented in developing countries concluded that, in present value terms, the realized benefits attributable to ACIAR from the ‘convincing’ benefit streams alone (the most conservative estimate) equated

to AUD 2.4 billion (USD 1.83 billion). ACIAR's long-term engagement within the region has generated important insights about ARI4D.

According to a study by IFPRI-ASTI, the levels of public agricultural research spending differ broadly across the Asian sample countries. China ranked the highest, while India and Indonesia ranked second and third, respectively. The key is to fund agricultural research in combination with investments in human resources and enabling policy environment. Funding constraints have prevented ASTI from maintaining datasets with consistent quality and detail for Southeast Asia (and the Pacific). It is crucial that sufficient resources are made available in the coming years for the Asia-Pacific region to build in-country capacity for agricultural research data collection, compilation, synthesis and analysis and to maintain this capacity over time, including that of the private sector. However, lack of data on investment by the private sector is a serious lacuna which needs to be filled for a more realistic and precise analysis of agricultural investment and its returns.

A study conducted by APAARI found that three key policies are guiding agricultural research and innovation in developing countries: food security, productivity improvement and sustainable NRM. The three key strategies that have been adopted for implementing these three policies include: innovation in technology transfer and support services, R&D and generation of new knowledge, and strengthening climate risk management/NRM capacity. The study outlined major targets for agricultural research, including, stable food supply/food security/food safety; sustainable development and NRM; and generation and use of new technologies to improve productivity. In view of the large diversity in investment patterns among Asia-Pacific countries, it would be more appropriate to develop country-specific investment recommendations based on respective country analysis of policies and priorities.

Productivity growth is vital to increasing profitability of agriculture to meet the growing food demands and ensure food security. It is achievable through currently available technologies and farming innovations. However, fulfilling the nutritional needs will require greater efforts including promotion of traditional foods including vegetables and fruits. ANU conducted analysis to determine the effect of agricultural research on agricultural productivity and the effect of agricultural productivity on poverty reduction. It provided evidence that government-sponsored domestic and CGIAR-sponsored international agricultural research investment significantly raises agricultural productivity.

## **Scoping Investments in Agricultural Research and Innovation**

### **Addressing Current and Emerging Challenges**

The session co-chaired by Ramesh Chand (Niti Ayog, Government of India) and Julian Parr (CIP), and documented by Laurent L'huillier, Institut Agronomique Neo-Caledonien (IAC), New Caledonia and Vilasini Pillai (APAARI), dealt with the scope of investment in areas now increasingly critical for research and innovation in the Asia-Pacific region. This includes the need for a systems approach to consider both research and investment in horticulture, livestock and fisheries and related new technologies. Four papers from the Centre for the Future, Australia; Nanyang Technological University, Singapore; AVRDC - The World

Vegetable Center; and the International Livestock Research Institute (ILRI), were presented. The presenters explored the differences between orthodox thinking underpinning current investment in agricultural research and alternative beliefs and practices that may hold the clues to future enduring success in agriculture. They also highlighted the status, needs and future pathways of investment to meet the goals of sustainable and climate-smart agriculture; and suggested policy changes to help achieve improved household nutrition and sustainable agriculture through smallholder crop, horticulture, livestock and fish production.

### **Patterns and Trends in Agricultural Investment: Leveraging Whole-System Impacts – Richard Hames, Centre for the Future, Australia**

The presentation argued that the current policies for agricultural investment are highly conservative and unimaginative, and there is a need for alternative beliefs and practices that can effectively address the major problems of our time. These problems include: (i) how to rapidly redesign our systems cooperatively and in ways that would benefit all of humanity without further damage to each other and to the environment; (ii) what changes will need to be made to our most fundamental belief systems to enable us to see possibilities that have eluded us thus far; and (iii) what it means to be human and alive in an era obsessed by technology and where a destiny narrative is mission. Conditions for policy development and implementation are moving away from competitive government grants, large-scale industrial practices, little variation in strategic vision between agribusiness industries and most NGOs and prevailing 19th century charitable model government mindset. The focus is now on peer-to-peer processes, commons and open source-based investments, small-scale localised practices, community influence and engagement, clear differentiation in aims and vision between corporates and communities, and social impact model gaining traction. To sustain current public funding of agricultural research, government strategies need to be linked to these trends, particularly food security and connections between poverty and conflict. Strategies also need to be distinctive, locally relevant, easy to implement and empower people in order to attract serious investors. They need to demonstrate social impacts and release new knowledge through connectivity in the sharing economy and peer-to-peer initiatives. The focus should be on cooperation and the change of whole system rather than wasting efforts on trying to eliminate discrete symptoms of a system that requires radical reform.

### **Investing in Agri-Biotechnology: Research for Entrepreneurship – Paul P.S. Teng, Nanyang Technological University, Singapore and International Service for the Acquisition of Agri-biotech Applications (ISAAA), Singapore**



“In ‘Research for Entrepreneurship’, there is a need to create the space for ‘Freedom to Operate,’” Dr Paul Teng, Principal Officer, National Institute of Education, Singapore

The presentation emphasised the need for investment in agri-biotechnology research that initiates in the laboratory and leads to farm and consumers, while transforming farmers into entrepreneurs. Agri-biotechnology includes conventional biotechnology (such as tissue culture, fermentation-based technologies, mushroom culture, improved crop varieties and animal breeds) and novel

biotechnologies (genetically engineered organisms, marker aided selections of plants and animals, biodiagnostic tools, new vaccines and synthetic food). Biotechnology practices provide tools to increase agricultural productivity with less fertilizer and water on less arable land. The global biotechnology industry is now valued at over USD 300 billion. In 2014, biotechnology seeds were estimated to contribute approximately 35 per cent of the global market for improved seeds. Maximizing the benefits of agri-biotechnology requires supportive policies, adequate infrastructure and funding of both the public and private sector. Development of human resources in the science of biotechnology, regulatory framework that guides the development and deployment of new agri-biotechnologies, intellectual property regimes, and finally, consumer education and public awareness of the safety of new biotechnology products, are also needed.

### **Necessary Policy Changes to Help Achieve Improved Nutrition and Sustainable Agriculture through Smallholder Vegetable Horticulture - Dyno Keatinge (AVRDC – The World Vegetable Center), Chinese Taipei**

The potential of vegetable horticulture to contribute to improved nutrition and sustainable agriculture is huge. However, this sector is largely unexploited because of a chronic lack of investment in vegetable research and development. The presentation explored five policy changes necessary to capitalise on the potential of horticulture. Firstly, food policies need to shift focus from staple food production towards healthier, better balanced diets, and collection of improved statistics to monitor the outcomes. Secondly, investments should be diverted towards more horticultural research



“Feeding the world without nourishing it at the same time is not the most sensible option,” Dr Dyno Keatinge, Director General, AVRDC - The World Vegetable Centre, Taiwan

and address long-term priority constraints to production. Thirdly, policies need to focus on improving market integration and the adoption of improved pre- and post-harvest technologies to strengthen market opportunities for small farmers. Policy and monitoring frameworks also need to be strengthened to ensure safe pesticide use. Finally, policy makers need to reconsider the need for appropriate investment in

vegetable germplasm development in the context of climate change. Policy change in these directions will help to unleash the substantial potential of smallholder vegetable farmers to improve the income of the poor and to provide better nutrition for all.

### **The Opportunities and Challenges for Livestock and Aquaculture Research for Development in Asia – Steve Staal, International Livestock Research Institute (ILRI), the Philippines**

A livestock revolution is underway in Asia. The demand for livestock and fish products is increasing as incomes and urbanisation continue to rise. In terms of value, four of the five top global commodities are livestock products, dairy being the most valuable commodity. South Asia has become the world’s largest dairy producer and beef exporter, with East Asia the fast growing region for livestock product imports. Approximately 60 per cent of the world supply of fish comes from the Asian region where a large proportion is used for domestic consumption. In spite of increased supply of animal-sourced foods (ASFs), the region houses

the majority of the world's under-nourished population. ASFs provide the best source of dense and high-quality protein and micro-nutrients, especially contributing to cognitive and physical development of children. Furthermore, aquaculture production must more than double by 2050 to satisfy projected fish demand. The sector continues to depend on smallholder producers who continue to use traditional technologies generating low yields and offer raw or traditionally processed products that do not meet modern standards, raising questions about food safety that need to be urgently addressed. It is important to correct the imbalance of public investment to reflect the changing shares in agricultural gross domestic product (GDP) that livestock contributes to and leverage national and international partnerships in livestock research.

### **Session Summary**

Green revolution era agriculture with its focus on a few crops and intensive cultivation practices has led to problems, such as natural resources degradation and neglect of other agricultural sectors. Attention needs to be shifted to systems-based integrated agriculture also involving horticulture, livestock and fish to diversify farmers' incomes, improve consumers' diets and contribute to sustainable development. Trends in agricultural research are changing from rice-wheat systems to diversification of crops, horticulture and animal systems; from producing more food to more affordable, safe, nutritious and healthy food; and from limited concern for environment to high concern for environment and climate change.

Biotechnology provides tools to significantly improve agricultural productivity and quality of produce. Long-term experience on the use of biotechnologically developed human insulin suggests that the technology is safe. However, no long-term studies on human feeding of biotech food are possible before these are approved as safe for consumption through prescribed food safety testing protocols.

Trans-boundary diseases, biodiversity loss, trade and energy in agriculture are other issues requiring urgent attention and investment. While government institutions continue to invest in agricultural research, private sector investment needs to increase particularly in high investment and high return areas. Impact assessment is crucial for planning and targeting of investment in agricultural research and innovation. The SDGs provide a basic framework for policy development on food and nutrition security.

### **Climate-Smart and Sustainable Agriculture**

Climate change is one of the critical challenges faced by agriculture in the Asia-Pacific region. Large areas of the region have been identified and mapped as being prone to its effects. While some of these areas may benefit agriculturally, many more will be adversely affected. To adapt to and mitigate the effects of climate change and reduce stress on the use of natural resources, the practice of climate-smart and sustainable agriculture has been advocated and promoted. This Session chaired by Masa Iwanaga (JIRCAS, Japan), and documented by Siosua Halavatau (SPC) and Sahdev Singh (India), discussed the trends in investing in research and innovation to develop and enable practice of climate-smart and sustainable agriculture. This includes agricultural diversification, breeding climate-adapted crops, adaptation of cropping systems and crop management practices.

### **Innovation in Agriculture in Response to Climate Change: Towards a Global Action Plan for Agricultural Diversification – George Hall, Crops for the Future, Malaysia**

The presentation strongly emphasised the need to reassess global agricultural practices in the light of climate change that have direct implications on the United Nations 2030 Sustainable Development Agenda and its related SDGs. Climate change will significantly affect crop yields, hence, production and distribution of food and ultimately the food security. Although the future



“It is almost universally accepted that the world's climate is changing. The consequences will have profound implications for agriculture, especially because just four crops (maize, wheat, rice and soybean) provide more than 60 per cent of the world's food,” Dr George Hall, Global Partnership Coordinator, Crops for the Future (CFF), Malaysia

of agriculture in a hotter world will not be fully known, it may be catastrophic for major crops. There is, therefore, a need for a new mindset with focus on diversification because the business as usual with focus on monoculture is no longer a suitable option. A Global Action Plan for Agricultural Diversification (GAPAD) attempts to address the above issues and shows way forward. The plan proposes to: (i) increase the range of crops grown beyond the four major crops; (ii) encourage intercropping to increase production per unit area; (iii)

bring a wider range of agricultural landscapes into production; and (iv) develop a sustainable production supply chain, which is shorter, possesses high value and maintains nutritional value.

### **Achieving National and Global Climate Objectives in Asia and the Pacific through Investment in Climate-Smart Agriculture – Beau Damen (FAO RAP), Thailand**

The presentation suggested that the agriculture sector, comprising crops, livestock, forestry, fisheries and aquaculture, would be a key focus area for future action under the United Nations Framework Convention on Climate Change (UNFCCC) to foster climate-resilient and low emissions development. Agriculture and land use are a major source of high emissions, which come particularly from crops and livestock, net forest conversion, forest fires and degraded peat lands. The highest share of emissions from agriculture – 35 per cent, comes from enteric fermentation. Rice cultivation, the use of synthetic fertilisers and manure management are other polluters. To achieve climate-smart objectives and find a “safe space” for food and climate systems, the FAO framework focuses on three pillars: (i) increasing productivity and income growth in agriculture in sustainable ways; (ii) supporting adaptation across agricultural sectors to expected climatic changes and building resilience; and (iii)

reducing greenhouse gas emission intensity of production systems. Leveraging domestic investment in these efforts will be the key to success of climate-smart agriculture. However, transitioning to new, more sustainable systems involves upfront investment costs, producer risks and transaction costs. To strengthen climate resilience, countries' intended nationally-determined contributions (INDC) could be potentially the channel for climate financing linked

“Can there be a 'safe space' in the midst of increasing population needs, production challenges and climate change? This is where Climate-Smart Agriculture is a possible option,” Dr Beau Dameu, Natural Resources Officer - Climate Change and Bioenergy, Food and Agriculture Organization of the United Nations - Regional Officer for Asia and the Pacific (FAO RAP), Thailand



to their country priorities. The growing interest of the international community in climate finance provides further opportunities to drive climate-smart development in the agricultural sector. INDCs are expected to transform into nationally-determined contributions (NDCs), becoming an important roadmap for directing future investment and technical support. From a developing country perspective, the UNFCCC negotiation process and the INDCs also highlight where the global financing mechanisms that underpin the UNFCCC – most notably the Green Climate Fund (GCF) – should focus investment.

### **Potential Areas of Investment in Climate-Smart Agriculture in South Asia – Paresh Bhaskar, Climate Change, Agriculture and Food Security (CCAFA), India**

The current research indicates that climate change is likely to reduce agricultural production by 10-50 per cent by 2050 and beyond, if adaption measures start late. The presentation highlighted the potential investment areas in climate-smart agriculture that aim to improve farm productivity and incomes, increase resilience to weather extremes and decrease greenhouse gas emissions. While current research on climate-smart agriculture is evolving and is being increasingly recognised in agricultural development plans, greater investment is required to deliver on these objectives. Firstly, investment in research should focus on: (i) identification, evaluation and development of interventions based on climatic risks and farming systems; (ii) assessment of business models and financial mechanisms for scaling out climate-smart activities; (iii) modelling micro-economic behaviour of agricultural farms to design incentives for implementation; (iv) identification of business cases for the private sector; and (v) generation of data for assessment of climate change impact that would lead to design adaptation and mitigation options. Secondly, investment in capacity building is needed to create enabling infrastructure, tools and models, including ICTs and advanced research stations, and decision support systems. Thirdly, investment in partnerships with the private sector are required to make value chains more sustainable, develop and commercialise agricultural inputs such as seeds and water/energy efficient technologies, and provide savings and credit schemes for farmers.

### **Session Summary**

The panel discussion on climate-smart and sustainable agriculture was moderated by Masa Iwanaga (JIRCAS, Japan). Paul Teng (NTU, Singapore), Sonny Tababa (CropLife Asia), and Junne-Jih Chen (TARI, Chiense Taipei) along with all the speakers were the panelists. The discussion provided new insights on the topic and summarised individual presentations. Agriculture is one of the biggest polluter contributing to climate change through unsustainable land use, and greenhouse gas emissions from unsustainable agricultural practices. The key issues related to climate change the world has been facing include warming trends, increased water scarcity, decline in food production, increase in extreme climate events, varied levels of capacity to adapt, and emissions from agriculture.

The influence of climate change on agricultural ecosystems is complex and reciprocal. These interactions need to be adequately understood while developing strategies for climate-smart agriculture. Diversification of species, systems and enterprises should become an important part of this approach, with indigenous knowledge providing leads to devising strategies for climate adaptation and mitigation. While traditional agricultural systems show some resilience to climate change, it is unknown how these systems will perform under new settings. Greater investment in this area of agricultural research is, therefore, urgently required.

There is a large potential of investment in climate-smart agriculture, though diverting funding from various national and international sources to this area remains a challenge. While SDGs and UNFCCC processes provide a framework to prioritise and implement climate-smart agriculture, strong synergies between them need to be created to end hunger and tackle climate change. Partnerships with CGIAR centers are crucial especially in the context of the need for climate-resilient agricultural crops. APAARI and other similar platforms have a role to play in promoting climate-smart agriculture by initiating dialogue on regional collaboration and technology transfer.

### **Knowledge Management for Sustainable Agriculture**

Agriculture in the Asia-Pacific region is increasingly becoming market oriented and, as a consequence, knowledge intensive. The practice of sustainable agriculture with emphasis on efficient utilisation of all resources from input in farming (including waste) to final consumption of products requires much more use of available information, skills and knowledge, as well as efficient generation and effective use of new knowledge. The session chaired by Dyno Keatinge (AVRDC), and documented by Sonali Bisht (India) and Martina Spisiakova (Slovakia), discussed the trends in research and innovation in knowledge management (KM) for sustainable agriculture. It also reviewed if sufficient investments are made to effectively manage knowledge and disseminate it to all those engaged in agriculture and agri-food systems. Other major aspects of discussion included: (i) current investment areas to manage information and knowledge from ARI4D; (ii) the appropriateness of the current direction in KM; (iii) the investment areas needed to further manage knowledge for sustainable agriculture; (iv) the quantity of this investment; and (v) what would be the impact and how it will be measured.

### **Land Resource Inventory of India for Development of Sustainable Agricultural Land Use Plans Using Geospatial Techniques: Avenues for Investment – Surendra Kumar Singh, National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), India**

The presentation addressed India's key challenges in land management and offered a strategy to overcome stagnancy in productivity despite the growing investment in agriculture in the country. The National Bureau of Soil Survey and Land Use Planning (NBSS&LUP) of the Indian Council of Agricultural Research (ICAR) has been conducting a systematic survey of soils of India and collecting other collateral data needed for scientific land use planning in geographic information system (GIS) environment. The nationwide survey will categorise agricultural and non-agricultural areas in terms of their strengths, limitations and opportunities for appropriate use, as well as threats from misuse and abuse. This will facilitate planning for soil and water conservation, irrigation and water harvesting, as well as monitoring of impact. Efforts have also been initiated to develop an Android-based smart phone geographic information system (GIS) application to provide real time field geo-database management. This entails collecting, storing and transmitting data to the data centre at the headquarters for processing and map design. A Geo portal that integrates four modules, including climatic history, human and livestock profile, market demand and trends, land use and yield data, and physiography, is also being developed. The platform will help acquire, process, store, distribute and improve the utilisation and dissemination of geo-spatial data through Web Map Services and Web Future Services.

### **The Case for Investment in Knowledge Management to Support the Sustainable Development Goals in Asia-Pacific Region: Some Lessons Learned from CABI's Experiences – Andrea Powell (CABI), United Kingdom**

The presentation emphasised the ambitious objectives of the 2030 Agenda for Sustainable Development and CABI's KM activities to illustrate the scale and type of investment required to achieve these objectives. The SDGs call for monitoring and measuring progress and the development of appropriate indicators to facilitate this process. Quality, accessible, timely and reliable disaggregated data is needed since such data is the key to decision making. CABI created innovative KM programmes through its global Plantwise Project, such as Plantwise Clinics, the Plant Knowledge Bank, the Plantwise Online Management System (POMS), and the Direct2Farm Mobile Advisory Service – tools that complement each other – by combining a traditional face-



“We need to democratise the supply of information, so that it ends up in the hands of those who need it the most, and we need to demonstrate the return on investment that open data can deliver,” Ms Andrea Powell, Chief Information Officer, Centre for Agriculture and Bioscience International (CABI), UK

to-face extension service (the Plantwise clinics, operated by CABI-trained but locally-employed plant doctors) with a data collection and communication platform – the Plantwise Knowledge Bank. The Knowledge Bank is a reference tool containing information resources relating to plant pests and diseases, and it is also a management information platform for the gathering and analysis of data. The Plantwise Online Management System (POMS) serves to enter data and enables carrying out a wide range of analysis, including impact

of plant clinics, gender impact, accuracy of diagnoses, spread of plant pests and diseases, and quality of services. Such KM initiatives require considerable investment in technology, KM and communication skills and analytical capabilities, which should not be underestimated when planning SDG implementation programmes. As a result of its own investments in KM capacities, CABI is now able to provide the underpinning data collection, sharing and reporting tools called for in the SDGs. Furthermore, the Global Open Data for Agriculture and Nutrition (GODAN) needs to be embraced and promoted by all AR4D stakeholders, to embark on the journey towards data-driven and evidence-based programmes.

### **The Rice Bowl Index: Using Open Data to Help Drive Sustainable and Robust Food Security Across Asia-Pacific – Eddie Chew (ASEAN and Syngenta), Singapore**

The Rice Bowl Index (RBI) is a tool designed to use open data to facilitate and inform productive dialogue, collaboration and action between governments, the private sector and other key stakeholders on how countries can improve their food security. It distills information from numerous public sources and brings this data together to facilitate actions towards improved food security. All these initiatives require investments in capacity building to be made at the regional and local level to ensure long-term sustainability through empowering stakeholders. In line with this, the RBI has developed new food security thresholds to provide governments and other stakeholders with more actionable insights in response to five emerging challenges to food security in the region. These thresholds include: (i) managing the impacts of climate change within the agri-food system; (ii) the need for a new business model for smallholder producers

and development of models that increase productivity; (iii) improving supply chain effectiveness; (iv) investing in innovation and infrastructure within partnerships; and (v) creation of enabling policy and regulatory environment to underpin robustness in the food security system. Based on these challenges and opportunities, it is the intention of the RBI to continue to refine its data to ensure that the tool is well equipped to support policy makers in identifying areas for improvement. In particular, RBI will continue working towards the following solutions: shifting the focus of the debate from problem to solution, supporting an evidence-based dialogue, facilitating productive multi-stakeholder dialogue, collaboration and action, and supporting partnerships with government, food value chain, NGOs and other stakeholders.

