SATNET ASIA

Report of the Third SATNET Policy Dialogue
on the Role of Technology Transfer in Agriculture
for Sustainable Development Outcomes

10-11 February 2015, Bogor, Indonesia

Highlights and conclusions

Working together to promote innovation and technology transfer in agriculture

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

CAPSA
Centre for Alleviation of Poverty through Sustainable Agriculture

APCTT

FSC

AVRDC
The World Vegetable Center

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the European Union

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Contents

Abbreviations

AAEHRD	Agency for Agricultural Extension and Human Resources Development
AIATs	Assessment Institutes for Agricultural Technology
ANEP	Agriculture and Nutrition Extension Project
APAARI	Asia-Pacific Association of Agricultural Research Institutions
AsiaDHRRA	Asian Partnership for the Development of Human Resources in Rural Asia
CAPSA	Centre for Alleviation of Poverty through Sustainable Agriculture
CEDAC	Cambodian Center for Study and Development in Agriculture
CFAP Cambodia	Cambodian Farmers Association Federation of Agricultural Producers
CSO	Civil society organization
DFID	Department for International Development
EU	European Union
ESCAP	Economic and Social Commission for Asia and the Pacific
F2F	Farmers-to-farmers (extension)
FFS	Farmer Field Schools
FO-FO	Farmers' organization-to-farmers' organization (extension)
IAARD	Indonesian Agency for Agricultural Research and Development
ICATAD	Indonesian Center for Agricultural Technology Assessment and Development
ICFORD	Indonesian Center for Food Crops Research and Development
ICT	Information and communications technology
iDE	International Development Enterprises
IHHL	Individual household latrine (IHHL)
IPRAD	Institute for Policy Research and Development
IRRI	International Rice Research Institute
LFA	Logical framework approach
LIFT Fund	Livelihoods and Food Security Trust Fund
LSP	Local service provider

MARDI	Malaysian Agricultural Research and Development Institute
M&E	Monitoring and evaluation
MPA	Megh Pyne Abhiyan (Cloud Water Campaign)
MPC	Marketing and Planning Committee
NAG	Network Activity Group
NCAP	National Centre for Agricultural Economics and Policy Research
NGO	Non-governmental organization
PS	Phaydemand Shauchalay (beneficial toilet)
R&D	Research and development
RBM	Results-based management
SATNET Asia	Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia
SMS	Short message service
SPS	Sanitary and phytosanitary (measures)
SRI	System of rice intensification
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USAID	United States Agency for International Development

Executive Summary

The Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is leading the implementation of the European Union-funded project 'Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia' (SATNET Asia) in collaboration with other regional and national partners. SATNET aims to support innovation by strengthening South-South dialogue and intraregional learning on sustainable agriculture technologies and agro food trade facilitation, thereby contributing to reducing food insecurity and poverty levels of the most vulnerable people in South and South-East Asia.

The Third SATNET Policy Dialogue on 'The Role of Technology Transfer in Agriculture for Sustainable Development Outcomes' was organized in Bogor, Indonesia, on 10 and 11 February 2015. The meeting brought together 85 development professionals, including national leaders in agricultural research and extension from the Asia-Pacific region, representatives of civil society, academia, the private sector and international organizations to identify steps required to develop and strengthen agricultural technology transfer at national and regional level, and reinforce the networking and knowledge-sharing outcomes of the project.

The Policy Dialogue focused on the importance of technology transfer within the overall post-2015 Sustainable Development agenda, which requires a much-needed transformative approach to sustainable development, integrating the economic, environmental and social dimensions of sustainable development. To achieve this goal, it is necessary to mobilize partnerships, establish a rigorous and participatory monitoring framework and prioritize food security and sustainable agriculture while addressing the needs of smallholders and other vulnerable groups.

Participants shared and discussed good practices in promoting agricultural innovation and transfer of climate-resilient food production technologies, agricultural trade facilitation as well as participatory and community-based approaches. The meeting debated the future direction of research and development (R&D) which should focus on adapting new agricultural technologies to local circumstances, promoting systematic approaches to strike the right balance between competitiveness, environment and social impact, assessing models for outreach and mechanisms that make the change happen, as well as identify best trade facilitation practice standards. Data and metric issues were reviewed and it was emphasized that these need to be addressed to help generate evidence-based results that can be used for adaptive management and policy guidance.

Since the Green Revolution, agricultural technology transfer has made a significant contribution to agricultural development, leading to today's achievements in food security. However, participants said the Green Revolution was

less succesful in disseminating knowledge to farmers, promoting investment in farmers' training and education, and reducing farmers' dependence on external inputs such as fertilizer and seeds, and using those developed by or in collaboration with the farmers themselves. To ensure that technology transfer promotes sustainable development, policies need to be pro-poor and incorporate sustainability dimensions. Private sector stakeholders should provide stewardship to improve both productive use of natural capital resources and ecosystem processes, as well as farmers' livelihoods without compromising the well-being of future generations. Civil society needs to create pressure groups to guide government policy in the right direction. Furthermore, improved communication with farmers, strong commitment to technology transfer by all stakeholders, clearly defined governance and institutional mechanisms, increased investment in sustainable agricultural production systems, strengthened partnership with the private sector, and improved extension services and capacity at all levels, are fundamental to achieving sustainable development outcomes.

Supporting farmers' development implies recognition of their knowledge, aggregation of agricultural information for them, and effective extension systems to reach farmers where information and communications technologies (ICTs) are absent. While the use of short message service (SMS) can address the problem partly, the future seems to be in smartphones increasingly used by service providers to disseminate information. ICT has, therefore, tremendous potential to bring about changes in technology transfer that would lead to desired policy changes.

Policymakers need data from researchers as well as farmers to better assess agricultural information and address food production challenges. However, lack of evidence about what works for smallholders and how successful use of improved technology can be scaled up, requires improved documentation and data management for informed policymaking in support of technology transfer to promote sustainable agriculture, food security, poverty reduction and environmental preservation. There is an urgent need to address information and data gaps in policy implementation to promote technology transfer.

Evaluation and impact assessment is crucial to generate evidence for informed policymaking to bring about positive development change. However, the results depend on behaviour and decisions, as well as practices and actions of people on the ground. Knowledge, skills, values and beliefs as well as socioeconomic, sociopolitical and environmental conditions are also important. These processes need to be recognized in evaluation methods to contribute to a better understanding of ways to achieve desirable outcomes. The methods need to be selected or designed on a case-by-case basis with consistency between objective, method and output. The indicators of changes in behaviour should reflect the human, social, financial, physical and natural dimensions. Numbers are important but need to be combined with narratives for a better assessment of the impact of innovations and processes. Monitoring, evaluation and impact assessment also need to be linked and built in the project design or there will be no indicators that are important to stakeholders. Lastly, evaluation and impact assessment need to be participatory, holistic, people-centred, evidence-based and communicated effectively.

Social capital and knowledge networks play an important role in promoting sustainable development by speeding up the transfer of knowledge with the participation of the recipients, thereby increasing the sense of ownership of the knowledge. Obtaining and sharing information and advice, collaboration, trust and friendship among practitioners are key reasons for establishing networks. However, cumbersome data collection and analytical limits make it difficult to quantify the impact of networks. Visualization of network diagrams can be misleading, the qualitative information received through evaluation surveys may be incomplete or superficial and indicators may be challenging. Baseline information collected at the beginning of a project or activity provides an information base for monitoring and evaluating the progress and effectiveness of the project/activity. Knowledge, Attitude, Practice (KAP) surveys complement this approach and help measure the success of capacity development programmes either immediately after they take place, or 6 to 12 months later.

The meeting demonstrated that networks together with regional and South-South cooperation can speed up innovation. To make it easier for all stakeholders, including farmers, to access needed information, more knowledge will have to be shared. However, bottlenecks in information sharing need to be addressed, particularly by acknowledging research ownership and establishing an appropriate licensing system for commercial technology. Development cooperation facilitated through networks can also bridge the gap between demand for and supply of knowledge, thereby addressing the problem of information deluge by bringing specialized and reliable information to those who need it. It was suggested that SATNET Asia could play this role in future.

The Policy Dialogue provided an important opportunity to accelerate collaborative efforts to promote sustainable development outcomes by focusing on learning and building participants' capacities to: (i) promote technology transfer to scale up low-cost, farm-level innovation; (ii) address bottlenecks in the sharing of information on good technologies and practices; (iii) ensure coordination between different stakeholders in technology transfer; and (iv) improve monitoring and documentation of the impact of technology transfer. The meeting developed a regional framework providing institutional mechanisms, policy priorities and commitments to support the above-mentioned development outcomes. The framework will guide agricultural innovation and technology transfer efforts in the region.