### Session Summary

The panel discussion on KM for sustainable agriculture was moderated by Dyno Keatinge (AVRDC). Fr. Francis Lucas (ANGOC), Reynaldo V. Eborra (PCAARRD), Etienne Duveiller (CIMMYT) and all the speakers of the session were the panelists. The dissemination and application of knowledge through digital means is a core component of the 2030 Agenda. However, investments in skills and relevant content are needed for KM to make a significant impact on the agricultural development landscape. For example, it is important to distinguish authoritative and evidence-based information from the “noise” of the World Wide Web; improve the ability to interpret, monitor and evaluate data to ensure that decisions are based on the best available evidence; acquire the know-how to convert generic information into practical, relevant and actionable guidance; and to analyse multiple sources of information to create insights and to make recommendations to policymakers.

KM strategies are very important in agricultural research and development programmes to improve access to information and skills. However, they are also multi-faceted and need to include various aspects, such as data collection, sharing and management, communication and language barriers, as well as capacity development. For example, they need to include what is needed to collect data, measure and monitor progress; establish a sustainable data management plan for new data, ensure researchers have access to authoritative, technically sound information to support evidence-based decision making; and make it easy for all stakeholders to contribute their knowledge, while setting quality control framework and validation methods. The amount of available data is huge and difficult to properly analyse and use. Tools are required for handling the complexity of meta data. M&E is required to assess the application of knowledge from the use of various learning tools and processes.

“When we entered the agricultural research and development field we were mostly trained in providing solutions through our lab research. Now we have realized we need to connect with our end users before we even start our research,”  
Dr Kalpana Sastry, National Research Management (NAARM), India



Besides data in public domain, a large amount of useful but unpublished data is often available with researchers. Encouraging researchers to facilitate access to and sharing of the data can further help solve problems in agriculture by enabling more effective decision making, fostering innovation

and increasing transparency. The Global Open Data for Agriculture and Nutrition (GODAN) needs to be promoted to lead a way towards data-driven and evidence-based programmes.

Communication continues to be a problem between researchers and development practitioners, including farmers. The language of academic research is often different from the language of practitioners. These language barriers need to be addressed to ensure that all stakeholders are able to access and interpret information, improve the quality of their work, and communicate effectively with others. Communicating with farmers on the use of ICT has been difficult, but is changing. Evidence shows that when children get involved, they can easily adopt and help others adopt new technology.

Accuracy and quality control of the delivered information is also important as inaccuracy and poor quality can erode trust with farmers. Sustainable agriculture requires building of a community of practice comprising farmers, NGOs and researchers and bridging of gaps and barriers such as language and expression.

### **Capacity Development for Sustainable Agriculture**

The Asia-Pacific region is facing enormous challenges in terms of capacity for agricultural research and development. The average age of agricultural researchers, extensionists, teachers and farmers is rapidly increasing and their numbers are declining. Youth are not interested to take up agriculture as their profession or agricultural education for a variety of reasons. On the other hand, the new paradigm of market-oriented agriculture requires new skills. The need for experienced agricultural research managers and leaders with more robust new skills of developing partnerships, managing organizational knowledge, planning, managing and monitoring large, multi-million dollar agricultural research and development programmes is being increasingly felt. Similarly, infrastructure needed for rapid agricultural development through the use of new technologies has not kept pace with the needs of the region. The effective application of new technologies, in addition to human capacities and infrastructure, also requires support from national, sub-regional and regional institutions. Right policies, strategies, legislation, regulatory mechanisms, organizations with appropriate structures and work processes need to be implemented. Hence, there is an urgent need to look at necessary investment to fill in the critical gaps of capacities required for effective and efficient agricultural research and innovation. This session, chaired by M.C. Varshneya (IAUA, India), and documented by A.K. Vasisht (ICAR, India) and Simon Wilkinson (NACAP), discussed current trends and needs in investment to enable new directions required in capacity development for sustainable agriculture.

### **Return from Investment in Agricultural Education, Research and Outreach Extension Systems for Development: Some Policy Guidelines in the Context of Pacific Island Countries – Abdul Halim, University of Technology, Papua New Guinea**

The results of a study by The Papua New Guinea University of Technology that assessed the real net benefit of higher education from graduates' income to the government were presented. Evidence shows that the real net benefits exceeded the cost of higher education, demonstrating that investment in education, research and outreach extension for development pays off. There are three types of benefits of higher education – private, social and research benefits. The main quantitative benefits are higher earnings of the graduates, hence higher tax earnings by the

government. Qualitative benefits include improved equity, motivation of students and benefits to the community and society. The spill over benefits from investment in university education, research system and community extension services are enormous because the university system provides more opportunities to make students' outputs public, instead of keeping them private. Apart from yielding significant financial returns, extension advisory services have also yielded positive social returns, particularly for women, people with low literacy levels, and farmers with medium landholdings. Agricultural universities and institutions engaged in teaching, research and extension services play significant role in integrating 'Knowledge triangle' through their programmes and projects. Policy guidelines to address these issues need to be updated in the context of changing environment. The disadvantaged geographical locations, such as isolated island countries need special attention for investment.

### **Investment in Extension and Advisory Services in Asia-Pacific Region: Status and Opportunities – Virginia Cardenas (SEARCA), the Philippines**

Several countries in Asia have very large extension systems with the extension and advisory service provision largely in the public domain. Most of it is funded and implemented through the national and state level ministries or departments of agriculture. Universities and agricultural research centers are also engaged in extension work. However, these services have been traditionally weak, in part because it is difficult to show impact of extension, which could convince policy makers to prioritise and invest in extension and advisory services. Decentralisation also generally weakened extension and advisory services, especially in terms of limited operational funds and poor links with research. Limited individual and institutional capacity of extension services make it difficult to provide adequate support to farmers, support adaptation to climate and market risks, coordinate extension activities and advocate for policy changes. At the time when agriculture faces unprecedented challenges related to changing climate and uncertain markets, investments in agricultural extension and advisory services need to increase to help farmers adapt. Regional networks are playing an active role in advocacy and KM to support extension services and enhance south-south cooperation in this area. However, in addition to regional fora, technical and functional capacities also need to strengthen at individual and institutional levels. To create an enabling environment for extension and advisory services to become more effective, it is also required to strengthen data base on investments and human resources, develop advisory services and extension policies and increase investment in extension.



“The Farm Sustainability Assessment (FSA) system is ambitious, yet it is only a first step in an exciting journey. It provides the foundation for many more opportunities, like training and knowledge exchange between farmers, beyond their direct neighbours,”  
Peter Erik Ywema, General Manager, Sustainable Agriculture Initiative Platform (SAI), the Netherlands

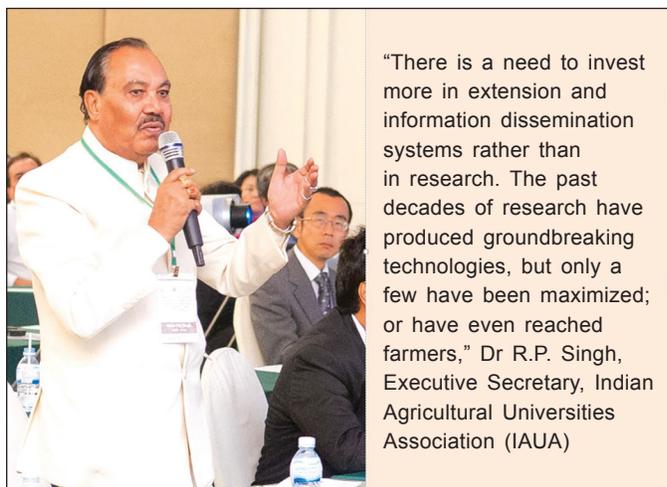
### **Agricultural Sustainability through Collaboration, beyond Competition – Peter Erik, Sustainable Agricultural Initiative (SAI Platform), the Netherlands**

Founded by three companies in 2002, the Sustainable Agriculture Initiative (SAI) Platform had more than 80 members by December 2015. These members are representing the entire supply chain and sourcing from countries all around the world. The Platform's vision is to implement secure and thriving agricultural supply

chains and protect the earth's resources through widespread adoption of sustainable practices that deliver value to the members, farmers farming communities and consumers. A common understanding of sustainable agricultural challenges and directions for solutions among members has resulted in 'Principles and Recommended Practices' for several agricultural raw materials, as well as many other supporting tools and guidance. For example, the principles and practices focused on sustainable fruit production, sustainable dairy farming, sustainable green coffee production, and some others. The ambitious members started to implement these principles and practices in their respective supply chains, which resulted in swamping the market with dozens of sets of good sustainable agricultural practices. All these practices were slightly different, which in some supply chains has led to confusion, frustration, and unintended bureaucracy. To address this problem, the Platform developed the Farm Sustainability Assessment (FSA) tool to allow farmers to assess, improve and report their sustainable agricultural practices in a way that is recognised by their customers. To date, FSA has become an online universal database used in 24 countries and available in 18 languages. It helps farmers improve performance, save time and resources, reduce costs, improve market access, and ultimately meet sustainability goals in a practical and easy to use approach. For example, it supports training facilities, knowledge exchange between farmers beyond their direct neighbours, avoidance of multiple audits, links to governmental programmes, the base for improvement plans, both individual and structural, online and offline assessments, data storage, reporting and communication, and finally a base for secure financing. FSA is a 'market vehicle' with a huge potential for more sustainable, safe and inclusive agriculture. However, to function more effectively it needs leverage for implementation from all stakeholders involved, including extension service, impact-assessors, management of change sociologists, coordination, common language, prioritisation of issues, and passion for farming.

### Session Summary

The panel discussion on capacity development for sustainable agriculture was moderated by M.C. Varshneya (IAUA, India). Yama Pandey (NARC, Nepal), Javed Rizvi (ICRAF) and all the speakers of the session were the panelists. Increased investments in higher education, research system and extension services for development in agriculture are critical, as economic success in the global market is closely linked to the outputs of these activities. The interaction effects of education-extension-research-innovations can accelerate the returns on investment. Furthermore,



"There is a need to invest more in extension and information dissemination systems rather than in research. The past decades of research have produced groundbreaking technologies, but only a few have been maximized; or have even reached farmers," Dr R.P. Singh, Executive Secretary, Indian Agricultural Universities Association (IAUA)

investment in higher education provides personal benefits for students, social benefits for the society at large and research benefits, which get diffused over time across countries. The public and private investment to universities is essential especially in the countries where university's own research potential is still uncertain. Public spending on higher education, research and extension for agricultural development, therefore, needs to be raised and adjusted over time. Investment in agricultural research, science and technology must be two per cent or above of the agricultural GDP.

Women and youth must be considered as an inseparable component of agricultural research and extension continuum. Special projects need to be undertaken for these groups with well-defined investment plans and required allocation. Youth needs special consideration as contributors to sustainable development. Attracting youth to agriculture requires incentives, such as income, employment, as well as exciting social commitment opportunities to enable them better contribute to food security and social stability. Changing food production and consumption patterns in the background of population growth, climate change and other emerging challenges require continuously evolving and inclusive capacity development efforts. In Asia, extension and advisory service provision remains largely in the public domain and most of it is funded and implemented through the national and state level ministries or departments of agriculture. It is difficult to show impact of extension, which could convince policy makers to prioritise and invest in extension and advisory services. Extension agents are not able to perform effectively due to limited individual and institutional capacity. Significant institutional changes and capacity development efforts are required to effectively link research, extension and farming communities and translate the research achievements into productive gains for farmers and the society.

Regional collaboration, especially among organizations such as APAARI, ASEAN and SAARC, can play an important role in convincing national governments to invest in capacity development programmes, and formulate focused and collaborative capacity development strategies for Asia-Pacific countries. Furthermore, innovative ways to institutionalise knowledge generated from diverse sources need to be developed and the knowledge needs to be made accessible to stakeholders. The power of social media and ICT to disseminate information particularly among young farmers needs to be harnessed.

## **Investment Needs in Agricultural Research and Innovation**

The outputs of the Theme Sessions on ‘Scoping Investments in Agricultural Research and Innovation’ in addressing current and emerging challenges were presented during a panel discussion to derive conclusions and recommendations. The session moderated by Ajit Maru (GFAR) and the proceedings documented by Kamal Kishore (RML, India) and Narendra Dadlani (APSA), aimed to provide critical analysis of the deliberations, in presence of and contributions from the panelists: Ramesh Chand (Niti Ayog, India), Shimpei Murakami (AFA, Japan), Virginia Cardenas (GFRAS), as well as the rapporteurs from the parallel sessions: Martina Spisiakova (Slovakia), Sahdev Singh (India), A.K. Vasisht (ICAR, India) and Laurent L’huillier (IAC, New Caledonia).

Currently, there seem to exist no reports that suggest specific amounts of investment required for agricultural research. Policy makers take investment decisions based on returns on investment compared to other sectors of the economy. Opinions on the reasons for inadequate investment in agricultural research suggest that in many countries:

- Research priorities are not aligned with national priorities on agricultural development. Just a few studies showing impact of agricultural research in terms of returns on investment have been conducted.
- Researchers often do not seem to address burning issues confronting agriculture.
- Progress in agricultural research seems to be the business as usual with nothing fascinating being reported.

Precise information on how much investment is really required for agricultural research is unknown. Based on the generally accepted norm of proportion of the Asia-Pacific countries' agricultural GDP, the current investment of about USD 8 billion per year needs to be raised to about USD 20-30 billion. However, instead of suggesting specific investment figures, it may be more appropriate to develop some guiding principles for arriving at conclusions. For example, such principles should consider the capacity of governments to spare money, amounts required for in situ applied research, and expected returns on investment; private sector investment; gestation period before substantial results of research are visible (though there are several interim cumulative gains); focus of investment plans on needs-based priority research areas, reforms in research management and M&E; the ecological impacts and sustainability of agricultural systems being invested in; and benefits of the investment and participation of the private sector in specific enterprises, such as poultry, milk and seed production.

The objectives of agricultural development are changing while new sustainability challenges are emerging that require innovative ways of adaptation and capacity development. Priority needs to be given to KM and learning, which result in more effective transfer of information to stakeholders to enable them to adapt to changing agricultural practices. Farmers must be in the centre of this vision. Learning from nature, as promoted by the sustainable community-supported agricultural model being practiced by a group of farmers in Japan, shows that practicing cycling of organic matter and diversification of crops ensures both agricultural and economic sustainability. This, and many other innovative approaches to agricultural research that promote sustainable agriculture could be promoted and scaled up through increased investment, effectively monitored, supported by solid data and evidence, and communicated to policy makers through more effective KM systems.

## **Impact Expectations from Investment in Agricultural Research and Innovation**

Investment in agricultural research and innovations lead to achieving certain planned outputs, and estimated outcomes, and these may further contribute to development impacts. Some can be intended to have positive impacts, while others can have unexpected negative impacts. The expectations of such outcomes and impacts could range from higher farm productivity - leading to enhanced incomes, higher employment, better nutrition and health, better income distribution, balanced gender gains - to improved environment, poverty eradication, and to overall sustainable development. Investments are made by individual farmers, communities, the private sector, corporate enterprises, the public sector, national, regional and global organizations, development banks, financial institutions, philanthropic organizations, NGOs, and many others. This session chaired by David Shearer (ACIAR), and documented by Mohammad Jabbar (APAARI) and Hung Nguyen (ILRI), focused on the respective expectations of impacts from planned programmes/projects, as well as the necessary policy support, interventions and investments needed to realise such expected results.

## **Agricultural Research in Vietnam: Recent Trends and Emerging Challenges – Chris Jackson (World Bank), Vietnam**

A case study of Vietnam showed that the country remains heavily dependent on agriculture and natural resources as a source of growth, employment and foreign exchange earnings. The country

has made significant advances in ARI4D with agricultural contribution to GDP increasing on an average by 4.2 per cent over 1990-1999 and 3.7 per cent per annum over 2000-2012. While agricultural production has had a major impact on poverty, key concerns over unsustainable agricultural practices, soil degradation, water and air pollution, and water scarcity remain. Yet, many bilateral donors have left Vietnam, and the terms on which multilateral donors are continuing to provide overseas development assistance (ODA) are less concessional. This is affecting both the broad strategy of remaining donors, and the attitudes of the government in terms of priority sectors for the use of more costly (but still concessional) ODA. As a result, ODA-financed agricultural research projects are declining. At the same time, Vietnam's funding of AR4D has increased but remains limited, while external financing is declining. The emerging research agenda includes: high quality rice for export, low quality rice for domestic consumption (climate resilient and saline tolerant, especially in areas with a large number of ethnic minorities), and transition out of rice to diversify food consumption, including maize. However, the domestic structures for a greater impact of agricultural research are not yet well configured to fill the gap, and Vietnam is arguably not fully leveraging partnerships with the relevant CGIAR centers.

### **Investing in Agriculture to Feed Asia Securely – Mahfuz Ahmed, Asian Development Bank (ADB), the Philippines**

The presentation focused on the complexity of food security in Asia and ways to address it through ADB priorities and investment. ADB recommends that investments in agriculture within the Asian context should be made in four priority areas: (i) increasing the productivity and reducing pre- and post-harvest losses of food; (ii) improving market connectivity and value chain linkage; (iii) enhancing food safety, quality, and nutrition; and (iv) enhancing management and climate resilience of natural resources. ADB has adopted a multi-sectoral approach towards investment in food security equal to about USD 2 billion annual investment. Both public and private sector organizations are supported in areas of agriculture and natural resources (enhancing productivity, market, food safety, quality and nutrition), inclusive agribusiness and value-chain, inclusive finance for agribusiness development and small and medium enterprises (SMEs) and cross-sectoral areas, including education, transport and finance. ADB's business development and innovation is based on learning from ongoing innovations and its strategic approach focused on partnership, thematic group secretariat support, ADB private sector operations and regional departments, as well as synergies with other sectors and themes. ADB's Knowledge Management Plan (2015-2020) focuses on four types of knowledge activities: (i) Asia-Pacific Food Security Knowledge Forum (2016); (ii) research collaboration on climate-resilient rice with the International Rice Research Institute (IRRI) and developing member countries (DMCs), and value chain financing with IFPRI and DMCs; (iii) expanding knowledge networks and partnerships with private companies and foundations (Syngenta, Rabobank); and (iv) engaging in South-South and North-South knowledge and technology transfer.

### **Expectations from Investments in Agricultural Research and Innovation: An NGO Perspective – Kamal Kishore (Rainfed Livestock Network - RLN), India**

In India, 70 per cent of agricultural research budget is directed towards food grain research. Research has been overemphasising technological interventions to improve and maximise

food production and concentrating on well-endowed arable areas and chemical subsidies such as fertilisers and pesticides, besides electricity and machinery, to increase food supply. As a result, drylands have received very low investment and attention for research. Generally, public investments in agricultural research in real term have been declining fast, particularly in rainfed areas. In the livestock sector, almost 70 per cent of the milk and 98 per cent of meat comes from commons and crop residue. Furthermore, sheep, goats, indigenous and crossbred cattle, as well as buffaloes also depend on commons. Estimates show that the demand for milk, poultry, mutton and bovine meat in Asia will double from 2010 levels by 2050. Agricultural research is urgently needed to enhance feed availability, develop a policy on commons and introduce a water plantation regime focusing on livestock while keeping local biodiversity intact. Research investment therefore needs to re-focus and consider that top down approach will not lead to sustainability. Lab-to-land needs to reverse to land-to-lab and livestock farming to be treated as entrepreneurship.

### **Developing Capacity for Change to Enhance the Potential of Investments into Agricultural Innovations – Karin Nichterlein (FAO), Italy**

In 2013, the Tropical Agriculture Platform (TAP), an initiative of FAO, conducted a regional assessment that revealed that several tropical countries lack the resources and capacities to fully develop their agricultural innovation systems (AIS). Supporting smallholder family farmers is crucial for the emergence of a functioning AIS that improves farmers' income, food security, nutrition and environmental sustainability. To develop the capacity for agricultural innovation in the least developed countries of the Asia-Pacific region, TAP advocates for increasing investments in R&D and more coherent, efficient and coordinated capacity development interventions that address individual, organizational and institutional capacity needs. A Common Framework on Capacity Development (CD) developed for AIS is a core component of the Action Plan of TAP, a G20 Initiative, aiming to increase coherence and effectiveness of capacity development for agricultural innovation that leads to sustainable change and impact at scale. The framework developed with contributions by TAP partners, including APAARI, consists of a conceptual background document and a practical guide for the operationalisation of the Framework. The initial plan is to apply the Framework from 2015 to 2018 in eight countries in Africa, Asia and Central America with support of the European Commission (EC) funded CDAIS project, and jointly implemented by AGRINATURA and FAO in collaboration with local organizations. APAARI will facilitate the application of the Common Framework and Policy Dialogue to develop capacity for agricultural innovation in the Asia-Pacific region. Capacity for change needs to be strengthened and simultaneously investments into agricultural innovation, both at national and international level, need to be increased, while volatility is reduced.

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“To draw innovation out, you must bring stakeholders in,”  
Dr Karin Nichterlein,  
Agricultural Research  
Officer, Tropical  
Agriculture Platform  
(TAP), Food  
and Agriculture  
Organization of the  
United Nations (FAO),  
Italy



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## **Session Summary**

The presentations led to a panel discussion moderated by David Shearer (ACIAR, Australia). The panelists included Peter Warr (ANU, Australia) and all the speakers of the session. Experiences and concerns over unsustainable practices in countries such as Vietnam show that partnerships with relevant CGIAR centres are still not fully leveraged. Yet, such partnerships are crucial especially in the context of climate change and the need for climate-resilient agricultural crops. Regional and international funding agencies, such as ADB and World Bank, have been playing a catalytic role in agricultural research and development but within the framework of priorities and programmes determined by the national governments. For example, ADB's multi-sectoral approach towards investments supports both public and private sector organizations in areas of agriculture and natural resources, inclusive agribusiness, value chain, finance and cross-sectoral areas, which includes education and transport. Its strategy strongly focuses on expanding knowledge networks and partnerships, engaging in South-South and North-South knowledge and technology transfer, as well as research collaboration with the CGIAR.