About the Event

At the United Nations Conference on Sustainable Development also known as Rio+20, held in Brazil in June 2012, the global community renewed its commitment to freeing humanity from hunger and poverty as an indispensable requirement of sustainable development. At the same time, it underscored the importance of ensuring sustainable production patterns and protecting the planet's natural resource base.

Realizing this commitment will indeed be challenging. The world faces increasing demand for food due to a rising population and changes in dietary patterns. It is estimated that food production must increase by 60-70 per cent by 2050 in order to feed everyone. For developing countries, it is also projected that 80 per cent of the required increase would be from intensification of crop production, particularly higher yields and cropping intensity, and only 20 per cent would come from increase in agricultural land area due to the competing land use requirements for urbanization and industrialization. There are also problems of land degradation and environmental contamination owing to the excessive use of synthetic inputs in agriculture, and the imperative need to adapt to the impact of climate change.

Agriculture is an important source of food, employment and livelihood for the rural poor. Effective technology transfer is critical to address this challenge and achieve increases in food production to secure future supplies, enhance farmers' incomes and preserve the environment.

The identification, dissemination, adaptation and adoption of appropriate technologies can help farmers bridge the yield gap and/or increase cropping intensity to increase production. The Rio+20 outcome document titled 'The Future We Want', duly recognizes the role of access to 'appropriate and affordable technologies' in revitalizing agriculture and rural development. Science, technology and innovation have been recognized as important for implementing the post-2015 development agenda.

In the Asia-Pacific region, home to 771 million of the world's poor, agriculture provides 38 per cent of total employment but accounts for only 7 per cent of the GDP (ESCAP, 2014). This indicates significant scope for enhancing agricultural productivity relative to other sectors. Technology transfer is a vital requirement for this. Smallholder farmers, comprising the bulk of the farming community in developing countries of the region, often lack the resources to use modern technologies, making technology transfer especially important for them. Gender-sensitive alternative technology options are yet another key consideration. Moreover, effective sharing of knowledge through regional knowledge networks and capacity-building of national stakeholders is required for successful technology transfer.

While a multitude of technology transfer initiatives are under way in the region, it is important to develop an evidence base to assess and measure whether these are achieving intended objectives, what works and what does not, and how successful cases can be scaled up to attain sustainable development outcomes. Equally important is enhancing the limited understanding and documentation of the nexus between sustainable agriculture, poverty and food insecurity. This underscores the urgency of collaboration and knowledge-sharing among key stakeholders to address information and data gaps for better policy formulation and programme implementation.

CAPSA is leading the implementation of the European Union-funded project 'Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia' (SATNET Asia – www.satnetasia.org) in collaboration with other regional and national partners. The project supports innovation by strengthening South-South dialogue and intraregional learning on sustainable agriculture technologies and agro food trade facilitation, to improve food security and living standards of the poorest and most vulnerable people in South and South-East Asia.

The Third SATNET Policy Dialogue on 'The Role of Technology Transfer in Agriculture for Sustainable Development Outcomes' was organized in Bogor, Indonesia on 10 and 11 February 2015. The meeting brought together national leaders in agricultural research and extension from the Asia-Pacific region, representatives of civil society, academia, private sector and international organizations to identify steps required to develop and strengthen agricultural technology transfer at national and regional level, and reinforce the networking and knowledge-sharing outcomes of the project.

Objectives

The overall objective of the Third SATNET Policy Dialogue was to bring into renewed focus the importance of technology transfer within the post-2015 Sustainable Development agenda. The objectives of the meeting were to:

1. showcase efforts by different stakeholders in the Asia-Pacific region to promote innovation and technology transfer in agriculture, with a focus on smallholder farmers;
2. review gaps in and discuss ways to enhance the evidence base for assessing the impact of agricultural technology transfer on sustainable development outcomes including food security, poverty reduction and environmental preservation;
3. discuss national and regional policy options that support agricultural technology transfer for sustainable development outcomes;
4. provide an opportunity for knowledge-sharing and networking among public, civil society and private sector stakeholders on agricultural innovation and technology transfer; and,
5. provide inputs to a regional framework document for guiding future agriculture technology transfer initiatives.

The meeting was an important opportunity to accelerate collaboration in support of sustainable development outcomes by focusing on learning and building capacities of participants by: (i) promoting technology transfer to scale up low-cost, farm-level innovation; (ii) addressing bottlenecks in the sharing of information on good technologies and practices; (iii) ensuring coordination between different stakeholders on technology transfer issues; and (iv) improving monitoring and documentation of the impact of technology transfer. The meeting developed a regional framework to guide agricultural innovation and technology transfer initiatives. The full agenda of the meeting is presented in **Annex 1.**

"Asia and the Pacific can be a path-breaker in meeting the commitment to promote technology transfer in agriculture for sustainable development."

Opening the Dialogue

Making use of new technologies to attain sustainable development outcomes

Statement by
Katinka Weinberger
Director, Centre for Allevation of Poverty through Sustainable Agriculture (CAPSA), Indonesia

The importance of the application of good ideas was already highlighted by Thomas Edison, the American inventor who said: "The value of an idea lies in the using of it." In agriculture, the use of good ideas can set the tone for successful development programmes. However, one good idea cannot suit all stakeholders in the development process. Finding the right idea starts with understanding the needs of small farmers and their communities whose livelihoods depend on agriculture. Ensuring the use of ideas that improve agriculture and make it beneficial to as many people as possible, was one of the reasons for the organization of the Third SATNET Policy Dialogue on 'The Role of Technology Transfer in Agriculture for Sustainable Development Outcomes'.

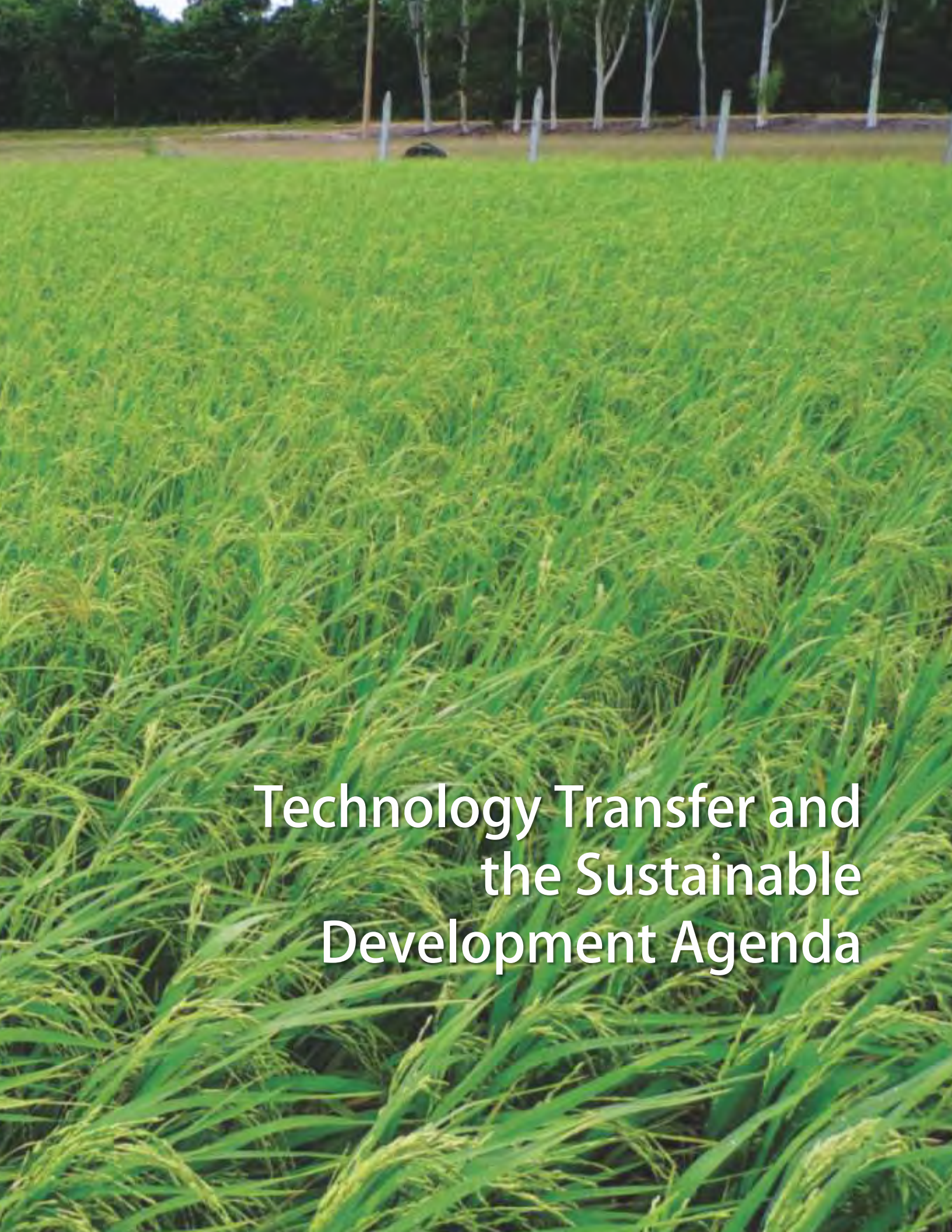
Moreover, global negotiations on the post-2015 development agenda are moving into the final stages and expected to lead to the adoption of the Sustainable Development Goals. Asia and the Pacific can be a path-breaker towards meeting these commitments by promoting technology transfer in agriculture for sustainable development. While a multitude of technology transfer initiatives are under way in the region, developing an evidence base to assess and measure whether these are achieving intended objectives, what works and what does not, and how the successful initiatives can be scaled up to attain sustainable development outcomes, is important. This calls for collaboration and knowledge-sharing among key stakeholders address information and data gaps and to provide better support to policy formulation and programme implementation.