Lack of information on impacts of investment in agricultural research in terms of livelihood benefits is a serious constraint to attracting investment. The issue is further complicated by the fact that livelihood benefits are often an outcome of multi-sectoral investments and dissecting individual contributors is difficult. In terms of funding of specific agricultural research areas, research urgently needs to refocus on priority areas to generate expected impact. Donor-driven priorities being short-term will not be effective in the long-term.

## **Innovative Funding Mechanisms**

One of the main objectives of the Policy Dialogue was to consider and develop innovations in funding mechanisms for enhanced investment by introducing innovative approaches and policy guidelines for new funding mechanisms and by improving the existing funding mechanisms. Besides generally existing traditional public sector funding sources, new funding sources have been emerging both in the developed countries as well as developing countries. Such new funding sources include, for example, the public-private partnerships, public-private-community partnerships, systematic regional and global aid and donor funding, networking and collaborative arrangements at national, regional and global levels to solicit aid/donation, and use of IPR for commercialisation in support of research and innovation funding. The session co-chaired by Allan Bird (PNG) and Karin Nichterlein (TAP, FAO), and documented by A.R. Ariyaratne (SLCARP, Sri Lanka), focused on innovative funding mechanisms, including presentations on: (i) agricultural innovations and enterprise facility; (ii) innovative funding mechanism of Indian public system; (iii) IP management and commercialisation for investment – a case of Malaysian Agricultural Research and Development Institute (MARDI); (iv) regional partnership and collaboration in the Pacific; and (v) a typical public-private-corporate partnership model in Australia and similar arrangements in organized enterprises elsewhere in developed and developing countries of Asia and the Pacific.

### **Time for a Step-Change: The Agricultural Innovation and Enterprise Facility – Mark Holderness (GFAR), Italy**

The presentation highlighted the major factors constraining the value and impact of agricultural innovation on the lives and livelihoods of poor people. Chronic public underinvestment in

AR4D in low-income countries has resulted in weak national agricultural research and innovation systems that will not be able to cope with the massive challenges that lie ahead. IFPRI estimated that investment needs to triple by 2025 to meet current and future challenges. However, national investments have only grown by 20 per cent in a decade, aid flows remain fragmented and volatile, and research focus rests on productivity rather than opportunity. Furthermore, national systems lack resources to turn innovation into

enterprise. Partners of GFAR are now developing the Agricultural Innovation and Enterprise Facility (AIEF) – a multi-stakeholder convening mechanism to mobilise resources, identify capacity development and technical assistance support, and create partnerships and enabling environment required to transform the lives of poor people at a significant scale. This would be done by directly creating effective and integrated innovation systems, enabling effective scaling out of appropriate innovations and turning innovation into enterprise opportunity for rural women and youth. GFAR, in collaboration with the CGIAR, also developed a series of national and regional consultations – GCARD – to bring together representatives from across all agricultural sectors with a stake in the future of agri-food research and innovations. The initiative takes forward new GFAR collective actions to validate, increase and improve investment in national agri-food research and innovation systems for development impact. It also frames how international research best aligns with national and regional demands and adds value to national capabilities.



“Research is essential, but not in itself sufficient for development impact,”  
Dr Mark Holderness,  
Executive Secretary,  
Global Forum on  
Agricultural Research  
(GFAR), Italy

### **Innovative Funding Mechanisms of Public Sector: The Case of National Agricultural Innovation Project (NAIP) of Indian Council of Agricultural Research – Mruthyunjaya (ICAR), India**

The National Agricultural Innovation Project (NAIP) implemented by the Indian Council of Agricultural Research (ICAR) and financed by the World Bank during 2006-2014 has facilitated an accelerated and sustainable transformation of the Indian agriculture through its innovative funding mechanism. The objective was to support poverty alleviation and income generation through collaborative development and application of agricultural innovations by the public organizations in partnership with farmers’ groups, the private sector and other stakeholders. The following factors made the financing successful: a strong project design, consortium approach to partnership, troubleshooting assistance through help desk, massive capacity development in centres of excellence, research on action value chain and livelihoods security, strong results framework, M&E system and E&S frameworks, strong emphasis on policy and visioning, ICT use, interaction and communication, governance, decentralised procurement and transparency, among many other innovative achievements and factors behind them. The NAIP has worked with 203 consortia, 653 consortia partners covering 33 public sector institutions, as well as the private sector, NGOs, national and international institutes. Among several other deliverables, the project has developed and validated 51 diverse value chain models, 36 livelihood models in most backward regions of India and 272 production

and processing technologies. It also commercialised 80 technologies/products and supported capacity development of 931 scientists trained abroad and an equal number trained by international experts in India. The economic and financial benefits which accrued from the project is estimated to be USD 430 million with an overall internal rate of return (IRR) of about 40 per cent.

### **Intellectual Property Management and Commercialization of Agricultural Research: A Case of MARDI – Tapsir Serin (MARDI), Malaysia**

Malaysia's main public agricultural R&D agency is the Malaysian Agricultural Research and Development Institute (MARDI), accounting for more than a quarter of national agricultural research investment. The research investments of three commodity-based research agencies, the Malaysian Palm Oil Board (MPOB), the Malaysian Cocoa Board (MCB), and the Malaysian Rubber Board (MRB) mainly focus on high value export crops and other related commodity-based resources. Investment in R&D will fully benefit from strong IP and commercialisation regimes, which is expected to propel more R&D investment. The focus on development of proficient IP management capabilities covers the whole IP chain activities from creation to protection with support of good infrastructure for IP transaction and protection of national IP interest. At the same time, harnessing IP will promote foreign investment and technology transfer to ensure IP as a stimulant for innovation. Thus, to ensure the relevancy in the mainstream of national invention and innovation arena, MARDI has proactively strengthened the in-house IP management portfolio. From 2005 to mid-2015, a total of 85 technologies worth RM 42.6 million (USD 10.4 million) were commercialised involving 47 companies and 66 licensees. The technology commercialisation is guided under MARDI Commercialization Policy to ensure that the rules and procedures are being followed. The flow of commercialisation starts from an ideation stage until the determination of commercialisation mode. The potential IPs generated by MARDI's pool of experts will have to pass several development stages in order to successfully transform into innovations. The major commercialisation mode (more than 80 per cent) is through licensing which is the key driver in MARDI's commercialisation success. MARDI is now planning to establish Technology Commercialization Office (TCO) combining the current IP Management Unit in Research and Innovation Management Program with the Evaluation and Up-scaling Program as a one-stop centre to manage IP and commercialisation activities.

### **Regional Partnership to Address Food Production Crisis in the Pacific Islands – Siosua Halavatau (SPC), Fiji**

Per capita crop production has been continuously falling in nearly all the Pacific countries over the past decade, even in countries with low population growth. The food production crisis has been caused largely by: (i) downward spiral of soil productivity as a result of increasing deforestation, high rates of soil erosion, and declining levels of soil organic carbon caused by intensive use of soils; (ii) loss of biodiversity as a results of changing modes of production from traditional mixed cropping to mono-cropping, increasing bush fires, pests and diseases, and climate variability/extreme events; (iii) increase in food waste; and (iv) limited capacity of land users to properly manage land, soils and forests. To sustain this intensification of food production requires development and adoption of technologies that will improve or sustain productivity while enhancing natural resources and ecosystem services. However, the proportion

of national budgets allocated to agriculture development in the Pacific is insufficient, ranging from less than 1-3 per cent, so national budget for research relies on donor support. The SPC Land Resources Division (LRD) cooperates with national ministries of agriculture and international and bilateral agencies, such as FAO, ACIAR, International Fund for Agricultural Development (IFAD), European Union (EU), Australian Department of Foreign Affairs and Trade (DFAT) and New Zealand Aid Programme (NZ Aid), in developing and implementing research proposals addressing priority research issues in the Pacific countries. This partnership is very successful and donor agencies use SPC LRD as a hub to channel funding for agricultural research in the Pacific Islands.

### **A Comparison of Public/Private Agricultural Research Partnerships – Simon Hearn, Agricultural Consultant/Director, Australia**

Approved in 1989, the Australian Rural Research and Development Corporation (RDC) model is unique in terms of funding and management of partnerships between the Australian Government and the agriculture, fisheries and forestry industries. Co-funded public/private research has helped Australian agriculture to double its productivity over the last thirty years. Apart from joint funding, the private sector has five key contributions in RDC partnerships: (i) pathways to greater scale and impact, (ii) diversity of partnership models and value chains, (iii) access to value chain knowledge, technologies and innovation capacity, (iv) potential to leverage private sector investment, and (v) access to markets. Currently, there are fifteen RDCs, each focusing on and jointly funded by particular farm industries. The RDC model recognises that individual farmers are not normally positioned to undertake such research or to appropriate the benefits of the investment. It is based on private-public partnerships given the joint dollar for dollar by producers (levies) and government. Co-funding also compels accountability to both industry and government and collaborative development of strategies, goals and priorities in research programmes and business plans. Joint priorities and goals are regularly updated in five-year corporate plans, complemented by annual operating plans and annual reports on achievements. Decision making includes mixed multi-skilled boards and industry research advisory committees to address key research programmes. This model helps to facilitate investment partnerships to enhance financial resources, research capacity, market knowledge and complementary technologies. All members of public/private research consortiums influence dissemination and commercialisation. This public-private partnership has led to more effective research, development, innovation and extension of results in areas that are priorities for both industry and government. Increased efficiency and effectiveness of joint communications enhanced research adoption. Finally, increased funding incentives leveraged higher total research investment that would not be possible by each party acting alone. While this public-private partnership model has been generally regarded as a success, whether it could be successfully applied in other Asia-Pacific countries depends on structural, commercial and financial considerations, as well as administrative challenges for countries and their industries in the region.

### **Session Summary**

The panel discussion on innovative funding mechanism was moderated by Allan Bird (PNG), Mahfuz Ahmed (ADB), Esther Penunia (AFA, Philippines), Apaitia Ravaga Macanawai (Fiji), and all the speakers of the session were the panelists. The panel discussion addressed key

issues and questions regarding various aspects of innovative funding mechanisms. This included: identification of such feasible mechanisms, development of capacities in mobilisation of funds, various policy initiatives and approaches, long-term planning and cost effectiveness for sustainability, why and how joint public-private co-investment works, public funding for 'out-of-the box' research and innovations, cost and benefit sharing, incentives, rewards and awards systems, participation and ownership of stakeholders/shareholders, obligations and joint IP management, benefit sharing and incentives, policy perspective and road map for mobilising ARI4D.

"I feel my nation's health has been severely hampered by the introduction of certain western, or (now) global foods. In particular, staple crops like rice, corn, and wheat have lessened the Papuans' dependency on more traditional foods while inversely raising the rate of chronic diseases,"  
Dr Allan Bird, Development Consultant,  
Department of National Planning and Monitoring, Papua New Guinea



The central role of farmers in implementing agricultural research and development projects needs to be strongly advocated. Investments need to be made on farmers' fields recognising farmers as scientists, innovators and extension agents, rather than beneficiaries. As such, research and development programmes need to be implemented in participation with farmers, who should be involved in designing, implementing, monitoring and evaluating these activities. To ensure farmer adoption of new innovations, there is a need to ensure funding support for their field evaluation and refinement. The concept of direct funding to farmer organizations is getting acceptance with some funding agencies having adopted this option with encouraging results.

Estimates of public-spending also need to take into account hidden investments through subsidies on seeds, fertiliser and energy, which might reveal substantially higher investment being made in AR4D. An emerging opportunity for corporate funding exists in food production and delivery systems targeted for the fast increasing urban population of the Asia-Pacific countries. Case studies of cross country partnerships that create win-win situations need to be carried out to develop models for investment through regional partnerships.

"I welcome research that will capture the relationship between land reform and increased productivity from farmers. It will be a good basis for farmers in Indonesia to prove this relationship using scientific data," Muhammad Rifai,  
Head of Production Planning and Business, Association of Farmers in Indonesia (AFI) and a farmer, Indonesia



Besides public funds allocated for AR4D, other sources of funding are also emerging. This includes private funds, grants and aids, IPR, foundations, farmers' cooperatives and corporate social responsibility funds for agricultural research and development programmes. Universities and other educational institutions need to promote agriculture as a profession among students by imparting appropriate training and initial funding support for their enterprises.

IFPRI estimates that investment needs to triple by 2025 to meet the current and future challenges. However, national investments have only grown by 20 per cent in a decade, aid flows remain fragmented and volatile, and research focus rests on productivity

rather than opportunity. Furthermore, several national systems lack resources to turn innovation into enterprise. Malaysian experience shows that it is important to realize IP in commercialisation, which should be an integral part of agricultural innovation systems that fully benefits R&D.

Partnership initiatives such as between GFAR and the CGIAR can mobilise collective actions to validate, increase and improve investment in national agri-food research and innovation systems for development impact. Collaborative development and application of agricultural innovations by public organizations in partnership with farmers' groups, the private sector and other stakeholders, have proved to work well in India where NAIP project was implemented, resulting in commercialisation of 80 technologies along with intensive stakeholder training. In the Pacific, the insufficient national budgets for AR4D have been addressed through a partnership between SPC, national ministries of agriculture and international and bilateral agencies. In addition to joint development and implementation of research projects, the partnership enables easy transfer of funds for agricultural research through SPC.

A case study on public-private partnership in Australia shows that the RDC model has worked well to fund and manage partnership between the government and various industries and helped double Australia's productivity over the last thirty years. This partnership has led to more effective research, development, innovation and extension of results in areas that are priorities for both industry and government. Increased efficiency and effectiveness of joint communications enhanced research adoption. Finally, increased funding incentives leveraged higher total research investment than would not be possible by each party acting alone.

It needs to be considered whether the presented innovative funding mechanisms are applicable in the Asia-Pacific context, what incentives can be provided to potential partners to commit funds, and whether there is enough political commitment to research by national governments and mutual trust as a basis for partnerships.

## **Reflections and Outcomes**

The final plenary session was moderated by Mark Holderness (GFAR) in which the reports on highlights and recommendations from the four thematic sessions (I, IV, V, VI) were presented by the rapporteurs, which was followed by general discussion. The highlights and recommendations have been incorporated under specific sessions in this report. David Shearer provided a summary of the event and offered implications. He also shared his reflections on the Dialogue content and outcomes and these are given under the Section "Synthesis and Implications".

## **Closing the Dialogue**

At the final session of the Policy Dialogue, Raghunath Ghodake presented a Way Forward for APAARI to guide its members, partners and stakeholders in the right direction towards the achievements of the SDGs. The discussions, insights and ideas of the participants during the meeting confirmed that APAARI can play a crucial role in this process. The Way Forward, which is part of the Synthesis (see next section), presents focused efforts of APAARI to develop capacity for addressing the challenges of the region.

In his closing remarks, Mark Holderness acknowledged the rich experience gained during the Policy Dialogue. Innovation along the entire production, value addition and market chain is the name of the game and all stakeholders from international agencies to farmers are players in this game. GFAR has adopted the policy of thinking globally and acting locally, which while leveraging international support and partnership, envisages collective local actions involving policy makers, NARS and all other stakeholders to bring about radical changes in the lives of farmers, also serving consumers and the society at large. APAARI has made substantial contribution with respect to technical aspects of agricultural development in the Asia-Pacific region. Now, it should engage with policy makers at all levels to ensure that the suggested innovations are owned, and implemented to bring benefits to the society. GFAR will support APAARI agenda but it is NARS that shall have to implement it.

Surmsuk Salakpetch, Deputy Director General, DOA, Thailand, presented the closing remarks on behalf of Somchai Charnnarongkul, Director General, DOA and Chairman, APAARI. Overall, the Policy Dialogue was highly successful in sharing ample knowledge on the status and outlook for investment in agricultural research and innovation. The event also encouraged thought-provoking ideas addressing current and emerging challenges. The in-depth discussions in parallel sessions contributed towards developing a strategic plan of actions that provides directions towards climate-smart and sustainable agriculture, KM for sustainable agriculture, as well as capacity development for sustainable agriculture. It is now in the hands of participants to bring the deliverables of the Policy Dialogue into action. APAARI looks forward to policy interventions from respective ministries and NARS showing significant support and recognition to the importance of agricultural research innovations. Vilasini Pillai, Member, Program Committee and Coordinator APCoAB, APAARI, presented vote of thanks in which she thanked the organizers in the APAARI Secretariat, co-organizers, sponsors, speakers, panelists, chairs and co-chairs, rapporteurs, poster presenters and social reporters, for their active participation and excellent contribution in their respective capacities.

## **Synthesis and Implications**

The purpose of the synthesis is to analyse and assess the outputs and outcomes from the Policy Dialogue and to derive implications for pursuing future collective actions in partnership with the stakeholders involved in improving investment and policy support to agri-food research and innovation systems in Asia and the Pacific. This section includes four sub-sections on: i) immediate reflections on the Dialogue, ii) assessment of what was scoped, achieved and remains to be achieved, iii) assessment of theme-wise outcomes, and iv) implications for further actions.

### **Reflections**

The immediate reflections drawn by David Shearer on the Dialogue content and outcomes are as follows:

#### **Investment in agricultural research: Meeting the challenges of today and tomorrow**

The inaugural address by Sakchai Sriboonsue, Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives, Government of Thailand, challenged over 130 key stakeholders

participating in the event to provide a road map to mobilise resource in attaining the SDGs within the Asia-Pacific region. The resource mobilisation would take place through innovative systems where governments are better equipped to meet the challenges of today and tomorrow.

Building on the Millennium Development Goals (MDGs), the United Nations has adopted a new 2030 Development Agenda titled “Transforming Our World: the 2030 Agenda for Sustainable Development”. The 17 SDGs and 169 targets that balance the three dimensions of sustainable development: the economic, social and environmental, will guide action to end poverty and hunger, protect the planet, ensure prosperity for all, foster peace, and mobilise partnerships. With agriculture being the common thread holding the SDGs together, this new universal agenda sets an important direction for the future of agricultural research policies, agri-food research and innovation systems, programmes and funding in the region. Raghunath Ghodake urged the participants to ensure that the outputs from the dialogue were able to go forward and make a substantial contribution towards achieving SDGs in the region.

Two of these SDGs are the most relevant to the Asia-Pacific region as well as the work of APAARI. SDG 2 calls specifically to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture”. SDG 12 on sustainable consumption and production focuses on reducing food losses and waste through more sustainable pre- and post-harvest practices – another area of importance for APAARI. Somchai Charnnarongkul, Chairman, APAARI and Director General, Department of Agriculture (DOA), Government of Thailand, pointed out that this can only be achieved if we are able to effectively work together to reduce hunger and poverty in the Asia-Pacific region.

Today, agricultural research is challenged by the need for greater investment to feed more than 9 billion people by 2050 and ensure the well-being of future generations in a manner that reduces pressure on the environment and underpins economic growth. However, as reminded by the Ministry of Agriculture and Cooperatives, Government of Thailand and ADB, all of this is happening in the very complex Asian setting, with high rates of growth and the region evolving rapidly technically, socially and environmentally.

### **The nature of agricultural research must change to address sustainability more effectively**

Rather than only seeking additional funding, agricultural researchers have to demonstrate effectiveness in implementing programmes and activities – the focus should be on both quantity and quality of research investment, not on funding alone. Climate change is adding increased complexity, as is the rapid growth of obesity in the region, making adaption more difficult and long-term investment more risky, but also raises the bar in terms of need. In this environment, the nature of agricultural research must change. Instead of focusing on producing more tonnes of what has previously been produced, it must be about the ability to meet the future demands – meat, fish, fruits, vegetables, all delivered to fulfil consumer requirements in view of future environmental concerns. This also requires investments in capacity to create and use new knowledge to facilitate mass innovations, and manage the flow of information to deliver impacts.

Agriculture also needs to be profitable with the smallholder farmers remaining the key focus. Women have become even more critical in agriculture and need to be addressed effectively. The youth that are disappearing from agriculture need to be retained. In view of this, research in agriculture needs to be gender sensitive and attract youth for agriculture to effectively address the issues of sustainability.

### **Partnerships and cooperation**

As agricultural research changes to address the issues of sustainability more effectively, innovation is becoming central to the agenda with new ways of doing things and in different partnerships than before. Karin Nichterlin, from the TAP, provided an insight to innovation as “to draw innovation out, you must bring stakeholders in”. The role of the private sector needs to be enhanced and paradigm in the funding and delivery mechanisms for agricultural research needs to shift. It is important to work together to continue to deliver benefits to smallholder farmers. Kamal Kishore from the RLN, India, inspired the participants to shift their thinking from lab to land and make it land to lab, which would require a very different approach to priority setting and lessons learned.

Various models exist to support this partnership development. For example, the TAP provides a sound framework of commitment, vision, capacity needs assessment, strategy and implementation, all underpinned with its M&E. However, different countries are promoting different approaches on the ground. Clearly, the future plans of each of the countries should focus on innovative partnerships, including South-South Cooperation, collaboration with China and India, as well as with the CGIAR, the health sector, and ASEAN. With changing conditions, cooperation will become more important than competition, and hence there needs to be a focus on the whole system and leveraging new knowledge through connectivity in sharing the economy to have impact.

### **Impact pathways to define the delivery of research outcomes**

Nick Austin, Chief Executive Officer, ACIAR, pointed out that agricultural research and innovation can provide a healthy diet for the people in the region. Aid has never overcome poverty by itself, but it is needed to support economic growth, during a time where there has been global disinvestment in agriculture. The aid agenda has changed away from the provision of basic services, to be focused on supporting economic growth, with agriculture and resource management at the top of the agenda. Developing countries themselves are showing that their economies are the key drivers of economic growth, but need to caution against the growth in inequality. In this respect, the private sector is recognised as the engine room of growth. To be able to do things differently, there is still a need for clear, explicit and logical impact pathways that define the delivery of research outcomes through the end users, with the right structural links to development actors.