"Long-term investment and comprehensive approaches are required to make technology transfer effective."

Statement by
Hari Priyono
Secretary General, Ministry of Agriculture, Indonesia

Lack of access to improved agricultural technologies is a major constraint to increasing smallholder farm productivity in the Asia-Pacific region. For example, Indonesia, with its rich resource base of approximately 12 million and 24 million hectares of wetland and dry land, respectively, can produce enough food for the country's population if farmers could access improved agricultural technologies. This underlines the need for technology transfer using participatory and community-based approaches, knowledge-sharing networks and capacity-building of national stakeholders.

Long-term investment and comprehensive approaches can make technology transfer effective, from the stage of technology development to extension. Both vertical and horizontal technology transfer is important. Vertical refers to transfer of technology from basic to applied research, then to development and production. Horizontal technology transfer refers to the movement of technology from one place, organization or context to another. Regardless of the type of technology transfer, the role of extension agents is crucial. They need to be involved, starting from the stage of identifying technology development needs to that of research and dissemination of new agricultural know-how to farmers.



Technology Transfer and the Sustainable Development Agenda

"Sustainability through technology can meet the demand of food in the future."

The role of technology transfer in sustainable agricultural development

Presented by
Agung Hendriadi
Executive Secretary, Indonesian Agency for Agricultural Research and Development (IAARD) on behalf of Dr. Haryono, Director General, IAARD

The number of food-insecure people in the world, presently estimated at about 850 million, may grow with the global population projected to reach about 9 billion by 2050. The challenge of food security has to be seen in the context of 1.3 billion tons of food being wasted every year due to inefficient post-harvest processes and supply chains, climate change impacts on agricultural productivity and diversion of agricultural land for cultivation of fuel crops.

Recently, there has been renewed interest in the rural poor, who comprise almost 70 per cent of the poor population in developing countries and depend mainly on agriculture for their livelihood. This is supported by the United Nations-led global discussion on sustainable development. Sustainable agricultural development has become a priority in addressing climate change and meeting the needs of the present without compromising the ability of future generations to meet theirs'.

However, agricultural development faces two sustainability challenges, namely: (i) the ability of agriculture to meet future global demands without adversely affecting the resource base; and (ii) the optimum approach to enable agriculture to provide sufficient food and act as an engine of pro-poor growth in the face of resource constraints. Technology transfer has an important role in addressing the adverse agricultural impact of climate change and natural resource degradation as well as socioeconomic constraints. Post-harvest food losses can also be minimized with technology transfer. As such, technology transfer is key to promoting sustainable agricultural development and food security and should prioritize increases in agricultural efficiency and competitiveness in developing countries.

Despite many initiatives to improve the effectiveness of technology transfer in different countries, key issues remain, including: (i) the slow uptake of sustainable development technologies; (ii) the lack of emphasis on specific and practical methodologies and tools for promoting the adoption of innovation; and (iii) the absence of an ubiquitous approach prioritizing initiatives for developing countries, based on their needs and circumstances.

The Government of Indonesia is giving priority to ensuring agricultural self-sufficiency in five key commodities – rice, corn, soybean, sugar and beef. The country's Agricultural Development Plan 2015-2019 aims to increase agricultural productivity and value-addition, improve land and water conservation, provide disadvantaged farmers access to low-interest finance, strengthen competitiveness in the global market, and strengthen rural institutions.