With innovation at the centre of the required thinking, size of the investment does not matter, with a small number of highly successful projects carrying the rest. The targeted research needs clear line of site to impact pathways and the ability to invest in projects that will not show the high rates of return that are crucial. These approaches must serve as lessons. The region needs rapid innovation with well-targeted research, effective communications and incentives for smallholder adaptation, with new cooperation to tackle intractable poverty.

### **How much does Asia invest in agricultural research?**

Gert-Gen Stads from IFPRI-supported ASTI project asked: “How much does Asia invest in agricultural research?” A simple question that has no simple answer. However, without this basic understanding, policy makers, and advocates of agricultural research as a contributor to productivity growth and poverty reduction, do not have a clear baseline to develop approaches. In her Keynote Address, Kundhavi Kadiresan, Assistant Director General, FAO RAP, reminded the participants not to be complacent. Although there is lot of evidence that research raises productivity, delivers excellent IRR and has an effect on poverty, the agricultural research intensity within the region rests with China and India. Elsewhere, it has been on the decline, which does not provide for a positive outlook for addressing key hunger and poverty concerns of the region.

Although the data is variable, it shows broad differences in spending. For example, in 2011, PPP China was USD 9.4 billion, India USD 3.4 billion and Indonesia USD 1.4 billion. China is driving the growth of regional spending, which quadrupled its investment in agricultural research from 2000 to 2013. Agriculture research intensity of Malaysia is also high. However, all countries are under what the UN calls for in terms of a 1 per cent target. This significant under-spending that exists in agricultural research in the region needs to be addressed.

Allan Bird, Development Consultant, Department of National Planning and Monitoring, Papua New Guinea, raised a question: “Are we using the right tools to tackle the problem?” which is often difficult to answer by agricultural researchers addressing poverty. The current funding challenges require the right tools to address the problem. The IP strategy, for example, is looking to address the change in funding profiles. The private sector can be an important vehicle for funding agricultural research. However, their funding contribution to agricultural research still needs to be understood and addressed. It is important to note that increasing total spending and research intensity, with targets being set to help mobilise resources, should not be the end goals. The end goal should be the institutional capacity to maximise the benefits of agricultural research.

Women smallholder farmers must be central to the agenda, but it should also be noted that women are severely under-represented as agricultural researchers. There is a need for different insights to address the unique issues for women smallholder farmers of the region and related funding.

### **Agricultural research and its impact on agricultural productivity**

While studies by the World Bank in Vietnam, show that enhancing productivity might not be the right approach and the focus may need to change to be on farming system sustainability, there is clear evidence that agricultural research has a positive impact on agricultural productivity, which has an effect on reducing poverty. Analysis by Professor Peter Warr, ANU, shows that 1/8th of the observed decline in poverty in Indonesia is attributable to agricultural research, with 4.8 million people now being non-poor due to agricultural research. Although the internal rates of return for agricultural research are excellent, this also indicates that there is massive under-investment in agricultural research. Therefore, one of the success factors, or performance indicators, should be a reduction in the internal rates of returns of agricultural research.

A key reason for the success in Indonesia is that the taking of research output from the international environment, such as that created by the CGIAR, to Indonesia is highly productive. This high rate of productivity of taking international outcomes into domestic impact needs to be continued and encouraged. However, there are institutional problems with the lack of engagement between R&D actors within the region. Agri-biotechnology products have demonstrated value in their ability to narrow yield gaps and contribute to manage post-farm gate losses, which are two key R&D challenges. Dr Paul Teng, Principal Officer, National Institute of Education, Singapore, proposed an approach centered on “Research for Entrepreneurship” where there is a need to create the space for “Freedom to Operate”.

### **Encouraging healthier diets**

ILRI also demonstrated the under-investment in livestock and fish, as well as their critical role in food security and livelihood improvement. The very strong market demand in livestock and fisheries is having a substantial impact on the dynamics of the sector, whereas there is not the same market dynamics in the vegetable sector. Obviously in these two different situations, different policy settings are needed to support change. Dyno Keatinge, Director General, AVRDC, encouraged the participants to think beyond Green Revolution to have a more balanced investment portfolio to support the production of nutritious food. There is a need to focus on healthier diets with vegetables being central to such diets. Smallholder farmers need to be given the chance to come out of poverty, with the ability to create jobs and reverse the flow of the youth to city. Women, Income and Nutrition (WIN) is a concept to benefit women by creating a win-win situation combined with the importance of working together, inclusiveness and NARS.

### **Data, effective communication and engagement for sustainable development outcomes**

The discussion on KM provided an insight from government, a not-for-profit and a commercial actor. Presentations highlighted the use of data, with novel and innovative tools to have impact at different levels, the highly specific data for appropriate land and water management in India, CABI’s PlantWise platform and the Rice Bowl Index. This diversity demonstrates not only the range of actors that operate in this space, but also the importance of effective knowledge transfer in achieving impact for different stakeholders with different performance indicators and requirements.

To achieve positive impact, there is a need for effective communications and the capacity to effectively communicate. A key aspect of effective communication, particularly at the smallholder farmer level, is the trust. While researchers trust in the published data and knowledge, farmers have different trust boundaries, and different avenues to gain trusted information. This needs to be taken into account for effective communications. To build these trusted relationships, participation of smallholder farmers is not enough as there is a need to create an environment of engagement, where the communication approach leads to the engagement in the right relationship.

In exploring KM, the opportunity that this critical area presents in making agriculture more attractive to the next generation and long-term impact, has become apparent. Models are being developed, like in the Philippines where students collectively run a farm and in the process

become better students. Furthermore, greater efforts need to be made to engage the youth in agriculture, and more importantly in agricultural research.

### **Assessment of planned outputs and outcomes**

This sub-section assesses what was and was not presented and discussed within the context of the expected outputs in the scoping paper leading to the way forward. The approach taken here is to look at what was planned, what was achieved, what was inadequately addressed, what remains to be addressed, and deriving implications.

- (i) The following expected outputs have been realised:
  - Current and future national, sub-regional and regional trends and capacities in investment (including areas of investment) in agricultural research and innovation systems were assessed and validated.
  - Participants became more aware of current investments, their trends and future needs and areas of investment in agricultural research and innovation systems.
  - Quality presentations were made with abstracts and briefing papers for databases and references.
  - Posters and accompanying brief papers on national and other stakeholder investments (private and community sectors, education and extension) were displayed and circulated.
  - Synthesis paper of country reports and briefing papers were presented.
  - Dialogue proceedings brought out recommendations, action plan and way forward.
  - Advocacy toolkit on improved and increased investment in agricultural research and innovation systems was recommended.
- (ii) The following expected outputs remain inadequately addressed and efforts in these areas need to be effectively pursued:
  - Consensus developed on appropriate joint arrangements for public-private-community co-investments in research and innovations and way forward on innovative funding mechanisms.
  - Perceptions of donors and policy makers firmed up on funding for and expectations from agricultural research and innovations.
- (iii) The key issues discussed were in relation to the changing context of investment in agricultural research and innovation, and these brought out adequate materials to build on and pursue expected outcomes. In particular, the key issues referred to changes in needs for ARI4D, change in areas for investment, change in considering investment in ARI4D, and constraints in planning and evaluation of investments.
- (iv) Salient points and recommendations were brought out for future focus and directions for investment in ARI4D by APAARI members, partners and stakeholders, so as to support the Sustainable Development Agenda.

## **Assessment of theme-wise outcomes**

This sub-section provides detailed synthesis and assessment outcomes under the key themes.

### **Challenges faced by agricultural research**

Today, agricultural research is challenged by the need for greater investment to feed more than 9 billion people by 2050 and ensure the wellbeing of future generations in a manner that reduces pressure on the environment and underpins economic growth. All of this needs to happen in the very complex Asian setting, with high rates of growth and rapid technical, social and environmental evolution of the region. The estimates of FAO in 2005 indicate that overall global agricultural production would need to increase by 60 per cent (and by 77 per cent in developing countries) by 2050 to meet these challenges. In the future, producing more food will largely depend on increasing crop yields and cropping intensity on existing farmlands rather than by increasing the land area under agricultural production. Hence, much more efforts, investments, innovative technologies and improved practices along the value chains are needed to sustainably address the above-mentioned challenges.

The region is, therefore, at the threshold of a new era in which economic growth and the need for increased investment in science and research are opening up new opportunities. The Asia-Pacific region is experiencing a major reorientation towards agriculture and agri-food systems for both development and commercial reasons. At the same time, these systems are undergoing a massive transformation, which requires rapid innovations driven by targeted research.

### **Agricultural research underfunded**

While evidence suggested that enhancing agricultural investments has a positive impact on agricultural productivity, the agricultural research intensity within the region rested with China and India. Elsewhere, such as in Malaysia, the Philippines and Thailand, research intensity ratios have been declining. The public sector is the primary source of investment in agricultural research, while bilateral funding is decreasing. Following the food price crisis in 2007-2008, aid to agriculture and global agricultural systems increased. However, developed countries now face new and emerging demands on their aid budgets. Declining investments in agricultural research, which is lower in Asia than in any other regions of the world, does not provide a positive outlook for addressing key hunger, malnutrition, and poverty concerns of the region. Climate change is adding increased complexity, making adaption more difficult and long-term investment more risky, but also raises the bar in terms of need. In this environment, the nature of agricultural research must change. As agricultural research changes to address the issues of sustainability more effectively, innovation is becoming central to the agenda with new ways of doing things and in different partnerships than before.

The significant underspending that exists in agricultural research in the region, as a share of agricultural GDP, needs to be addressed urgently if the SDGs are to be achieved by 2030. Institutional problems with the lack of engagement between R&D actors within the region also needs to be addressed to help increase investments. Instead of producing more tonnes of what has previously been produced, it must be about the ability to meet the future demands

for meat, fish, fruits and vegetables, all delivered to fulfil consumer requirements in view of future environmental concerns. This also requires investments in capacity to create and use new knowledge to facilitate mass innovations, and manage the flow of knowledge and information to deliver impacts.

## **Opportunities for agricultural research investment**

### ***Micronutrients***

While the number of undernourished people in the world has declined and is estimated by FAO to be 795 million, the number of people who suffer from micronutrient deficiencies is much larger. More than 2 billion people are anaemic and zinc deficient, and 250 million school children suffer from vitamin A deficiency. Bio-fortified crops, such as, rice high in zinc (plus iron) are already being produced in Bangladesh and India; wheat high in zinc (plus iron) in India and Pakistan; pearl millet high in iron in India; and golden rice in the Philippines and Taiwan. Apart from the serious consequences on health, the economy is also affected by undernutrition. The high prevalence of this condition hinders economic development and perpetuates poverty both directly, through a loss of productivity due to poor physical condition, and indirectly, through poor cognitive function and learning deficits. Agricultural research and extension systems need to bring new varieties of crops rich in vitamin A, zinc and iron to market by ensuring their profitability and safety. Collectively, these new crop varieties could help to address some of the most damaging micronutrient deficiencies in the world: vitamin A, iron and zinc.

### ***Horticulture***

The potential of horticulture to contribute to improved nutrition and sustainable agriculture is huge. However, a sustainable horticulture production system requires increased investment in horticultural research and development to better cope with an increasingly degraded environment and uncertainties resulting from climate change, prevailing malnourishment and obesity, as well as economic volatility in the context of the shift towards market-oriented agriculture. Market opportunities for smallholder farmers require strengthening through better market integration and adoption of improved pre- and post-harvest technologies. Investing more in horticultural research and focusing on overcoming long-term priority constraints to production including the generation of sufficient well-trained human resource is very important. The private sector needs to be encouraged to invest through public-private partnership projects to ensure the growth of the horticulture sector.

### ***Livestock and fisheries***

As incomes rise, consumers in the Asia-Pacific region increasingly want to consume foods with more protein and vitamins, boosting demand for dairy products, meat and fish. Animal-sourced foods (ASFs) have huge potential to provide the best source for high-quality protein and micronutrients such as iron, vitamin A and zinc, and contribute to cognitive physical development of children. ASFs also present an important opportunity for improved income generation of smallholder farmers. Results show that rural income multipliers are higher for livestock than for other commodities and even higher than non-agricultural activities. However,

sustainability of commons that livestock and fish depend on needs to be addressed. Large quantities of milk and meat from sheep, goats, cattle and buffaloes grazing on common lands, as well as unsustainable practices in fisheries and aquaculture, challenge the sustainability of the farming system.

There is a need to strengthen surveillance systems at the regional, national and local levels to prevent and detect disease emergence, and control disease spread, especially trans-boundary diseases. Safe animal production practices need to be reinforced to defend against zoonotic disease and other food safety risks that pose threat to human health from their potential association with livestock and fish products. Agricultural processing to meet modern standards to address issues of traditional processing need to be improved and feed availability increased through enhanced agricultural research. The need to correct the imbalance of public investment to reflect the growing demand for livestock and fisheries, and the increasing contribution of this sector to agricultural GDP, needs to be advocated.

### ***Information communication technology***

Information and communication technologies (ICTs), have opened participatory avenues for rapid, mass innovation in agriculture through improved sharing of information. ICTs play an important role in disseminating information to farmers. Examples include Android-based smart phone, geographic information systems (GIS) applications to provide real time field geo-database management, geo portals and other geographic information systems that can help acquire, process, store, distribute and improve the utilisation and dissemination of geo-spatial data through web services. Radio, short message services (SMS) and social media are other platforms with potential to facilitate a new Green Revolution. SMS is particularly used through mobile phones to access market prices, reach clients, share production information and money transactions. Internet is already being used in rural areas to obtain production and market technologies. Such ICT platforms are particularly cherished by youth, who often teach their parents and relatives – an opportunity that needs to be capitalised on. Agriculture needs to be branded as a new sector for growth in business opportunities, especially utilising ICTs, thereby attracting youth into agriculture. The use of social media in rural areas needs to be particularly promoted to enhance learning, sharing, and peer-to-peer assistance.

### ***Biotechnology***

With the rapid advancement of scientific knowledge over the past few decades, new techniques, such as biotechnology and nanotechnology, have proved their value and ability to reduce yield gaps and contribute to the management of post-harvest losses. The need for quality and safe food and feed, and improved stability of food security necessitates adoption of new technologies to increase agricultural productivity with less fertiliser, less arable land and reduced water use. However, developing biotechnology products is scientifically demanding, capital intensive, time-consuming, and risky. It requires significant capital investment, which might not be accessible by agricultural research institutions. Investment in research is, however, only one element of a complex, multi-step system that eventually leads to useful products for farmers and consumers. Research resource allocation is a challenging process in both the public and private sectors. Generally, the public sector tends to adopt a “science/technology – push” approach, while the

private sector predominantly adopts “demand – pull” approach. Generation of agri-biotech products commonly emanates from lab-based research. The “lab-to-farm-to-consumer” pathway requires appropriate investment in R&D and the development of a new paradigm of “farmers as entrepreneurs”. Cooperation in research among private, public, non-profit organizations and “farmers as entrepreneurs” also needs to be facilitated.

### ***Climate change***

In the context of climate change, which has direct implications on crop yields (hence nutritional value, production value and food security), global agricultural practices need to be reassessed if SDGs are to be achieved. The Global Action Plan for Agricultural Diversification (GAPAD) attempts to address the above issues by showing a way forward towards agricultural diversification of crops, horticulture and animal systems. Climate-smart agriculture (CSA) is being promoted to support production systems that sustainably improve farm productivity and incomes, resilience (adaptation) to weather extremes, GHGs reduction and mitigation, and greatly contribute to the achievement of national food security and SDGs. Farmers have to make several adjustments in crop management practices (e.g. changes in sowing time, application of water and fertilisers, tillage practices and inter-cultural operations) to transform their agricultural production systems (e.g. change in cropping systems and land uses) to adjust to new climatic conditions. The trends and focus of agricultural research need to change from mono-cropping (rice-wheat) systems to diversification of crops, horticulture and animal systems; from producing more food to more affordable, safe and healthy food; and from limited concern for environment to high concern for environment and climate change. GAPAD-proposed specific measures include: increasing the range of crops grown beyond the four major crops; encouraging intercropping to bring land into production; bringing a wider range of agricultural landscapes into production; developing a sustainable production supply chain, which is shorter and possesses high value; and maintaining nutritional value.

The recognition of the importance of adopting climate-smart practices, policy and finance in the international arena has been growing. However, experience shows that the uptake of many CSA practices and technologies by farm communities is inadequate to achieve their full potential benefits. Adoption barriers include lack of investments, policy and institutional bottlenecks, and lack of coordinated actions by different stakeholders. This is being addressed through the United Nations Framework Convention on Climate Change (UNFCCC), a Subsidiary Body for Scientific and Technological Advice (SBSTA), which places agriculture in the centre of the immediate future work programme. It guides the Conference of the Parties (COP) on climate-resilient and low emission development and represents a unique opportunity to leverage countries’ existing agriculture sector development and investment plans. It also drives climate-smart development in the agriculture sector leading to real benefits for agricultural communities and the environment. While SDGs and UNFCCC processes provide a framework to prioritise and implement CSA, strong synergies between them need to be created to end hunger and address climate change.

Investments in GAPAD need to be encouraged by supporting, encouraging and participating in the implementation of the “Paris Declaration” launched at COP 21, which called upon states, intergovernmental organizations and NGOs to develop GAPAD, convene an international conference on agricultural diversification, and agree on a process to formulate a protocol on

agricultural diversification in CBD COP 12 (Mexico 2016) to the Convention on Biological Diversity (CBD), 1992. Large potential of investment in CSA exists but diversion of funding to CSA activities from national and international sources remains a challenge. Maximising the impacts and scaling out the adoption of CSA requires investment in ARI4D and enabling policy environment. While there is significant international interest in climate financing, domestic investment is the key and must be paid greater attention.

### **Attracting women and youth into agricultural research**

The Asia-Pacific region contains 60 per cent of the world's youth population, or 750 million young men and women aged 15 to 24 years. Their number and percentage of the total population have been increasing. Yet, most of them end up in informal, unskilled, low-paid rural jobs that lead to massive migration to cities in view of better employment and life opportunities. Generally, rural women also face problems when it comes to rural and agricultural jobs, often having unequal opportunities and low wages whether as agricultural labourers, entrepreneurs or researchers. Women account for close to 50 per cent of the agricultural labour force in East and Southeast Asia, and roughly one third of the agricultural labour force in South Asia. They have historically constituted significant shares of agricultural researchers in countries like Malaysia, Myanmar, the Philippines, and Sri Lanka. However, in countries like Bangladesh, Nepal and Pakistan, shares of women scientists remain very low –12, 13 and 12 per cent, respectively. There is a need for different insights to address the unique issues for youth and women of the region and related funding. The youth find agriculture unattractive mainly due to the time and input investment, risky and often low yielding returns, with incomes dependent on rainfall and harvest cycles. Yet, they are more open to technologies (including ICT's), innovations and entrepreneurial risks.

To attract youth to agriculture and provide employment opportunities for both men and women, agriculture needs to be branded as a new sector for growth in business opportunities, utilising new ideas, innovations and ICTs, and prospering in an enabling and supportive environment. The youth and women can be attracted to agriculture if they see meaningful opportunities, participate in training, mentoring and extension services, and accessing capital. The use of social media in rural areas needs to be promoted to draw more young people into farming, help them learn from each other, trade and overcome the challenges of agriculture together. Making agriculture research profession gender affirmative would attract women and youth in agriculture and effectively address the issues of sustainability.

### **Capacity development**

Current public investment in AR4D is inadequate to attain the kind of development impact that the nations envision in their long-term development strategies. Capacity development in agricultural research and innovation is crucial in achieving development impact because individual and institutional capacity of research and extension makes it difficult to provide the needed support to farmers for technology adoption and adaptation at scale. Investment is now needed not only in improving individual capacities in various areas of agricultural research and science to generate technologies, but also in changing institutions and creating new capacities in agricultural communities for both absorbing and creating new knowledge and innovations. The engagement of farmers in this process is critical because when they become involved

in large numbers, it is possible to tap on a much wider pool of knowledge and experience to facilitate mass innovation. Evidence shows that investments in higher education, research and extension yield enormous benefits for sustaining knowledge-based human capital and building knowledge society. They provide private benefits for students, social benefits for the society at large, and research benefits which get diffused over time cutting across countries. A capacity needs assessment carried out by the TAP in 2013 confirmed that interventions that aim to fill gaps in capacity in agricultural innovation face the following problems: (i) inadequate analysis of needs and demand by farmers, markets, organizations and government; (ii) small-scale interventions with narrow scope and mostly focused individual training; and (iii) weak governance of external interventions, insufficient alignment with other interventions and national and international policies. Understanding of impact pathways, where performance and delivery of these pathways can be achieved in the most effective way and can build long-term capacity, is important. Once this is understood, research will lead to productivity gains and poverty reduction.

### **Policies to promote greater investment in agricultural research and innovation**

A synthesis of the status of agricultural research and investment to support sustainable development in countries of Asia and the Pacific conducted by APAARI found that food security, productivity improvement and sustainable NRM are major policy objectives across all 22 Asia-Pacific region countries. The common strategies adopted for implementing policies include: R&D, generation of new knowledge, innovation in technology transfer and support services, and strengthening climate risk management, as well as capacity for improved NRM. All countries have ongoing plans and programmes based on the past achievements, which operate under five-year or longer plans. There are specific plans or areas that focus on more engagement with stakeholders, agriculture and human health, greater engagement and collaboration with CG centers and regional bodies, such as ASEAN and SAARC.