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"Farmers should not only be regarded as the final beneficiaries of technologies but active clients providing guidance and feedback to the research process."

Strengthening agricultural innovation systems

Statement by
Katinka Weinberger
Director, Centre for Allevation of Poverty through Sustainable Agriculture (CAPSA), Indonesia

Meeting the food needs of the growing world population and helping address persistently high levels of poverty, inequality, hunger and malnutrition, particularly in rural areas, requires urgent attention to transforming global agricultural systems. Today, about 850 million people are still hungry while 1.5 billion are obese, or have inadequate diets and unsustainable consumption patterns. Climate change and resource degradation have also reached the point of 'no return' and call for making agricultural systems sustainable.

The ongoing global deliberations on the post-2015 development agenda offer an opportunity for seeking a much-needed transformative approach to sustainable development, integrating the economic, environmental and social dimensions. To implement this transformative sustainable development agenda, it is necessary to mobilize partnerships and establish a rigorous and participatory monitoring framework. Food security and sustainable agriculture priorities need to address the needs of smallholders and small-scale farming systems as well as of vulnerable groups.

While technology is a necessary requirement to make agriculture more sustainable, it is not sufficient in itself. New agricultural technologies are not inherently more sustainable and there is also no 'one-size-fits-all' model. Technologies must be adaptable to local circumstances and have flexible criteria for determining sustainability thresholds. Systematic approaches are needed to strike the right balance between competitiveness, environment and social impact. This is an emerging field and data and metric issues still need to be addressed to assess the trade-off between different dimensions of sustainability and the impact of agricultural technology transfer. Working through the SATNET Asia project, CAPSA has developed a composite sustainability indicator of agricultural technologies to address these gaps.

Agricultural trade within and beyond the Asia-Pacific region has increased dramatically, but agricultural supply chains in the region are among the most complex and environment-unfriendly. Effective technology transfer can improve food processing and product quality, contribute to development of new value added products, enhance food safety and trade facilitation, and bring about inclusive growth, integration of smallholders and sustainable development. Along with the agro food sector, R&D needs to focus on the identification of best practice standards, such as introduction of electronic documents and the automation of processes, technologies to upgrade environmental standards in food processing and distribution, as well as indicators to assess sustainability along the food chain.

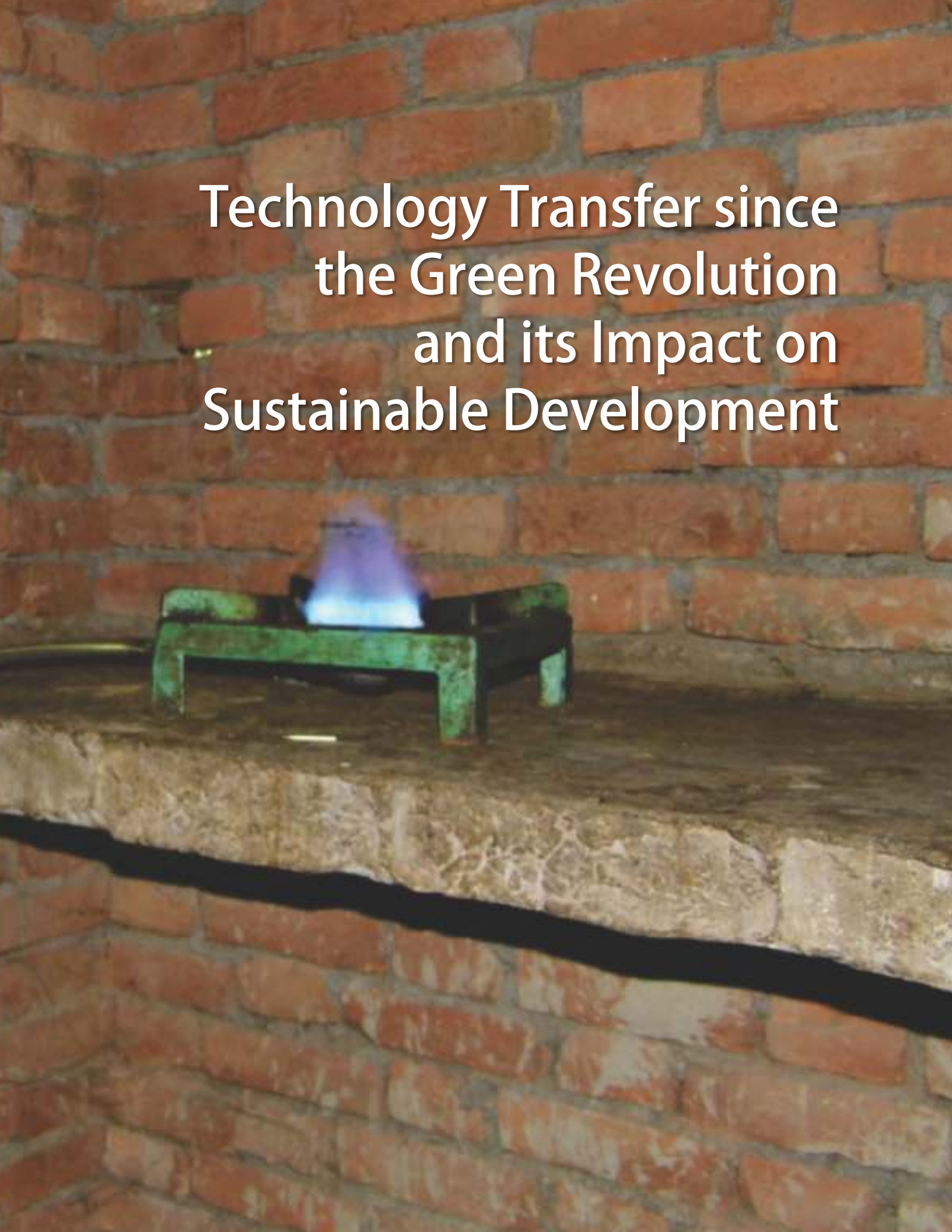
Different roles, different perspectives

Agricultural innovation is often seen as a linear process but in reality, it is not. Informal interaction among stakeholders with different roles and perspectives constantly creates technical, institutional, economic, environmental and social innovation. Given the wide range of stakeholders, R&D must address the effectiveness of different innovation strategies for technology transfer and ways to ensure technology adoption by the greatest number of farmers possible.

The different perspectives underlying research and practice may not always be communicated effectively, resulting in ineffective technology transfer to farmers. Limited communication between researchers and extension workers is, therefore, an issue of frequent concern. However, there are many opportunities to enhance stakeholder engagement in the innovation process. Research must be aware of the needs of farmers who should be regarded not merely as final beneficiaries of technologies but also as active clients who provide guidance and feedback to research.

Asia-Pacific stakeholders need to work together to promote technology transfer to scale up low-cost, farm-level and value-chain innovation, and remove bottlenecks to the sharing of information. Effective coordination among stakeholders and better monitoring and documentation of the impact of technology transfer, are also needed. Policies can also affect innovation and technology transfer systems by influencing the quality of research and extension as well as investment in R&D. Thus, policies to create an enabling environment for R&D are required as much as investment in infrastructure and incentives for business innovation.

Technology Transfer since the Green Revolution and its Impact on Sustainable Development



"The private sector that comes from outside has to play a crucial role in terms of stewardship and not to make the developing world a dumping ground."

Iftikhar Ahmad
Chairman, Pakistan Agricultural Research Council (PARC), Pakistan

"The negative impact of technology is caused because of lack of farmers' knowledge. The lack of protocols for using this knowledge is therefore the main gap we are facing today."

Muhammad Zeshan Saqib
Director, Quality Assurance and Traceability System, Star Farm Pakistan (Pvt.) Limited, Pakistan

The Green revolution of the 1970s and 1980s increased agricultural productivity with the introduction of high yielding varieties, improved irrigation, intensified use of agrochemicals and supportive government policies. While helping avoid large-scale hunger in the Asia-Pacific region, recent years have seen a decline in productivity growth and land and biodiversity degradation due to reduced R&D investment. The use of chemicals also had an adverse effect on the health of farmers and consumers while small and marginal farmers were unable to take advantage of the gains of the Green Revolution.

The overall impact of Green Revolution technologies in promoting sustainable development was the topic of the first panel discussion of the Policy Dialogue, "Has the Green Revolution been a boon or a bane for sustainable development?" The five panelists were Dr. Iftikhar Ahmad, Chairman, Pakistan Agricultural Research Council (PARC), Mr. Muhammad Zeshan Saqib, Director, Quality Assurance and Traceability System, Star Farm Pakistan (Pvt.) Limited, Ms. Ranny Mutiara Chaidirsyah, Head of Farming Institution Empowerment Division, Agency for Agricultural Extension and Human Resources Development (AAEHRD), Ministry of Agriculture, Indonesia, Dr. Kong Thong, Dean, Faculty of Agro-Industry, Royal University of Agriculture, Cambodia and Mr. Shimpei Murakami, Chairperson, Asian Farmers Association (Japan/the Philippines). The panel was moderated by Dr. Raghunath Ghodake, Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI).