### **Partnerships**

Reducing hunger and poverty in the Asia-Pacific region requires diverse partnerships. Various models exist to support partnership development. For example, the TAP provides a sound framework of commitment, vision, capacity needs assessment, strategy and implementation, all underpinned with its M&E. However, different countries are promoting different approaches on the ground. Clearly, the future plans of each of the countries should focus on innovative partnerships, including South-South Cooperation, collaboration with China and India, as well as with the CGIAR, ASEAN and SAARC. Partnering with regional agricultural research related organizations, such as APAARI that have an important role to play in facilitating collaboration and partnership across regions, can help countries and actors share agricultural technologies for the benefits of both farmers and consumers, especially the poor. With changing conditions, cooperation will become more important than competition, and hence there needs to be a focus on the whole system and leveraging new knowledge through connectivity in sharing the economy to achieve greater impact.

### **Smarter knowledge and information management**

KM is a critical area that presents an opportunity for making agriculture more attractive for

the next generations and long-term impacts. It is also an area that can both attract investment and help mobilise investment. Data management, trusted communication, knowledge transfer and engagement are critical for the achievement of sustainable development outcomes. Data, information and knowledge have become more powerful as without the right understanding of baseline issues, such as research intensity, decision making is difficult. Without accurate data, research stakeholders cannot know whether or not they are on the right track and remain stuck in presumptions. Agricultural research stakeholders need such data to analyse research investment and capacity trends, identify key gaps, set future priorities, promote efficient use of resources, and ensure effective coordination and coherence of agricultural research initiatives. Substantive investments in data management have been made in a number of projects e.g. IFPRI-supported ASTI project, FSA of the SAI Platform, Plantwise and GODAN Open Data projects implemented and hosted by CABI. National investments have also been increasingly made in the development of systems for collecting data needed for scientific land use planning in GIS environment to facilitate planning for soil and water conservation, irrigation and water harvesting.

However, data, information and knowledge are not enough to deliver impact at scale. A key aspect is effective communication and trust, particularly at the smallholder farmer level. While researchers trust in the published data and knowledge, farmers have different trust boundaries, and different avenues to gain trusted information. In an increasingly digital world, KM strategies are very important in agricultural R&D programmes to improve access to information and skills. Being multi-faceted, the strategies need to include various aspects. For example, the evidence needed to collect data, measure and monitor progress; a sustainable data management plan for new data, ensured access of researchers to authoritative, and technically sound information to support evidence-based decision making. The strategies should also make it easy for all stakeholders to contribute their knowledge, while setting quality control framework and validation methods.

It is also important to invest in building trusted relationships with farmers to achieve positive impact through effective communication, creation of an environment of engagement, rather than just farmer participation, and assure accuracy and quality control of delivered information. Equally important is to establish systems for long-term funding in Asia and the Pacific, such as BMGF's support for ASTI to enable sustainable, institutionalised systems of data compilation, synthesis, and analysis at frequent intervals in South Asia. Building relationship with the private sector will be useful to gather R&D investment data, since agricultural research of the private sector is rapidly increasing in Asia and the Pacific. Regulatory systems need to be made more efficient by investing in technology, KM infrastructure and access to markets that are required to manage volatility and create robustness in the food security system.

### **Impact expectations from investment**

Currently, no studies suggest specific amounts of required investment in agricultural research. Policy makers make investment decisions and estimate impacts based on returns on investment compared to other sectors of the economy. Lack of information on impacts of investment in agricultural research in terms of livelihood benefits is a serious constraint to attracting investment. The issue is further complicated by the fact that livelihood benefits are often an outcome of multi-sectoral investments and dissecting individual contributions is difficult.

In terms of funding of specific agricultural research areas, research focus is urgently needed to enhance livestock and fisheries production; develop policies on commons; increase productivity and reduce pre- and post-harvest losses of food; improve market connectivity and value chain linkage; enhance food safety, quality, and nutrition; enhance management and climate resilience of natural resources; and make agriculture more profitable to attract youth. However, achieving substantial improvements in these areas would require large increases in local investment in agricultural research, knowledge dissemination and related capacities. Progress in agricultural research needs to advance to avoid the business as usual with nothing fascinating being reported.

Studies need to be conducted to show impact of agricultural research in terms of returns on investment. There is a need to develop capacities to demonstrate impact from investments in agricultural research on livelihoods. Targeted research that focuses on impacts and thinks through the impact pathway and theory of change associated with agricultural investments, as demonstrated by ACIAR, can help achieve research outputs and outcomes, as well as development outcomes and impacts. This high rate of productivity of taking international outcomes, such as those created by CGIAR, into domestic impact is highly productive and needs to be continued and encouraged. The capacity of governments to spare funds required for *in situ* applied research, and conduct analysis on expected returns on investment needs to improve. Ecological impacts and sustainability of agricultural systems being invested in also needs to be considered.

### **Innovative funding mechanisms**

The message from the global community on the need to increase investment in agricultural research is clear. Investments in national agricultural research and innovation systems need to triple by 2025 to meet changing global food needs; achieving Zero Hunger by 2030 requires 17 per cent of new rural development investments, i.e. USD 17,628 million p.a. should be in agricultural research, development and extension, investing from innovation into impact; investing USD 4.1 billion p.a. should generate annual return of USD 439 million; and every USD1 invested in CGIAR should equal USD 9 worth of additional food.

To enhance investments in agricultural research requires innovative funding mechanisms and improving existing ones. Besides existing traditional public sector funding sources, which remain static, new sources of funding have been emerging that are critical to sustaining funding for agricultural R&D. They include, for example, public-private partnerships, public-private-community partnerships, organized private sector equity funding, systematic regional and global aid and donor funding, networking and collaborative arrangements at national, regional and global levels to solicit aid/donation, tax credit schemes, incentive funds, innovative agricultural grant schemes, national agricultural innovation projects, use of IPRs for commercialisation in support of research and innovation funding, land grant research and education systems in mobilising revenue, philanthropic aid/donation and newly proposed Agricultural Innovations and Enterprise Facility (AIEF) now being developed through many partners from all sectors involved in GFAR.

To ensure project success requires selecting right partners and projects with end-to-end solutions, clearly defining objectives, results framework and operating procedures.

Collaboration in research proposals addressing priority research issues that would lead to resource mobilisation to implement such proposals should be encouraged particularly for small countries as demonstrated by SPC's collaboration with national ministries of agriculture and international and bilateral agencies. Research consortia of the public sector with the private sector and NGOs can break silos among partners, and promote pluralism, synergy, value addition, pooling of efficient work culture, talents, skills and resources. Awareness and understanding of the importance of IPRs need to improve, otherwise researchers are missing out, failing to commercialise their own ideas and sometimes failing to prevent others unfairly exploiting their research. In technology licensing, negotiations between parties are very important in ensuring successful transactions. Negotiation skills of research organizations with potential users and business counterparts need to be built to contribute to the successful IP commercialisation.

While public sector investment in agricultural research has a long gestation period before substantial results are visible, there are several interim cumulative gains that need to be demonstrated while soliciting public funding for agricultural research. If the Australian RDC model is to be adopted elsewhere, it needs to be considered that an essential pre-condition is an agreement by government and farmer/food industry representatives to establish the ways and means to raise joint research funding (this may require legislation to be enacted). The national governments would need to provide incentives and security for farm industries to commit funds with likely budget implications. This in turn requires a political commitment to research by governments, and mutual trust to achieve both community and commercial benefits as a basis for partnerships. Other considerations include reasonable collection costs for levies (and capacity to pay voluntary or compulsory production-based research levies), timing of payment, fairness, principles and equity, and cost effectiveness. Flexible and evolving rules and procedures by the national governments and funding agencies are critical for the overall success and timely completion of joint projects. Competitive funding promotes creative ideas, quick and quality revision of proposals and progress reports, response, and continued interest of the partners.

## **Implications**

The synthesis shows that the Policy Dialogue addressed many of the issues as planned in the Scoping Note of the meeting. However, a number of issues have remained outside the scope of the Dialogue and will require better reflection. This is particularly on the following issues involved in perceiving and pursuing investments in agricultural research and innovations.

## **Changing role of agriculture and development**

The role of agriculture in development has been changing and investments now also require political, economic and business considerations. The sectoral overlaps and competing demands in energy, water, environmental services, health, infrastructure, education, recreation, tourism and preservation of cultural heritage were not addressed in the Dialogue. Yet, their understanding is important as they may influence the quantum and direction of investment in it.

## **Status and outlook for investment in agricultural research and innovation**

Efforts were made to look at intensity and extensiveness of investment and returns in various countries, indicators of systems' capacities and investment disparities, comparison against norms/recommended levels and also between developed and developing countries in the region and outside, as well as outcome indicators and investment priorities. However, due to insufficient data available, as well as time constraints, it was not possible to explore this theme to the desired extent. Nevertheless, this information helped suggest optimal level of investments that needs to be targeted.

## **Complexities of investing in agricultural research and innovations**

Investments in improving agricultural research and innovation is also done by a multitude of actors, such as national governments, international research and development agencies, the private sector and many others. Therefore, investing in agricultural research and innovations can be very complex with multiple dimensions, each having different layers. Such complexities were not considered for addressing in the Dialogue and need to be comprehensively looked at.

## **Changing scenario for enhanced investments**

The changing socio-economic scenario has brought into focus new demands on the region's agriculture, which needs to become more rapidly market-oriented and globally competitive. The region's agricultural and agri-food systems are therefore significantly changing. The systems now require new technologies and innovations to enable their transformation supported by appropriate levels of investment. The Dialogue did not look at the changing agri-food systems that have implications on the levels and effectiveness of future investments. It will be a continued challenge to consistently and regularly look at these considerations.

## **Scoping investments in agricultural research and innovation**

The Dialogue explored the differences between orthodox thinking underpinning current investment in agricultural research and alternative beliefs and practices that may hold the clues to future enduring success and greater impact in agriculture. They also highlighted the status, trends, needs and future pathways of investment to meet the goals of sustainable and climate-smart agriculture e.g. by exploring agri-biotechnology. Policy changes were suggested to help achieve improved household nutrition and sustainable agriculture through smallholder crop, horticulture, livestock, fisheries and aquaculture production. These sectors represent many opportunities for ushering such farming systems based on specific agro-ecologies and local preferences. However, such local contexts and preferences were not discussed in the Dialogue and there is a need to consider such localised context for practical and reality applications.

## **The future of agricultural research and innovation**

To promote sustainability, research and innovation need to be directed towards enabling a green bio-based economy that produces new bio-material as industrial feedstock and also emphasises ecosystem management and sustainable use of natural resources, energy and forests. Addressing sustainability needs to take place by also looking at challenges of coping

with climate change, fluctuating prices and unstable economies, as well as preventing and managing spread of trans-boundary diseases of human, animals and plants. While the meeting sufficiently explored climate change, many other areas, such as price fluctuation, unstable economies and trans-boundary diseases, were not sufficiently addressed. These require further efforts to be inclusive in our considerations of such future needs.

### **Capacity to attract investments**

Capacity development was a major theme explored and discussed in the Dialogue to enable new directions to fill in the critical gaps of capacities required for effective and efficient agricultural research and innovation. Capacity and ability in planning, monitoring, implementation and delivering on effective agricultural research and innovations were not covered at all. With the need for new agri-food systems to be competitive in globalised agricultural product markets and shift to bio-based economies, there will be a need for increased as well as new and different capacities in institutions, technologies and enabling communities to innovate to participate in markets. Furthermore, while the meeting explored perceptions of returns on investment in agriculture to some extent, these were not compared to investments in other sectors, which, again might relate to weak capacity to address these important issues. All these areas are very important for mobilising adequate investments and indicate potential lack of capacity and abilities, which the Dialogue did not address. Addressing these areas will be a continued challenge for agri-food research and innovations, policy planners, systems and development agents.

### **Investing in new and emerging areas of science, technology and innovation**

The numerous problems in agriculture and agri-food systems that the region faces can be solved through the use of science, technology and innovations. Some pathways such as for germplasm management, new variety development and utilisation, and space application comprise those that require large multi-million dollar investments for decades and advanced infrastructure in science and technology. There are also those that need a larger spread of relatively small investments that enable mass innovation by farmers, market intermediaries and consumers. While germplasm management and space application were topics covered to a limited extent, the discussion was insufficient to generate any substantive outputs. More dialogue is needed to consider appropriate pathways and collaboration to apply advanced science and technologies to address key issues.

### **Investment in public, private and community sectors**

Improved funding of agricultural research and innovation is vital for sustainable development. While the meeting addressed the issues and opportunities of public funding to a large extent, and those of private funding to a limited extent, it did not cover any discussions related to community funding. This is an important area that must be addressed in future meetings.

### **National, sub-regional and regional partnerships and collaboration**

Institutional innovations and partnerships aligning with new understanding are evolving for collective actions at global, regional, national and community levels to solve complex, interconnected problems that affect the whole society. The Dialogue explored the areas of

investments that will be needed to foster these new partnerships through organizations in carrying out research and also spread of innovations. Partnerships were discussed in reference to different topics, including increased funding, innovative funding mechanisms, horticulture, livestock and fisheries, ICT and impact expectations. The discussions around partnership and collaboration have been summarised in section on partnerships. However, no presentations were invited from sub-regional organizations, such as ASEAN and SAARC. Their perspectives will need to be taken into consideration in future dialogue.

### **Renewed political will**

There is renewed political recognition of the role and impact of agriculture, especially in terms of government policies addressing agriculture as one of the major drivers of economic and social development. This was highlighted through the study of the status of agricultural research and investment to support sustainable development in countries of Asia and the Pacific conducted by APAARI, but the topic of political will and policies was not specifically assessed in the meeting.

### **Specific investments**

The Dialogue dealt with four specific topics to explore if sufficient investments are made in these areas to enhance agricultural research, namely current and emerging challenges, smart and sustainable agriculture (climate change), KM, and capacity development in partnership, collaboration and networking. However, there are many other areas of equal importance that missed specific focus, e.g. NRM, value chains and policies. Future dialogue needs to take a more demand-driven approach through consultations with participants identifying and assessing specific areas of importance and priority for discussion. Furthermore, while the Dialogue discussed the areas of current and future investments under these specific themes mentioned above, it remained short of addressing the quantity of the investment needed, related impact and ways of measuring it.

### **Impact expectations**

Lack of information on impacts of investment in agricultural research in terms of livelihood benefits is a serious constraint to attracting further investments – a topic that dominated discussions on expected impact from investments. The areas of research and innovations where the maximum leverage can happen in realising expectations and investments was explored only to a limited extent. However, it is important to understand the major actors and stakeholders in terms of their investment decisions, and their expectations of impacts from such decisions and how researchers and research managers reflect and match these expectations in designing and implementing such research projects and programmes. That is crucial to both attracting enhanced investment and improving investment in terms of greater impact. This issue was not adequately addressed and also points to the limited capacity and understanding of researchers and policy makers in this area.

### **Why, what, where and how investments are being made**

The Dialogue succeeded in discussing many issues relevant to investment in agricultural research and innovation systems in Asia and the Pacific. However, it did not provide information on

key questions, such as why, what, where and how investments are being made now and will need to be made in future at the national, sub-regional, and regional levels for intensifying the development of agriculture and agri-food systems in Asia and the Pacific. To generate reasonable investments, these different levels need to be assessed and substantial discussions need to take place in the way forward.

### **Expected outputs, intermediate outcomes and outcomes based on theory of change**

A number of expected outputs were scoped to come out of the Dialogue. While most expectations have been met, the meeting did not develop a consensus on appropriate joint arrangements for public-private-community co-investments in research and innovations, as well as a way forward on innovative funding mechanisms. Furthermore, perceptions of donors and policy makers did not firm up on funding for and expectations from agricultural research and innovations. In future, it should be considered whether such consensus and perceptions are needed to mobilise more investments.

## **Major Recommendations**

Based on the presentations and deliberations in the panel discussions, plenary sessions, discussions, several important recommendations relating to enhanced and improved investment emerged. These recommendations are presented under various categories, such as research and innovation, KM, capacity development, partnerships and networking, funding and policies, as follows:

### **Research and Innovation**

- Investment is needed for enhancing systems-based productivity through promoting agronomic (water, nutrient, weed management), genetic (improved crop varieties) and physiological interventions, as well as through introduction of resource conservation technologies (conservation agriculture, precision agriculture, etc.) at the level of smallholder producers.
- Malnutrition is a serious problem in many countries in the Asia-Pacific region and that needs to be addressed on a priority basis. For this, greater investments need to be made in crop diversification, supplementation and food fortification, promoting use of biofortified crops and developing new crop varieties rich in vitamin A, zinc and iron. There is also a need to think beyond Green Revolution to have a more balanced investment portfolio to support the production of nutritious food.
- Greater investment is required in horticultural research with focus on overcoming long-term constraints to production including the development of sufficient well-trained human resources. A specific need is to enhance investment in germplasm development to safeguard long-term improvement in the horticultural sector and to better align new emerging varieties with the need for better nutrition. The private sector also needs to be encouraged to invest more to ensure the growth of horticulture sector.
- Due to the very strong market demand in livestock and fisheries, different policy settings that encourage investments in these sectors are needed to support change and capitalise

on the critical role that livestock and fisheries play in food and nutrition security and livelihood improvement. The need is also to correct the imbalance of public investment to reflect the growing demand for livestock and fisheries and the increasing contribution of these sectors to agricultural GDP.

- There is also a need to invest in leveraging strong partnerships to make new technologies available to livestock and fish producers, who typically operate using traditional technologies and experience low yields; encourage agricultural processing to meet modern standards; enhance feed availability; develop mechanisms to prevent overgrazing and overfishing; and introduce a water plantation regime focusing on livestock while keeping local biodiversity intact.
- Substantial increase in investment is needed to strengthen the surveillance systems at the regional, national and local levels to prevent and detect disease emergence, and control disease spread, including trans-boundary diseases. Safe animal and fish production practices need to be reinforced to defend against zoonotic diseases and other food safety risks.
- The region's agricultural and agri-food systems are significantly changing and require new technologies and innovations. Greater investment thrust needs to be given to enhance food production using modern technologies including biotechnology and nanotechnology, with renewed focus on the development and promotion of widely adapted, climate-resilient and nutritive crop varieties.
- There is an urgent need to enhance policy research on investment in the agriculture sector for continuous updating and adjustments of country-specific policies. Policy research is also needed to help generate precise information on priority research areas and the amount of investment required for agricultural research and innovations.
- Investment in research is needed in terms of identification, evaluation and development of portfolios of CSA interventions based on climatic risks and farming systems in different agro-ecological zones; assessment of business models and financial mechanisms for scaling out CSA; modelling micro-economic behaviour of agricultural farms and communities to design incentives for CSA implementation; identification of business cases on CSA for the private sector; data generation for enhanced assessment of climate change impacts and design adaptation and mitigation options; and improved crop management techniques to reduce GHG emissions.

### **Knowledge management**

- The use of universal databases, such as FSA as well as the Open Data concept to increase transparency and greater openness in sharing of data by researchers, needs to be invested in.
- Greater investments are needed for collecting and sharing of data on successful research and innovation efforts, coordination and implementation of monitoring of R&D investment and assessing investment impacts. This would reduce knowledge and information gap on the performance, inputs, outcomes and impacts of agricultural R&D systems in the region.
- Investment is needed to build capacity to create and use new knowledge to facilitate mass innovations, build in-country capacity for agricultural research data collection, compilation,

synthesis and analysis, acquiring the know-how to convert generic information into practical, relevant and actionable guidance; analysing multiple sources of information to create insights and make recommendations to policymakers; and managing the flow of information to deliver impacts and address the challenges of the region effectively. This would increase the availability of high-quality, timely and reliable data, and also develop statistical and communication skills to enable the implementation of more effective M&E systems.

- Agricultural data needs to be digitised to allow processing and marketing of information through web-based resources to increase outreach and use. Enhanced investment, therefore, needs to be made to promote the dissemination and application of knowledge through digital means, such as scientific land use planning through GIS, along with investments in skills and relevant contents. The use of social media is important in rural areas to enhance learning, sharing, and peer-to-peer assistance, especially to young farmers, who can train older farmers.
- Enhanced investment is needed in developing infrastructure (especially with the private sector) and capacity building for using ICT tools and models, including cloud computing system, decision support systems, such as computer-based models, and climate-smart prioritisation and investment tools, as well as systems to disseminate climate information and operate agro-advisories and helplines.
- Increased investments need to be made for building effective communication, trusted relationships and an environment of engagement with farmers.
- There is a need to institutionalise knowledge generated from diverse sources through innovative processes and make it accessible to stakeholders. The database on investments and human resources in extension and advisory services (EAS) also needs to be strengthened.

### **Capacity development**

- Greater investment is required to strengthen the organizational and system capacity, functional capacity of extension professionals, and key individual competencies of advisory service providers. One such area is the capacity to show impact of extension, which could convince policymakers to prioritise and invest in EAS.
- Higher and improved investments are needed for developing national extension platforms to share knowledge and skills, participate in innovation processes, transfer technologies, develop youth entrepreneurship, as well as advisory services and extension policies.
- The investment in agricultural research and innovation, including education, science and extension, needs to be enhanced to 2 per cent or above of the agricultural GDP because economic success in the global market is determined more than ever by the pace of innovations.
- Greater thrust needs to be given to support agricultural innovation through increased package allocation and policy support in education, research, and extension e.g. through educational institutions in the least developed and disadvantaged countries, such as isolated Pacific Island countries, where it is often insufficient and lacking quality.

- Investment in and capacity building for agricultural research and innovations systems and self-sustaining governance and resource mobilisation are extremely important. An impact-oriented strategy for a skill enhancement and capacity development programme needs to be developed and implemented for research and innovation organizations.
- There is an urgent need to develop capacities to demonstrate impact from investments in agricultural research on livelihoods, and also to strengthen capacity and simultaneously increase investments into agricultural innovation, both at national and international levels.
- With the need for agri-food systems to be competitive in globalised agricultural product markets and shift to bio-based economies, there will be a need for increased and different capacities in institutions, technologies and enabling communities to innovate, for which increased investments will be needed. For example, negotiation skills of research organizations with potential users and business counterparts need to be built to contribute to the successful IP commercialisation.
- Investments and related policy support are needed to address the age and staff gap in agricultural research organizations through a mentoring system between senior and junior researchers and training for replacement to retain and transfer knowledge, and also to address the age and farmer gap in the farming community by enabling smallholder producers to create jobs and opportunities for youth in the agricultural sector to reverse the flow of the youth to cities.
- Investment in human resources, especially in science, along with consumer education and public awareness on the safety of new products need to be strengthened. Greater thrust needs to be given to integration of youth in capacity development to enable them to respond to new challenges and ensure sustainability of the agricultural sector.
- Investment in development and capacity building in CSA is required in terms of infrastructure, such as decentralised weather stations, ICT, climate-smart value chain and advance research stations; tools and models, including cloud computing system, decision support systems, such as computer-based models, and climate-smart prioritisation and investment tools.

### **Partnership and networking**

- There is a need for a paradigm shift in the funding and delivery mechanisms for agricultural research and innovations in partnership with the private sector, not-for-profit organizations, regional bodies, South-South co-operation, as well as with women and youth.
- Investment opportunities involving the private sector need to be encouraged in terms of sustainable value chains, including value addition, energy use efficiency, reduction of post-harvest losses, dissemination of climate information, operation of agro-advisories, helplines and ICTs.
- Greater efforts are needed for promoting and implementing new approaches to technical cooperation and joint investments between governments, businesses and agricultural organizations, particularly to target intractable poverty.

- Concerted efforts need to be made to address the needs of the private sector (industry, farmers' groups, civil society, etc.), which is a base for successful partnerships and increased investment for more efficient development and delivery of agricultural research and innovations.
- A framework of regional partnership for agricultural research and innovation involving multiple sectors aimed at encouraging investments in improving agricultural productivity and livelihoods of practitioners needs to be developed.
- Investments in strong partnerships need to be strengthened to make new technologies available to smallholder farmers and producers, who typically operate using traditional technologies and experience low yields.
- Bringing together all players with a shared vision through the participatory approach is very powerful as camaraderie is being built through shared experiences, respect for diversity and flexibility within partnerships. This can lead to accelerated learning process, more collaboration and access to new funding.
- The future plans of each country should focus on innovative partnerships, including South-South Cooperation, collaboration with China and India, as well as with the CGIAR, AIRCA, ASEAN, SAARC, and SPC.
- To ensure a continuum and consistency of efforts to enhance investment in research and innovations, a regional platform/network of trusted partners needs to be established. Such a special platform can look at foresight and visioning, emerging challenges and opportunities, as well as resource mobilisation for supporting the platform initiative.
- Institutional innovations and partnerships need to be developed and strengthened for collective actions at global, regional, national and community levels to solve complex, interconnected problems that affect the whole society. Greater investments are needed to foster these new partnerships through organizations in carrying out research, as well as the spread of innovations.
- There is a need to bring new stakeholders for out-scaling and up-scaling of agricultural research and innovation and working together to continue to deliver benefits to smallholder farmers and consumers. The diversity of partners needs to be respected and flexibility and adaptability within partnerships to be supported since each partner is different, with interactions taking place at many levels.
- Expanding knowledge networks and partnerships, engaging in South-South and North-South knowledge and technology transfer, as well as research collaboration with the international research centers, especially in the context of climate change, are equally important and need to be fully leveraged to mobilise and use investments for greater impact.

### **Women and youth in agriculture**

- Greater efforts need to be made to address engagement of women and youth in innovation processes and their under-representation as agricultural researchers. In order to attract youth to agriculture and provide employment opportunities for both men and women,

agriculture needs to be branded as a new sector for growth in business opportunities, utilising new ideas, innovations and ICTs, and prospering in an enabling and supportive environment.

- Making agriculture research profession gender sensitive would attract women and youth in agriculture and effectively address the issues of sustainability. Efforts need to be made to involve the youth in extension services which require higher investments. The concept of women, income and nutrition (WIN) to benefit women needs to be promoted by creating a win-win situation combined with the importance of working together with national agricultural research and innovation systems.
- Women smallholder farmers must be central to the agenda and the unique issues for women smallholder farmers and related investments need to be addressed effectively. The youth that are disappearing from agriculture need to be attracted and retained by addressing their problems and making agriculture more remunerative.
- Passion and adaptation of youth to use innovative ideas and tools, such as ICTs, needs to be capitalised on. In addition their engagement in agricultural research, they can help farmers use ICT tools, thereby improving farmers' access to information, collection and submission of data, as well as communication with each other.

## **Funding**

- The massive under-investment that exists must be addressed to improve the agricultural research intensity, which in turn can address key hunger and poverty concerns in the Asia-Pacific region.
- The levels of current investments of individual countries in various agricultural research areas need to be well understood. Countries with declining investment in agricultural research need to re-focus and re-prioritise agricultural research in order to leverage the innovations coming out from international organizations and the private sector, and adopt them to local conditions.
- Sufficient resources need to be made available in the Asia-Pacific region to build country capacity for agricultural research and innovation. To attract funding, agricultural researchers have to demonstrate effectiveness in implementing research activities with the focus on both quantity and quality of investment, not on absolute level of funding alone.
- Investment plans should focus on the need-based priority research areas, reforms in research management and M&E. Collective efforts of concerned stakeholders are required for mobilising investment since individual efforts are not usually successful. Diversification of funding sources needs to be encouraged to ensure required investment.
- The private sector can be an important vehicle for funding agricultural research. However, its funding contribution to agricultural research needs to be understood and addressed. It is important to note that increasing total spending and research intensity, with targets being set to help mobilise resources, should not be end goals. The end goal should be the institutional capacity to maximise the benefits of agricultural research to impact at scale.

- Assessment and documentation of innovative funding mechanisms and mobilisation for improved investments comprised of innovative approaches, policies and strategies need to be made in order to assist regional partners and stakeholders in enhancing the needed investments.
- Investment opportunities involving the private sector need to be encouraged in terms of sustainable value chains and addition; energy use efficiency; reduction of post-harvest losses; use of ICT tools and systems; agro-advisories and helplines; water and energy efficient technologies; and financial sectors, such as saving and credit, and agriculture insurance.
- A holistic approach for funding agricultural research needs to be adopted. Investments in agricultural R&D need to take place within the framework of priorities and programmes determined by national governments. Country-specific investment plans need to be developed based on respective country analysis of policies and priorities, in view of the large diversity of investment patterns among the Asia-Pacific countries.
- Intellectual property regimes are needed to attract the private investment and secure funding to support biotechnology innovations. Investment in the management of IPs is important for the benefit of knowledge workers, as well as the society in general and needs to be encouraged. Commercialisation strategy depends on many variables, such as individual circumstances, business capabilities, competitive environment and access to finance. Licensing is the most common commercialisation method, but it is just one of many options for taking IPs to the market place.

## **Policies**

- Enabling policies need to be in place for increasing strategic investment in agricultural research and innovation. There is a need for developing investment strategies that are sufficiently distinctive, locally relevant, easy to implement, and empowering people. Such strategies should generate demonstrable social impacts, achieve unprecedented leverage and release new knowledge through peer-to-peer initiatives.
- Investment is needed to create awareness and understanding of the importance of IPRs to enable researchers to commercialise their ideas and prevent others exploiting their research unfairly.
- A holistic approach for creating an enabling policy environment for increased funding to agricultural research needs to be adopted. It would lead to a larger impact on total poverty than any other expenditure areas.
- Resource groups need to be established for advocacy and assistance on enhanced funding, research and innovations systems in the region. They can cover various areas, such as policy, strategy, investment structure, and re-engineering. Such groups can be available based on the needs, demands and partnership of national, sub-regional and regional systems.
- By considering various dimensions of enhanced and improved investment in agricultural research and innovation, there is a need to have well-equipped and developed skills and capacities as part of the advocacy toolkit available in the region.

- Food policies need to be reoriented from having a focus on staple food production towards the promotion of healthier, better-balanced diets and collection of better statistics to monitor the outcomes of such new practices. Policy and monitoring frameworks also need to strengthen to ensure safer use of pesticides and fertilisers that help protect the environment and both smallholder farm families and consumers alike.
- A policy of commons needs to be developed and introduced to prevent overgrazing and overfishing, as well as a water plantation regime focusing on livestock, while conserving biodiversity. Due to the very strong market demand in livestock and fisheries that is having a substantial impact on the dynamics of the agricultural sector, different policy settings that encourage investments are needed to support change and capitalise on the critical role that livestock and fisheries play in food security and livelihood improvement.
- Supportive policies and regulatory frameworks are needed to guide the development and deployment of new agri-biotechnologies, and provide a transparent regulatory approval process for new products that are science-based to better secure their benefits. Adequate infrastructure to enable transparent, competitive and commercially viable markets for biotechnology products needs to be developed.
- Policy makers need to focus on the whole system change and align policies with the sustainable development agenda, shift from the top down ‘lab-to-land’ approach to ‘land-to-lab’, treat farming and livestock as an entrepreneurship/enterprise, improve coordination between R&D, and put in place policies around land contracting, bank credit and agri-insurance.

## Way Forward

In this changing environment for agricultural research and innovation and the urgent need to contribute to the SDGs, APAARI can play a crucial role to nudge the ARI4D activities in the region in the right direction. APAARI, as a trusted broker and valued partner, needs to focus efforts on advocacy and capacity development to address the challenges of the region and build a network of trusted partners that can operate effectively together. Looking at the needs of the Asia-Pacific region during the next 15 years, APAARI has recently developed its Vision 2030 and is in the process of developing its first Strategic Plan 2017-22. It is important to note that among the various thematic thrusts, two specific thrusts are more important in the context of theme of the Policy Dialogue:

- Investment in and capacity building for agricultural research and innovations systems in the region; and
- Self-sustaining governance and resource mobilisation for APAARI.

Both these thrusts are complementary and synergistic to each other. The end of the Policy Dialogue has begun a new process of steps, collective actions and partnerships in the ‘Way Forward’ towards realising the SDGs in the region. The impact pathways have been developed as planned outputs and outcomes from the Policy Dialogue.

The following outputs and outcomes from the Dialogue form the basic building blocks of the Way Forward:

## **Outputs (being accomplished)**

### **Dialogue proceedings**

The proceedings cover the Dialogue's deliberations, inputs and outputs, efforts, assessments and perspectives; as well as the key recommendations and a statement of way forward actions and pathways.

### **Dialogue reflections, recommendations and way forward**

Immediate outputs are expressed in terms of the Dialogue highlights in a narrative form, recommendations and follow up actions as expressed in the Way Forward statement.

### **Evaluation of Dialogue's results**

The results of evaluation of the Dialogue, based on responses of the participants through an online survey, and various other responses, such as through social media, are now made available.

### **Base structure for the way forward**

APAARI's recently developed Vision 2030 includes some key thematic thrusts along with its implementation focus areas.

### **Dialogue results fed into GCARD 3 Global event**

The inputs to and results obtained from the Dialogue, as reflected in the proceedings, have been fed into the regional and global event of the CGARD 3 process, being undertaken in partnership between GFAR and CGIAR in April 2016. Being the national, regional and global platform for addressing and chalking out future plans and processes, the enriching experience of the Policy Dialogue was shared for further enhancement of the Way Forward globally.

### **Country reports and synthesis paper as an independent print**

Soliciting country reports from 22 countries in Asia and the Pacific and distilling the results into a Synthesis Report for the region, has itself been a pioneering effort in painting various comparable and unique scenarios, as well as in laying the foundation for baseline data, information and knowledge as part of knowledge continuum. These efforts are being consolidated through refinement of country reports and synthesis paper through independent print.

## **Outputs (to be accomplished)**

### **Resource group for advocacy and assistance**

The area of enhancing and improving investment, getting policy support and generating an enabling environment will require highly skilled group of experts or a resource group that should be able to provide objective advice on funding and research and innovations systems in the region. The group can cover various areas, such as policy, strategy, investment structure, reengineering and

structure. It can be easily available based on the needs, demands and partnership of national, sub-regional and regional systems.

### **Advocacy toolkit for structured application**

By considering various dimensions of enhanced and improved investment in AR&I in Asia and the Pacific, there is a need to have well-equipped and developed skills and capacities as part of the advocacy toolkit in the region. Key dimensions in arriving at recommendations on strategies and options of enhancing and improving investment, include: the type and kind of investment; policies, priorities, specific needs, internal and external scenarios of decision-making systems on investment; regimes, options and scoping of investment; skills and capacities among research and innovation systems; attractiveness of returns to investment; and alternative development options for investing the limited resources. Therefore, the advocacy toolkit needs to be equipped with such methodologies and approaches to address the assessment of these key dimensions in helping facilitate appropriate recommendations to both the systems making investments and the systems needing investments. Once developed and validated, such advocacy toolkits, as supported by an appropriate resource group, can be used based on demand and partnership arrangements.

### **Platform for ongoing dialogue**

To ensure a continuum and consistency of efforts to enhance research investment, a platform for ongoing dialogue will need to be established and supported at the regional level. Such a special platform can look at foresight and visioning, emerging challenges and opportunities, as well as resource mobilisation for supporting the platform initiative.

## **Towards Outcomes**

### **Skills and capacity development in mobilising and attracting investment**

Based on the impact-oriented strategy and plan, a skill enhancement and capacity development project/programme will need to be implemented for research and innovation organizations in measuring up to accountability, and attracting and mobilising investment. The areas can include: i) planning, prioritisation, M&E, and outcome and impact assessment (both ex-ante and ex-post); ii) good science, innovations, partnerships; iii) creating congenial internal and external environment, prudence, transparency and accountability; iv) improved ways of smallholder producers' participation in ARI4D; and v) public-private and community partnerships.

### **Improved traction among global, regional and national agencies through collaboration and knowledge sharing**

Efforts for mobilising improved investment by research and innovation systems will need to be synergised through closer collaboration with global, regional, sub-regional and national agencies. Some areas can include knowledge sharing, databases, methods, tools, sharing of successful case studies, partnership, collaboration and assistance to research and innovation, as well as funding organizations.

**Enriching and sharing data and information on successful efforts and impacts:** Another core area is to generate and share adequate data and information on successful research and innovation efforts, and results and impacts within and across the region. This can be done through the development of compendium of such efforts, which can be effectively shared amongst various stakeholders as per their needs and requirements.

**Coordination and implementation of a project on monitoring of R&D investment, capacity and impact in Asia and the Pacific:** The purpose of this project with expanded coverage, training and in-country implementation, will be to reduce the knowledge and information gap on the performance, inputs, and outcomes/impacts of agricultural R&D systems in Southeast Asia and the Pacific. Improved knowledge will assist policymakers and research managers to better manage agricultural research institutions, improve imbalances among research staff, enhance research prioritization, and improve the allocation and mobilisation of funds for research programmes. This project is proposed as a partnership initiative between, ASTI of IFPRI, ACIAR, APAARI and countries in Asia and the Pacific.

**Assessment and documentation of innovative funding mechanisms:** Innovations in funding mechanisms and mobilisation for improved investments comprised of innovative approaches, policies and strategies and can include: i) various policy initiatives and long-term planning; ii) the ‘why’ and ‘how’ of joint public-private and community co-investment; iii) public funding for out-of-the box ARI4D; iv) cost and benefit sharing, incentives, rewards and awards; v) case studies, experiences and successful examples; vi) future collaborative ARI4D efforts among CGIAR, AIRCA, CSOs, the private sector and regional NARIs/NAROs vis-à-vis investment mobilisation needs; vii) funding agency and research establishment relationships, obligations and joint IP management; and viii) policy perspectives and road map for mobilising ARI4D.

**Refined and comprehensive scoping of investment options:** Besides the Dialogue’s limited coverage of scoping investment in the areas of addressing future challenges, smart and sustainable agriculture, partnership and knowledge for sustainable agriculture, a number of other areas need to be considered for developing comprehensive investment scoping options and priorities. These could be both generic and specific to various needs and scenarios.

**Demand- and partnership-based efforts in national, sub-regional and regional strategic ARI4D planning:** Based on the above steps, actions, preparations, and way forward, efforts will be made in helping and assisting research and innovation programmes in strategic ARI4D planning for both improved and effective investment and delivery of results and impacts. The basic consideration will be demand-driven and partnership-based efforts at the sub-national, national, sub-regional and regional levels.

## **Welcome and Introductory Remarks**

**Dr Raghunath Ghodake**

Chairman, Organizing Committee and Executive Secretary, APAARI

Good morning ladies and gentlemen!

Our greetings and warm welcome to all of you to the High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific.

The Policy Dialogue is being organized by APAARI, ACIAR, DOA Thailand, FAO RAP, GFAR and IFPRI and well supported by the sponsorship of Syngenta and Agricultural Technology Research Institute (ATRI), Chinese Taipei.

As Chair of the Dialogue Organizing Committee, and on behalf of the Co-Organizers and Sponsors, I am privileged and honored to present a warm welcome to the dignitaries on the dais: the Chief Guest, Mr Sakchai Sriboonsue, Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives, Government of Thailand; the Guest of Honor, Dr Kundhavi Kadiresan, Assistant Director General, FAO Regional Office for Asia and the Pacific; Mr Somchai Charnnarongkul, Director General, DOA, Thailand and Chair, APAARI Executive Committee; and Dr Surmsuk Salaketch, Deputy Director General, DOA, Thailand.

I am also equally privileged and honored to recognise and welcome our special guests and delegates: Prof Ramesh Chand, Member, Niti Ayog (Planning Commission), Government of India; Mr Allan Bird, Advisor to National Planning, Government of Papua New Guinea; and Mr Muhammad Sheheryar Sultan, Secretary Agriculture, Government of Punjab, Pakistan.

I am also honored and privileged to warmly welcome representatives and leaders of APAARI member organizations including NARIs, NAROs under NARS; farmers and farming communities; civil society organizations (CSOs), including NGOs and FOs; women and youth representatives; the private sector; policy makers and planners from agriculture ministries, planning departments, foreign/international affairs/finance; development organizations and banks; donor and funding organizations; social media participants and the media; CGIAR and CG Research Programmes (CRPs); international agricultural research centers; higher education sector; GFAR and the Global Forum for Rural Advisory Services (GFRAS); and members of the Policy Dialogue Advisory Committee and Program Committee.

Coming to the Policy Dialogue, I must admit that this is really a dream come true for us in APAARI that we had been talking about over the last 10 years. And that is about creating enabling environment and policy advocacy on this crucial area of investment in agricultural research and innovation in the Asia-Pacific region. These efforts have been well supported by all the co-organizers and sponsors.

We are very fortunate to have more than 25 specially invited and well prepared papers to be presented. There will be over 40 senior and experienced experts in taking lead roles in conducting the Policy Dialogue which is being attended by 130 participants from diverse backgrounds and stakeholder groups.

The programme is structured with resource papers, panel discussions, parallel sessions, plenary sessions as steered by expert chairs and moderators. There will be adequate time and space and plenty of opportunities for the participants to interact. We have also specially organized poster displays, covering ARI4D endeavors of countries, CGIAR and CRPs, the private sector, civil society organizations, higher education sectors and many others.

I would like to mention here that we have specially trained social media participants, who will be widely covering the event and communication through blogs and tweets to our wider stakeholders and others, who are not here. I take this opportunity to request you to please also participate online ([blog.gfar.net](http://blog.gfar.net)) by re-tweeting messages and/or using your own social media networks. We sincerely thank Peter Casier and Mark Holderness of GFAR for this initiative.

With these welcome and introductory remarks, we look forward to significant outputs and outcomes that will take us forward to the appropriate actions for all of us to partake towards sustainable development in Asia and the Pacific.

Thank you very much.

## **Chairman's Address**

### **Mr Somchai Charnnarongkul**

Chairman, APAARI Executive Committee and Director General, Department of Agriculture,  
Thailand

Good morning. On behalf of APAARI and the Department of Agriculture (DOA), Thailand, I would like to warmly welcome you all to the High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in Asia and the Pacific. It is certainly an honor and great pleasure for me to give remarks in the Inaugural Session of this Policy Dialogue.

First and the foremost, I would like to congratulate the APAARI Secretariat for the concerted efforts of bringing together high level officials and leaders of research and development institutions from the Asia-Pacific region. This has been made possible because of the highest level of support and co-operation extended by the co-organizers of this Policy Dialogue - the Australian Center for International Agricultural Research (ACIAR), the Department of Agriculture (DOA), Thailand, Food and Agriculture Organization of the United Nations - Regional Office for Asia and the Pacific (FAO RAP), the Global Forum on Agricultural Research (GFAR) and the International Food Policy Research Institute (IFPRI), as well as the sponsors – Syngenta and Agricultural Technology Research Institute (ATRI), Chinese Taipei, but also because of all of you who are able to join us today.

Honored Guests, Ladies and Gentlemen, I would like to express my sincere appreciation for your participation in this important event, which is an indication of your dedication and commitment to address the pressing needs of investment in agricultural research and innovations, that will not only help fight hunger of the vast population today but also for the wellbeing of future generations.

This Policy Dialogue is very timely, in view of the two important events this year. One is the launching of the Sustainable Development Goals (2030) and its endorsement by world governments and communities in September; and the second is the ongoing Climate Change meeting (Conference of Parties COP 21) in Paris. The SDGs and COP 21 are grappling with the challenges of finding equilibrium in addressing the issues of economic growth, poverty reduction and environmental sustainability.

Ladies and Gentlemen, this Dialogue certainly signifies our common concern and recognition of the vital role of investment in agricultural research and innovation for development, or in brief ARI4D, and its invaluable contribution to economic growth and sustainable development in countries of Asia and the Pacific.

We all agree that one of the paramount questions the world will be facing over the next three and half decades is how to feed more than 9 billion people by 2050. This needs to be done

in a manner that advances economic development and at the same time reduces pressure on the environment. A great balancing act is needed to simultaneously close the gap between the amount of food available today and what is required in 2050.

The agriculture sector employs directly or indirectly more than 28 per cent of the global population. According to the World Bank, growth in the agricultural sector can reduce poverty more effectively than growth arising from other sectors. This also means that there is an urgent need for the agriculture sector to be more dynamic so as to contribute to inclusive economic and social growth and development and at the same time to reduce its adverse impact on the environment. Producing more food will largely depend on increasing crop yields and cropping intensity on existing farmlands rather than by increasing the land area under agricultural production.

So, Ladies and Gentlemen, much more efforts and innovations will be urgently needed in order to sustainably increase agricultural production, improve the global supply chain, decrease food losses and waste, and ensure that all who are suffering from hunger and malnutrition have access to safe and nutritious food. Therefore, boosting agricultural production to the levels needed to feed the increased world population will require sharply increased and improved investment in agricultural research, new technologies, innovations and development.

We are here today to discuss and reiterate that enhancing investment in research and innovations is the most effective pathway to support agriculture. Huge public and private investments in research and innovations are required if agriculture is to benefit from the use of new technologies and techniques.

The need for substantially higher levels of investment in agriculture R&D will further increase due to climate change and intensifying water scarcity. The Policy Dialogue is expected to draw the direction, needs, and quantum of investment now and in the future in agricultural research and innovation that can contribute to improving the region's overall agriculture and agri-food systems and achieving the Sustainable Development Goals.

There will be discussions on policy and funding mechanisms for continued high investments in agriculture that can be used to achieve sustainable food systems, food security and nutrition, as well as identifying the role for national and international players. The role of the private sector is crucial, as well as the mechanisms for fostering the relation between public private partnership.

We have many questions that we need to answer such as:

- Will the region be able to produce enough food at affordable price by 2030?
- Do we have enough resources and how can we use them more efficiently?
- What type of technologies will we need and how to ensure that smallholders and women farmers are not bypassed, and do actually get benefitted from these technologies?
- How can regional and international cooperation be encouraged to increase investment in the agri-food research system including in technological advancements?

- How can the resources required for investment in developing countries' agriculture be mobilised from both public and private sectors? What kind of incentives do we need to that effect?

Surely the task in front of us is enormous. But, I am confident we will rise to the challenge with the help of all of you here today, as policy makers, investors, scientists, economists, farmers, men and women and other stakeholders.

APAARI being an organization that promotes the development of agricultural research and innovations in Asia and the Pacific, will incorporate the Policy Dialogue's conclusions and recommendations into its Strategic Plan and its operational/implementation plans and activities.

We look forward to the outcomes of our deliberations in the next two days.

Ladies and Gentlemen, I would like to wish all of you a productive and fruitful dialogue.

Thank you very much.

## **Keynote Address by Guest of Honor**

**Dr Kundhavi Kadiresan**

Assistant Director General and FAO Regional Representative for Asia and the Pacific  
(FAO RAP), Bangkok, Thailand

Your Excellencies, Colleagues, Ladies and Gentlemen

I extend a very warm welcome to all of you here in Bangkok at the “High Level Policy Dialogue on Investment in Agricultural Research for Development in Asia-Pacific Region – also known as AR4D.”

I wish not to state the obvious -- the relevance and importance of agricultural research for food security and poverty reduction. Today, there is ample evidence that agricultural research raises productivity and pays high financial dividends. Around the world, Bob Evenson found that internal rates of return on investments in research and extension programmes were nearly always above 20 per cent. Agricultural research in Thailand was recently estimated by Waleerat Suphannachart and Peter Warr to have a marginal internal rate of return of 30 per cent. Indeed, rates of return are generally estimated to have been higher in Asia than elsewhere.

Agricultural research does not pay off just in terms of higher financial rates of return – it also pays off in terms of poverty reduction. Again, there is plenty of evidence of this. Shenggen Fan and colleagues have shown that in case of India, government expenditures on agricultural research and development (R&D) have a larger impact on rural poverty reduction as compared to any other public expenditures aside from roads. And if we adopt a holistic approach, and include urban poverty as well, then agricultural R&D has a larger impact on total poverty than any other government expenditure. Agricultural R&D has also had a large impact on rural poverty reduction in China, second only to the effect of improvements in education.

These studies lead to two key conclusions. First, it is important to spend more money on agricultural research. Second, they also show that, for agricultural researchers, the ultimate clients are both producers and consumers.

In terms of agricultural R&D spending, there is both good news and bad news for our Asia-Pacific region. The good news is that public expenditures on agricultural research have been rising in real terms over the past thirty years. But, the most recent data show that public expenditure on agricultural research, as a share of agricultural GDP, is lower in Asia than in any other region of the world, including Sub-Saharan Africa, West Asia and North Africa, Latin America and high-income countries. This is not just bad news, it is terrible news!

Furthermore, much of the R&D increase witnessed in this region has come from China and India. In many middle-income countries, like Malaysia, Thailand and the Philippines, research intensity ratios have been on the decline – at least that’s the evidence from 2002 to 2008, the

most recent data available. These countries need to focus more on agricultural research in order to leverage the new innovations coming out from international organizations and the private sector and adapt them to local conditions.

The question to ask is why despite all this evidence agricultural research is not adequately funded? The most obvious answer is that it takes a long time before the results of these investments can be seen. When politicians and governments whose vision are often limited to 2-5 year horizons, we often find agricultural research competing against subsidy programmes and hand outs and physical infrastructures where one can show something tangible to the voters. Also, I have often heard Ministers of Finance grumble that even the funds given to agriculture research institutions are not spent properly, so why allocate more funds? So, it is not about making a case for more funding but also how the current resources are spent and on what. In my recent visit to Bangladesh where I visited the major agricultural research stations and rice research institute, it was clear that they were suffering from lack of resources. But at the same time, the research institutions were carrying out research on over 200 varieties of food crops. Where is the prioritisation? Breeding takes over everything else in most research stations, why?

This is an important question since there are many more challenges and complexities that agricultural research is facing and will face in the coming years. Population, urbanisation, technological advances and innovations present opportunities and challenges. The world's population is still increasing, particularly in this region, and coupled with the dietary diversification that accompanies growing incomes, food demand will increase substantially in the future. FAO estimates from 2005 indicate that global agricultural production will need to increase by 60 per cent overall (and 77 per cent in developing countries) by 2050. Given the increasing scarcity of land and water, this is a tall order.

Climate change adds another layer of complexity and uncertainty to the problem. As if agriculture was not already risky enough, farmers are likely to face an increased frequency of droughts and floods, as well as a general increase in temperatures. Adaptation will be difficult, and the increased uncertainty will discourage long-term investment. These trends will make it more difficult to produce enough food at affordable prices. If people are to continue to have access to food, agricultural research needs to assist farmers by developing more varieties that are tolerant to floods and droughts, along the lines of the submergence tolerant rice that is currently being adopted in Bangladesh and India. But let's face it. There is more to research than only finding ways to produce more.

There is no disputing the importance of increasing productivity and production over the next few decades. But the world's dietary habits, and those of Asia in particular, are changing, so the nature of agricultural research must also change. This will involve an approach that goes beyond just producing more tons of what we presently produce such as grains – although they will remain important. Asia-Pacific's consumer will want to consume foods with more protein and vitamins. We've already seen the soaring demand for dairy products, along with a growing demand for more meat and more fish.

Also as people in our region become richer, they are demanding more environmental services such as clean streams, rivers and oceans, as well as fewer pesticide residues. Agricultural research must respond to these trends and focus not just on production, important as that is,

but also on the environment. In my recent visit to countries in the Asia-Pacific, I was pleasantly surprised that in the roof tops and balconies of urban houses people are growing vegetables and fruits to meet their basic needs. Again, the issue of food safety was a primary factor for middle income families moving in this direction. Agricultural research must recognise this trend and respond accordingly.

Agricultural research must also develop improved crop management techniques to reduce greenhouse gas (GHG) emissions. We have seen many new pilots and pilots of the pilots - conservation farming, landscape approach to agricultural practices, integrated land, water and forestry management. And as an economist, I must stress that these approaches and pilots need to generate profits for farmers, or else they will not adopt them. In the case of Zambia where huge donor funds were invested on conservation farming, it was necessary for research institutes, government officials and village chiefs to work together to adopt and mainstream this.

At FAO, our number one priority is to eradicate hunger and malnutrition.

While the number of undernourished people in the world has declined and is now estimated by FAO to be 795 million, the number of people who suffer from micronutrient deficiencies is much larger – more than 2 billion are anaemic, more than 2 billion people are zinc deficient, and 250 million school children suffer from vitamin A deficiency.

These groups of people may not be riding the wave to higher caloric intake as previously mentioned. Their micronutrient deficiencies will need to be addressed in many ways, including crop diversification, supplementation and food fortification. But one promising option is greater use of biofortified crops, where the nutrients are bred into the seed itself.

As many of you know, there are several examples of such varieties: high zinc (plus iron) rice in Bangladesh and India; high zinc (plus iron) wheat in India and Pakistan; high iron pearl millet in India. None of these are genetically modified organisms (GMOs).

And then of course, there is golden rice, which is a GMO. Collectively, these new crops could help to address some of the most damaging micronutrient deficiencies in the world: vitamin A, iron and zinc. Agricultural research and extension systems need to bring these new crops to market by making sure they are profitable and safe.

And while we are on the subject of malnutrition, the number of people who are obese is rising throughout the world. In Asia, obesity prevalence rates are still quite low, at less than 10 per cent in nearly all countries (although it is a problem in the Pacific). It would be great if we can address this matter before it becomes a more serious problem in the region. Much of the work to reduce obesity will undoubtedly center on educating consumers, but perhaps agricultural research can do something as well.

Not only is it important to consider a wider range of objectives than in the past, we can do our agricultural research differently than in the past. Information and communication technologies (ICTs), by facilitating the sharing of information, have opened avenues for rapid, mass innovation in agriculture that is more open and participatory in nature.

As a result, investment is now needed not only in generating technologies, but also in changing institutions and creating new capacities in agricultural communities for both absorbing and

creating new knowledge. When larger numbers of farmers become involved, we can tap on a much wider pool of knowledge and experience to facilitate mass innovation.

There are some good and bad examples that I am aware of. In the Philippines, farmers can use cell phones to input some of their farm characteristics and then receive information specific to their fields. But in other circumstances, we have seen researchers who are completely out of touch with their extension agents. When such communication is lacking, information cannot flow from farmers to scientists and back again, and the pace of relevant innovation is slowed down substantially. Farmers are the scientists, business people, innovators and problem solvers. I heard one passionate state secretary in India say that 90 per cent of the problems can be solved by farmers and research is needed for the remaining 10 per cent. The point he was making is that we need to be farmer centric in agricultural research and its dissemination. With more and more women undertaking all aspects of farming, is agricultural research being sensitive to gender? A hybrid corn variety gave higher yield but it was hard to pound, therefore, women were not adopting that variety.

With the rapid advancement of scientific knowledge over the past few decades, we will also need to use new techniques – biotechnology, nanotechnology, and geographic information systems. Again, as I said earlier, applying these techniques will require significant capital investment that may be beyond the reach of agricultural research institutions. This speaks to the importance of spending more money on agricultural research.

But, it also suggests that there will be a greater need for cooperation in regional bodies and South-South cooperation in agricultural research. ASEAN and SAARC can serve as platforms for working together in agricultural research. And China and India in particular, as large countries with well-established research institutions, can share their knowledge with other countries in the region.

Finally, I would like to stress the importance of partnerships, especially with the private sector. The public sector has an important catalytic role to play in research and extension, but we must remember that the vast bulk of agricultural investment comes from the private sector, including individual farms and farm communities. Thus, for public sector research and extension to be relevant, these institutions must fully engage with different parts of the private sector, to understand what problems they face and what solutions they need.

Private sector research in developing countries is much less than in developed countries, but there are nevertheless many examples such as Amul Dairy in India. It has utilised a classic agri-food systems approach starting from animal feed and veterinary services, through to milk collection, processing and marketing, and integrating innovation as well. Regional agricultural research related organizations such as APAARI have an important role to play in facilitating collaboration and partnership across regions, countries and actors to share agricultural technologies for the benefits of both farmers and consumers, especially the poor.

For many centuries, agricultural research has created for humanity the food and nutrition it needed for us to reach where we are today. That research will continue to be our vanguard ensuring a healthier and happier future for generations to come. Hope this event is nudging us in the right direction.

Thank you

## Inaugural Address by Chief Guest

**Dr Sakchai Sriboonsue**

Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives,  
Royal Government of the Kingdom of Thailand

### **Dignitaries on the Dias, Ladies and Gentlemen,**

I do appreciate the invitation and I am very pleased to be at the Inaugural Session of this crucial Policy Dialogue on Investment in Agricultural Research and Innovations for Sustainable Development in Asia and the Pacific.

The event is very timely as we all are shaping the post-2015 development agenda and moving towards achieving the Sustainable Development Goals by 2030. These goals have been recently approved for realisation by the world communities and governments.

The Asia-Pacific region is the most populated region with rapid and high rates of economic and social development. Although poverty has significantly decreased over the years, there are still many challenges to be addressed as the region is fast evolving technologically, economically, socially, and politically.

We continue to face the overall challenges of food and nutrition insecurity, poverty, environmental degradation and natural and manmade disasters. The Asia-Pacific region is home to almost two-third (642 million) of world's hungry and poor.

Some specific challenges to agricultural development are: low productivity of farming, providing remunerative prices to farmers, providing affordable, safe and nutritious food to communities, reducing losses of food, preventing trans-boundary diseases and coping with climate change risks.

One of the root causes explaining our inability to address these challenges is the weak and underinvested agricultural research and innovations systems in most of the countries in the Asia-Pacific region.

Therefore, enhanced attention to agricultural research and innovation is necessary to achieve the Sustainable Development Goals that include *inter alia* attaining food security, improving nutrition, promoting sustainability, restoring agricultural systems, and combating adverse impacts of climate change.

The World Development Report of 2008 has shown that returns from investments in agriculture sector have given much higher dividends compared to similar investments in other sectors in the developing world. This reiterates the need for higher and improved investment and must receive priority attention of national governments and donors.

Accordingly, it is critical that we reshape our agricultural research agenda now to lay greater emphasis on “innovation” for attaining sustainable agricultural growth and development. But while doing so we must have foresight as agriculture in the Asia-Pacific region is rapidly transforming and evolving. The Region is at the crossroads of significant change in its agriculture and agricultural food systems.

For this crucial initiative, I take this opportunity to commend the Asia-Pacific Association of Agricultural Research Institutions (APAARI), Department of Agriculture (DOA), Thailand, and other co-organizers such as Australian Centre for International Agricultural Research (ACIAR), Food and Agriculture Organization of the United Nations – Regional Office for Asia and the Pacific (FAO RAP), Global Forum on Agricultural Research (GFAR) and International Food Policy Research Institute (IFPRI).

I wish and hope that the Policy Dialogue will provide a road map to mobilise adequate resources and capacities to effectively contribute towards attaining the SDGs in the Asia-Pacific region. Thus, the agricultural research and innovation systems and the governments and donors will be better equipped to address the challenges.

The Government of Thailand looks forward to receiving such recommendations for our positive considerations and implementation at the national level.

Now I declare the High Level Policy Dialogue officially open and I wish all the best for the success of this important event.

Thank you and God Bless all.

## Programme

### Day 1 : Tuesday, 8 December 2015

08:00 - 09:00 : Registration

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#### 09:00 - 10:00 Inaugural Session

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Welcome and Introductory Remarks	Raghunath Ghodake Chairman, Organizing Committee; and Executive Secretary, APAARI
Chairman's Address	Somchai Charnnarongkul Member, Advisory Committee; Director General, DOA, Thailand; and Chair, APAARI
Keynote Address by the Guest of Honor	Kundhavi Kadiresan Member, Advisory Committee; and ADG, FAO RAP
Inaugural Address by the Chief Guest	Sakchai Sriboonsue Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives, Government of Thailand
Vote of Thanks	Surmsuk Salakpetch Member, Organizing Committee; and Deputy Director General, DOA, Thailand

10:00 - 10:30 *Group photograph and Coffee break*

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#### 10:30 - 12:30 **Session I: Status and Outlook for Investment in Agricultural Research and Innovation**

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*Co-Chairs* : Simon Hearn (Australia)  
Pramod Joshi (IFPRI)

*Rapporteurs* : Norah Omot (PNGWiADF)  
Dave Watson (CRP Maize)

#### **Presentations:**

- Long-Term Agricultural Research and Innovation for Development an ACIAR Perspective in the Asia-Pacific Region Nick Austin (ACIAR, Australia)
  - Agricultural R&D in Asia: Recent Investment and Capacity Trends Gert-Jan Stads (IFPRI)
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- A Synthesis of the Status of Agricultural Research and Investment to Support Sustainable Development in Countries of Asia and the Pacific Mohammad Jabbar (APAARI)
  - Agricultural Research Raises Productivity and Reduces Rural Poverty: Empirical Evidence from Indonesia and Thailand Peter Warr (ANU, Australia)

General Discussion

12:30 - 14:00 *Lunch Break*

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**14:00 - 15:30 Session II: Scoping Investments in Agricultural Research and Innovation – Addressing Current and Emerging Challenges**

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*Co-Chairs* : Ramesh Chand (Niti Ayog, India)  
Julian Parr (CIP)

*Rapporteurs* : Laurent L'huillier (IAC, New Caledonia)  
Vilasini Pillai (APAARI)

**Presentations:**

- Patterns and Trends in Agricultural Investment - Leveraging Whole - System Impacts Richard Hames (Centre for the Future, Australia)
- Investing in Agri-Biotechnology: Research for Entrepreneurship Paul Teng (NTU, Singapore)
- Five Necessary Policy Changes to Help Achieve Improved Nutrition and Sustainable Agriculture through Smallholder Vegetable Horticulture Dyno Keatinge (AVRDC)
- The Opportunities and Challenges for Livestock and Aquaculture Research for Development in Asia Steve Staal (ILRI)

General Discussion

15:30-16:00 *Coffee Break*

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**16:00 - 18:00 Parallel Session III(A): Scoping Investments in Agricultural Research and Innovation – Climate Smart and Sustainable Agriculture**

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*Chair* : Masa Iwanaga (JIRCAS, Japan)

*Rapporteurs* : Siosua Halavatau (SPC)  
Sahdev Singh (India)

**Presentations:**

- Innovation in Agriculture in Response to Climate Change: Towards a Global Action Plan for Agricultural Diversification George Hall (CFF)
  - Achieving National and Global Climate Objectives in Asia-Pacific through Investment in Climate Smart Agriculture Beau Damen (FAO RAP)
  - Potential Areas of Investment in Climate-Smart Agriculture in South Asia Paresh Bhaskar (CCAFS)
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**Panel Discussion: Climate Smart and Sustainable Agriculture**

*Moderator* : Masa Iwanaga (JIRCAS, Japan)  
*Panelists* : Paul Teng (NTU, Singapore)  
 Sonny Tababa (CropLife Asia)  
 Junne-Jih Chen (TARI, Chiense Taipei)  
 All Speakers

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**16:00 - 18:00 Parallel Session III(B): Scoping Investments in Agricultural Research and Innovation – Knowledge Management for Sustainable Agriculture**


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*Chair* : Dyno Keatinge (AVRDC)  
*Rapporteurs* : Sonali Bisht (India)  
 Martina Spisiakova (Slovakia)

**Presentations:**

- Land Resource Inventory of India for Development of Sustainable Agricultural Land Use Plans Using Geospatial Techniques - Avenues for Investment S.K. Singh (NBSS&LUP, India)
- The Case for Investment in Knowledge Management to Support the Sustainable Development Goals in Asia-Pacific Region - Some Lessons Learned from CABI's Experiences Andrea Powell (CABI)
- The Rice Bowl Index: Using Open Data to Help Drive Sustainable and Robust Food Security Across Asia-Pacific Eddie Chew (ASEAN & Syngenta)

**Panel Discussion: Knowledge Management for Sustainable Agriculture**

*Moderator* : Dyno Keatinge (AVRDC)  
*Panelists* : Fr. Francis Lucas (ANGOC)  
 Reynaldo V. Eborra (PCCARD)  
 Etienne Duveiller (CIMMYT)  
 All Speakers

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**16:00 - 18:00 Parallel Session III(C): Scoping Investments in Agricultural Research and Innovation – Capacity Development for Sustainable Agriculture**


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*Chair* : M.C. Varshneya (IAUA, India)  
*Rapporteurs* : A.K. Vasisht (ICAR, India)  
 Simon Wilkinson (NACAP)

**Presentations:**

- Return from Investment in Agricultural Education, Research and Outreach Extension Systems for Development: Some Policy Guidelines in the Context of Pacific Island Countries Abdul Halim (Unitech, PNG)
  - Investment in Extension and Advisory Services in Asia-Pacific Region: Status and Opportunities Virginia Cardenas (GFRAS)
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- Agricultural Sustainability through Collaboration, Peter Erik (SAI Platform)  
Beyond Competition
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**Panel Discussion: Capacity Development for Sustainable Agriculture**

*Moderator* : M.C. Varshneya (IAUA, India)

*Panelists* : Yama Pandey (NARC, Nepal)

Javed Rizvi (ICRAF)

R.P. Singh (IAUA, India)

All Speakers

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**18:30 - 19:30 Poster Session**

*Covering country reports, private sector reports, CRP posters, other sponsors activities, and any other displays (Posters will be available on both days)*

19:30-22:00 Cultural Programme Dinner hosted by Department  
of Agriculture, Government of Thailand

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**Day 2 : Wednesday, 9 December 2015**

**8:30-10:10 Session IV: Plenary: Scoping Investments (Theme of Sessions II & III)**

*Chair* : Ajit Maru (GFAR)

*Rapporteurs* : Kamal Kishore (RML, India)

Narendra Dadlani (APSA)

**Presentation of Session Highlights/Recommendations:**

Outputs/reports from Sessions II and III -  
Presented by Rapporteurs of Sessions II  
and III (A, B, C)

**Panel Discussion: Scoping Investments (Theme of Sessions II & III)**

*Moderator* : Ajit Maru (GFAR)

*Panelists* : Ramesh Chand (Niti Ayog, India)

Shimpei Murakami (AFA, Japan)

Virginia Cardenas (GFRAS)

10:10 - 10:45 *Coffee Break*

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**10:45 - 12:30 Session V: Impact Expectations from Investment in Agricultural Research and Innovation**

*Chair* : David Shearer (ACIAR)

*Rapporteurs* : Mohammad Jabbar (APAARI)

Hung Nguyen (ILRI)

**Presentations:**

- Agricultural Research in a Transforming Country: Views from the Vietnamese (Rice) Field Chris Jackson (World Bank)
  - Investing in Agriculture to Feed Asia Securely Mahfuz Ahmed (ADB)
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- Expectations of Impacts from Investment in Agricultural Research and Innovations – An NGO Perspective Kamal Kishore (RLN, India)
  - Developing Capacity for Change to Enhance the Potential of Investment into Agricultural Innovations Karin Nichterlein (TAP, FAO)

**Panel Discussion: Impact Expectations from Investment**

*Moderator* : David Shearer (ACIAR, Australia)

*Panelist* : Peter Warr (ANU, Australia)

All Speakers

12:30 - 14:00 *Lunch Break*

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**14:00 - 16:10 Session VI: Innovative Funding Mechanisms**

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*Co-Chairs* : Allan Bird (PNG)

Karin Nichterlein (TAP, FAO)

*Rapporteur* : A.R. Ariyaratne (SLCARP, Sri Lanka)

**Presentations:**

- Time for a Step-Change: The Agricultural Innovation and Enterprise Facility Mark Holderness (GFAR)
- Innovative Funding Mechanisms of Public Sector: The Case of National Agricultural Innovation Project (NAIP) of Indian Council of Agricultural Research Mruthyunjaya (India)
- Intellectual Property Management and Commercialisation of Agricultural Research: A Case of MARDI Tapsir Serin (MARDI, Malaysia)
- Regional Partnership to Address Food Production Crisis in the Pacific Islands Siosua Halavatau (SPC)
- A Comparison of Public/Private Agricultural Research Partnerships Simon Hearn (Australia)

**Panel Discussion: Innovative Funding Mechanisms**

*Moderator* : Allan Bird (PNG)

*Panelists* : Mahfuz Ahmed (ADB)

Esther Penunia (AFA, Philippines)

All Speakers

16:10-16:40 *Coffee Break*

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**16:40 - 17:30 Session VII: Final Plenary**


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*Chair* : Mark Holderness

**Presentations:**

- Reports featuring summary, highlights and recommendations from four Thematic Sessions and General Discussion as participated by the Floor Presented by Rapporteurs of Sessions I, IV, V and VI
- Highlights covering Final Recommendations and Actions David Shearer as assisted by the Rapporteurs of Various Sessions

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**17:30 - 18:00 Closing Session**


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Way Forward	Raghunath Ghodake Chair, Organizing Committee; and Executive Secretary, APAARI
Closing Remarks	Mark Holderness Member, Advisory Committee; and Executive Secretary, GFAR Surmsuk Salakpetch Depty Director General, DOA, Thailand
Vote of Thanks	Vilasini Pillai Member, Program Committee; and Coordinator APCoAB

19:30 - 22:00 *Dinner Hosted by APAARI*

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## List of Participants

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## Participants' Representation from Different Institutions

Country	Gender		Organizational type												
	Male	Female	Policy body	NARI	NARO	Higher education	CSO (NGO)	CSO (FO)	YPARD	Intergov. sector	Private	CGIAR	AIRCA	Fora	Dev. agency
<i>South Asia</i>															
Bangladesh	4	1			2			1	1	1					
Bhutan	2		1		1										
India	14	2	2	1	3	6	3				1				
Iran	1				1										
Nepal	2	1			1			1	1						
Pakistan	1		1												
Sri Lanka	1				1					1					
<b>Sub-total</b>	<b>25</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>1</b>				
<i>Southeast Asia</i>															
Cambodia	1				1										
China		1								1					
Indonesia	2	3						4	1						
Japan	3	1			3			1							
Lao PDR	2	1	1	1						1					
Malaysia	2		1	1											
Mongolia		2												2	
Philippines	5	3												3	2
Republic of Korea	1							1	1						

Country	Gender		Organizational type												
	Male	Female	Policy body	NARI	NARO	Higher education (NGO) (FO)	CSO	CSO	YPARD	Intergov. sector	Private	CGIAR	AIRCA	Fora	Dev. agency
Singapore	2	1				1					2				
Taiwan	1	1	1								1				
Thailand	5	8	2	9	1						1				
Vietnam	2	2	1	1		2									
<b>Sub-total</b>	<b>26</b>	<b>23</b>	<b>5</b>	<b>4</b>	<b>15</b>	<b>2</b>	<b>2</b>	<b>10</b>	<b>7</b>	<b>4</b>	<b>4</b>				
<b>Pacific</b>															
Australia	5			2	2	1					2				
Fiji	2			1					1						
New Caledonia	1		1												
Papua New Guinea	2	1	1			1									
<b>Sub-total</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>				
<b>Europe</b>															
Belgium	1										1				
Netherlands	1										1				
Slovakia	1										1				
<b>Sub-total</b>	<b>3</b>										<b>3</b>				
<b>Regional/International Organizations</b>															
Regional	5	5												10	
International	23	5										14	6	2	6
<b>Sub-total</b>	<b>28</b>	<b>10</b>										<b>14</b>	<b>6</b>	<b>12</b>	<b>6</b>
<b>Total</b>	<b>92</b>	<b>39</b>	<b>10</b>	<b>6</b>	<b>27</b>	<b>10</b>	<b>6</b>	<b>13</b>	<b>10</b>	<b>1</b>	<b>10</b>	<b>14</b>	<b>6</b>	<b>12</b>	<b>6</b>
%	70	30	8	5	21	8	5	10	8	1	8	11	5	9	5

## Policy Dialogue Evaluation

### Introduction

The Asia-Pacific Association of Agricultural Research Institutions (APAARI) in collaboration with Australian Centre for International Agricultural Research (ACIAR), Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific (FAO RAP), Global Forum on Agricultural Research (GFAR) and International Food Policy Research Institute (IFPRI) jointly organized the High Level Policy Dialogue on Investment in Agricultural Research for Sustainable Development in the Asia-Pacific Region on 8-9 December 2015 at Bangkok, Thailand, to explore the possibilities as well as modalities of mobilising national, regional and international funding organizations and other interested donors to enhance financial and policy support for agricultural research for development (AR4D), and to develop appropriate strategies and a road map.

### Participants

A total of 130 persons participated in the event. The Policy Dialogue evaluation survey questionnaire was sent to 120 participants (excluding APAARI staff). Out of these, 50 participants (39%) completed the evaluation questionnaire either through a Word form or an online platform Survey Monkey. Out of the 50 respondents, 37 participants (74%) were male and 13 participants (26%) were female.

In terms of institutional types, the highest number of respondents (16%) was from the National Agricultural Research Organizations (NAROs) followed by Consultative Group on International Agricultural Research (CGIAR) Centres (12%) and Civil Society Organizations (Farmer Organizations) (12%). Table 1 below show details.

**Table 1.** Institutional Types of Respondents

<b>Institution</b>	<b>No. of respondents</b>	<b>% of total respondents</b>
Association of International Research and Development Centers for Agriculture (AIRCA)	4	8
Consultative Group on International Agricultural Research (CGIAR) Centres	6	12
Civil Society Organizations (CSOs) - Farmer Organizations (FOs)	6	12
Civil Society Organizations (CSOs) - Non-Governmental Organizations (NGOs)	4	8
Young Professionals for Agricultural Development (YPARD)	4	8
National Agricultural Research Institutes (NARIs)	5	10
<b>National Agricultural Research Organizations (NAROs)</b>	<b>8</b>	<b>16</b>

<b>Institution</b>	<b>No. of respondents</b>	<b>% of total respondents</b>
Inter-Governmental Organizations	1	2
International Development Organizations	1	2
Higher Education Sector	2	4
Private Sector	5	10
Policy Bodies	4	8

## Policy Dialogue

### Usefulness and quality

Participants were invited to rank the usefulness and quality of the meeting in terms of its content, processes and logistics, from ‘excellent’ to ‘poor’. The table below shows results with four evaluation criteria (excellent, good, average and poor). In terms of content, participants evaluated each key content of the meeting. The content/sessions that most participants evaluated as excellent include: (i) Theme of the Dialogue – Investment in AR4D in the APR (74%); (ii) Status and Outlook for Investment in Agricultural Research and Innovation (44%); and (iii) background materials such as the Concept Note, Scoping Paper and Abstract Book (42%).

**Table 2.** Usefulness and quality of content in the Policy Dialogue

<b>Topic</b>	<b>Excellent</b>		<b>Good</b>		<b>Average</b>		<b>Poor</b>		<b>Total</b>
	<b>No. of people</b>	<b>%</b>	<b>No. of people</b>	<b>%</b>	<b>No. of people</b>	<b>%</b>	<b>No. of people</b>	<b>%</b>	
<b>Theme of the Dialogue – Investment in AR4D in the APR</b>	<b>37</b>	<b>74</b>	<b>12</b>	<b>24</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>50</b>
<b>Status and Outlook for Investment in Agricultural Research and Innovation</b>	<b>22</b>	<b>44</b>	<b>22</b>	<b>44</b>	<b>6</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>50</b>
Scoping Investments in Agricultural Research and Innovation – Addressing Current and Emerging Challenges	16	32	30	60	4	8	0	0	50
Scoping Investment in Climate Smart and Sustainable Agriculture	18	36	22	44	10	20	0	0	50
Scoping Investment in Agricultural Research and Innovation – Knowledge Management for Sustainable Agriculture	10	20	32	64	7	14	1	2	50
Scoping Investments in Agricultural Research and Innovation – Capacity Development for Sustainable Agriculture	10	20	29	58	10	20	1	2	50

Topic	Excellent		Good		Average		Poor		Total
	No. of people	%	No. of people	%	No. of people	%	No. of people	%	
Impact Expectations from Investment in Agricultural Research and Innovation	11	22	27	54	12	24	0	0	50
Innovative Funding Mechanisms	5	10	27	54	17	34	1	2	50
Poster Displays	10	20	21	42	15	30	4	8	50
<b>Background Materials – i) Concept Note, ii) Scoping Paper, and iii) Abstract Book</b>	<b>21</b>	<b>42</b>	<b>25</b>	<b>50</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>50</b>

### Processes

In terms of the processes of the event such as agenda, inauguration, facilitation, presentations, discussions and engagement, most participants ranked them as ‘good’. The processes that most participants evaluated as excellent include: (i) agenda and session arrangements; (ii) inauguration session and statements; and (iii) time management and decorum.

**Table 3.** Meeting processes

Topic	Excellent		Good		Average		Poor		Total
	No. of people	%	No. of people	%	No. of people	%	No. of people	%	
<b>Agenda and Session Arrangements</b>	<b>30</b>	<b>60</b>	<b>19</b>	<b>38</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>50</b>
<b>Inauguration Session and Statements</b>	<b>21</b>	<b>42</b>	<b>27</b>	<b>54</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>50</b>
Chairing, Moderating and Facilitation	18	36	29	58	3	6	0	0	50
Presentations by Speakers	17	34	29	58	4	8	0	0	50
Panel Discussions	15	30	28	56	7	14	0	0	50
Participants’ Engagement in Discussions	12	24	29	58	9	18	0	0	50
Reflections and Way Forward Outcomes	13	26	29	58	7	14	1	2	50
<b>Time Management and Decorum</b>	<b>21</b>	<b>42</b>	<b>26</b>	<b>52</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>50</b>
Social Media – Communication, participation and interactions through social media such as tweets and blogs	15	30	29	58	5	10	1	2	50

### Logistics

Logistics such as food, drinks and entertainment, as well as meeting facilities and administrative assistance, were rated relatively high – most people thought they were excellent. The table below provides details.

**Table 4.** Logistics

Topic	Excellent		Good		Average		Poor		Total
	No. of people	%	No. of people	%	No. of people	%	No. of people	%	
Meeting Facilities – Hall, Sitting Arrangements, Audio-visuals	32	64	16	32	2	4	0	0	50
Food, Drinks and Entertainment	33	66	16	32	1	2	0	0	50
Administrative Assistance and Courtesy	32	64	17	34	1	2	0	0	50
Travel /Booking/ Advice	28	56	20	40	1	2	1	2	50

### Overall organization

The majority of participants (58%) ranked the Policy Dialogue as ‘excellent’, while 36 per cent perceived it as ‘good’. Two participants thought that it was average, while only one thought it was ‘poor’.

### Aspects to be improved in the future

This section indicates the key areas that will be taken into consideration in the organization of similar events by APAARI in the future. These areas are based on the suggestions that individual participants expressed during the evaluation. Thirty-five participants answered this question (15 skipped) providing the answers below:

#### Process

- More time needs to be given to participatory discussions, including panel discussions (4 respondents).
- There should be more interaction and discussions to share problems and experiences, including gathering feedback from the grassroots level (4 respondents)

One person each also thought that panel discussions need to be more focused; improved summing up is needed; group work and plenary sessions could be a good way of sharing knowledge from different countries; and the sessions were not that participatory and it would have been better if seating was arranged in group tables, sessions included time for discussion and were more oriented towards participation, rather than the lecture/question format.

#### Facilitation

- Some moderated panel discussions had a good exchange of views among panelists. However, there were some panel discussions where the moderator took most time sharing his views rather focusing on sharing and exchanging views among the participants.
- Panel discussions tended to be dominated by some facilitators. There is a need to control facilitators as well.

- Comments from participants need to be better managed. Often, comments from the floor were unfocused addressing only minor issues.

### **Participants**

- Greater participation of farmers' organizations to be considered (and their presentations).
- More government researchers, especially from Laos, Cambodia and Myanmar should be involved to share their experiences and learn lessons from international researchers.
- Representation from sub-national institutions should be considered.
- Participants with more diverse backgrounds need to be included.

### **Comprehension**

- Earphones should be provided to all delegates to help with audio, hence comprehension.
- Presenters should be asked to speak slowly to enable non-native English speakers understand better.
- Improved sound system – microphones are needed.

### **Logistics**

- The distance between the stage and audience should be smaller.
- Smaller workshops need to be considered.
- Improved administrative assistance and courtesy is needed.
- Extend the workshop by one day to provide more time to each speaker.

### **Content**

- More detailed and serious debate and focus on innovative funding mechanism is needed
- Presentations on various topics should include examples of successful case studies and scoping out ways and means of ensuring continuous funding for such studies as well as scaling them up.
- Better scoping study needs to be undertaken.
- Wider range of speakers should be included.
- More detailed presentations are needed.

### **Field trip**

- It would have been better if there was a visit to an agricultural research institute in Bangkok.

## Understanding and knowledge gained from the Policy Dialogue

This section focused on knowledge and understanding that participants acquired from various sessions. Most participants rated their knowledge on the significance of investment in ARI4D in APR as excellent. Others generally rated their knowledge on the Policy Dialogue's topics as 'good'. This is especially in relation to the Way Forward following the Policy Dialogue and the extent of expected impact from investment in ARI4D. Table 5 below provides details.

**Table 5.** Understanding and knowledge gained from the Dialogue

Topic	Excellent		Good		Fair		Poor		Total
	No. of people	%	No. of people	%	No. of people	%	No. of people	%	
The current status and outlook of investment in ARI4D in APR	14	28	32	64	4	8	0	0	50
The significance/importance of investment in ARI4D in APR	23	46	24	48	3	6	0	0	50
Appreciation for scoping and prioritization of research and innovations for improving investment	17	34	17	52	7	14	0	0	50
The level and magnitude of funding investment in ARI4D in APR	10	20	10	56	12	24	0	0	50
The extent of expected impact from investment in ARI4D	11	22	11	66	6	12	0	0	50
The type and extent of innovative funding mechanisms	6	12	6	56	14	28	2	4	50
The key outcomes of the Dialogue	16	32	30	60	4	8	0	0	50
The way forward following the Dialogue	11	22	34	68	5	10	0	0	50

## Ability to use new knowledge

When asked how much of what the participants learned in the Policy Dialogue that they will be able to use/apply in their work (all, most of it, about half, a little and nothing), they provided the feedback below. Sixty per cent of participants indicated that they will be able to use most of the new knowledge acquired and 30 per cent will be able to use about half.

**Table 6.** Ability to use new knowledge

Answer choices	Responses	
	No. of people	%
All	2	4
Most of it	30	60
About half	15	30
A little	3	6
Nothing	0	0
<b>Total</b>	<b>50</b>	<b>100</b>

## **Synopsis of the Dialogue Social Media Training**

As part of HLPD meeting, GFAR and APAARI agreed to conduct a social media training and social reporting project that proved successful. The goals were to:

- Provide a social media training to the interested HLPD participants, YPARD representatives, GFAR/APAARI partners and representatives of other interested organizations as part of larger capacity building projects;
- Provide live updates via blogs, twitter and other social media tools from the meeting, allowing to reach out to the larger online APAARI/GFAR community beyond merely those present at the meeting.

### **The Social Media team participants**

The project was announced on the GFAR blog, one month before the Policy Dialogue and invitations were sent out to all HLPD participants. YPARD selected five youth from the Asia-Pacific region to participate, funded by GFAR. The announcement blogpost was also circulated to the online communities from CGIAR, the Asian and FAO forestry networks, members of the Global Landscapes Forum and other institutions. The following 21 trainees participated in the training program:

- 7 original HLPD participants (of which one was also a YPARD member)
- 5 sponsored YPARD members
- 9 trainees from other interested organizations: International Livestock Research Institute (ILRI), International Water Management Institute (IWMI), Water, Land and Ecosystems (WLE), The Center for People and Forests (RECOFTC), ASEAN Social Forestry Network (ASFN), Crops For the Future (CFF) and World Wide Fund for Nature (WWF).

The trainees made an excellent mixture of professional communicators, scientists, practitioners and academics. Overall, the participants mixed “young” and “experienced” with ages ranging from 23 to 72.

### **The training and social reporting set-up**

The training targeted both novices and advanced social media users, interested in learning more about the use of social media within a professional environment. It consisted of two parts:

- Classroom training of one day with an overview of all social media tools, as used in a professional environment, covering two key tools more in-depth: twitter and blogging.

- Practical training (the social reporting project) during which the trainees used their social media skills to report live from the HLPD. During this social reporting exercise, the trainees were intensively mentored by the social media trainer.
- As part of the social reporting project, all blogs were published on the GFAR blog, while participants used their own Twitter accounts for live tweeting.

The cost of the training was covered by GFAR, with significant logistics support by APAARI. The training and social reporters' mentoring was coordinated by Peter Casier, the GFAR Social Media Coordinator.

## **The theoretical training**

Limited to one day, the theoretical training had an intensive induction programme as follows:

- Social Media Plethora: Overview of all tools, and their use for non-profit causes including practical examples of social media strategies
- The art of blogging: How to write good blogposts. What makes a good blog? – Including a practical exercise
- The art of tweeting: How to use twitter efficiently? – Including a practical exercise
- Preparation of the social reporting at the HLPD

The trainees were very engaged in the exercises and examples and there was an enthused interaction between all participants.

## **Practical training – the social reporting project**

All trainees were encouraged to engage on twitter and live blogging, to report live from the two-day HLPD event, and to fully engage in the onsite programme either as part of the panels or in the Q&A sessions/panel discussions. This was a tall order for all trainees, particularly in a two-days meeting, which is shorter than the “typical social reporting projects” where efforts could be spread over a longer period. It was very encouraging to see all participants actively engage, both onsite and online. Special thanks should go to all social reporters who worked through the night to submit their live blog posts.

GFAR had set up a remote support team: All submitted blog posts were screened during the night by the onsite social media coordinator, and then forwarded to the GFAR editor in Rome. The latter edited the blog posts, sent feedback to the author, as part of the mentoring programme, and forwarded the blog to the blog publisher (also in Rome). The latter published the blog post without delay.

This workflow ensured all blogposts were written, edited and published during the night after the meeting day.

The highlights of results are given below:

## **Twitter**

In the 7 days around the meeting, 1,085 tweets were sent out with the #GCARD3 tag, by 99 different contributors. The tweets were delivered to 426,000 different twitter accounts. All #GCARD3 tweets are available here: <https://twitter.com/search?f=tweets&vertical=default&q=%23GCARD3&src=typd>

## **Blog**

The team published 22 blogposts during the conference, which are available here: <http://blog.gfar.net/category/gcard3/>. By the end of the meeting, the posts were viewed about 2,500 times by 896 people.

## **Slideshare**

The team made an extra effort of collecting all the presentations given at the conference, and uploaded them in real time, as the sessions were happening - about 26 in total. These presentations were viewed 4,100 times by the end of the meeting. They are available here: <http://www.slideshare.net/gcard/>.

With thanks to APAARI and GFAR for their support in the conceptualisation and realisation of this project; particularly Fiona Chandler, Tanya St George, Charles Plummer for their support either at the onset or during the project; the APAARI administration and logistics team for a flawless organization and practical support on travel, visa, training room arrangements and overall logistics; YPARD for their support in selecting top notch trainees and team members; and all social media trainees and social reporters.

**Peter Casier**  
GFAR Social Media Coordinator.

# Photo Gallery





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