The panelists agreed that agricultural technology transfer since the Green Revolution had made a significant contribution to agricultural development, contributing to today's achievements in food security. While they agreed that the benefits of the Green Revolution outweigh the negative impact it has caused, participants said that the main problems were in the dissemination of knowledge to farmers, investment in farmer training and education, and farmers' dependence on extension services and external technologies, such as fertilizer and seeds, rather than on those developed by or in collaboration with farmers themselves.

Benefits of Green Revolution technology

It was pointed out that agricultural technology has a negative impact when farmers have limited knowledge of its proper use due to the lack of guidance. For example, farmers are often blamed for the extensive use of chemical pesticides and fertilizer. But are we focusing enough on capacity-building of the farmer? The improper use of technology results in acceptance issues for farmers during technology transfer. For example, if farmers are not educated about alternatives to chemical pesticides, they think that their yield would shrink and they would lose. Understanding the benefits of new technologies and related training can make adoption easier and lead to sustainable advances in agricultural production.

Farmers around the world understand the characteristics of their land and nature, having practical knowledge and experience in making food systems sustainable. However, their overreliance on commercial production systems to know how much production inputs to use as well as external technologies, diminishes their confidence

in being able to manage their natural resources sustainably. As a consequence, technology brought by the Green Revolution results in ecological degradation and is seen as unsustainable. Therefore, the complexity of technology transfer systems needs to be well understood in order to be developed further. Indigenous knowledge and experience, the pressure of population growth and climate change on land and food systems, and the need to adapt external technologies to fit local circumstances, need to be taken into consideration if technology transfer is to be beneficial to farmers and the environment.

More needs to be done to strengthen technology transfer

While the Green Revolution made it possible to address the challenges of food security today, the participants agreed it was not enough to meet the challenges of tomorrow. For example, the Government of Indonesia realized that Green Revolution technologies alone would not make the country self-sufficient in rice, a key national commodity. This realization led the government to shift policy focus from technology transfer for rice intensification to improving research-extension linkages and bringing research institutions together with extension workers to develop suitable technologies for farmers. However, more needs to be done to strengthen technology transfer. Firstly, it is crucial to educate and empower farmers to verify suitable agricultural technologies while encouraging local extension and research institutions to adapt to local conditions, improve their approach and build farmers' confidence in technology. The government also needs to recognize that certain technologies are indigenous products of farmers. On the other hand, farmers need to promote technology themselves to motivate others. Finally, public-private partnerships need to be promoted for both business and technology transfer to achieve sustainable development outcomes.

"We need to educate and empower farmers to verify suitable technologies, while local extension and research institutions should adapt to the local context."

Ranny Mutiara Chaidirsyah
Head, Farming Institution Empowerment Division, AAEHRD, Ministry of Agriculture, Indonesia

More technologies or better processes?

In discussing the importance of better technologies versus better technology transfer processes, panelists agreed that improved processes, models and policies can be highly effective if these are pro-poor and include sustainability dimensions.
If government policies are not supportive and protective of smallholders, taking into account economic and social aspects, farmers will be helpless and any change will be difficult.

"Farmers need technology to increase yield but they don't think about sustainable solutions. To think about the future, farmers need tomorrow."

Kong Thong
Dean, Faculty of Agro-Industry, Royal University of Agriculture, Cambodia

Role of key stakeholders

Panelists reflected on issues that governments, civil society and the private sector should keep in mind to ensure that technology transfer promotes sustainable development. Firstly, pro-poor policies and their implementation system provide food security to society. Multinational corporations should recognize that developing countries where they invest, have their own traditional knowledge and understanding of sustainable development. As such, private stakeholders should provide stewardship not only to improve the productive use of natural capital resources and ecosystem processes, but also improve farmer livelihoods without compromising the prosperity of

"We are talking about sustainable agriculture because Green Revolution technologies are not sustainable at all."

Shimpei Murakami
Chairperson, Asian Farmers Association,
Japan/the Philippines

"Interactive process must happen, we cannot just have one side of a solution."

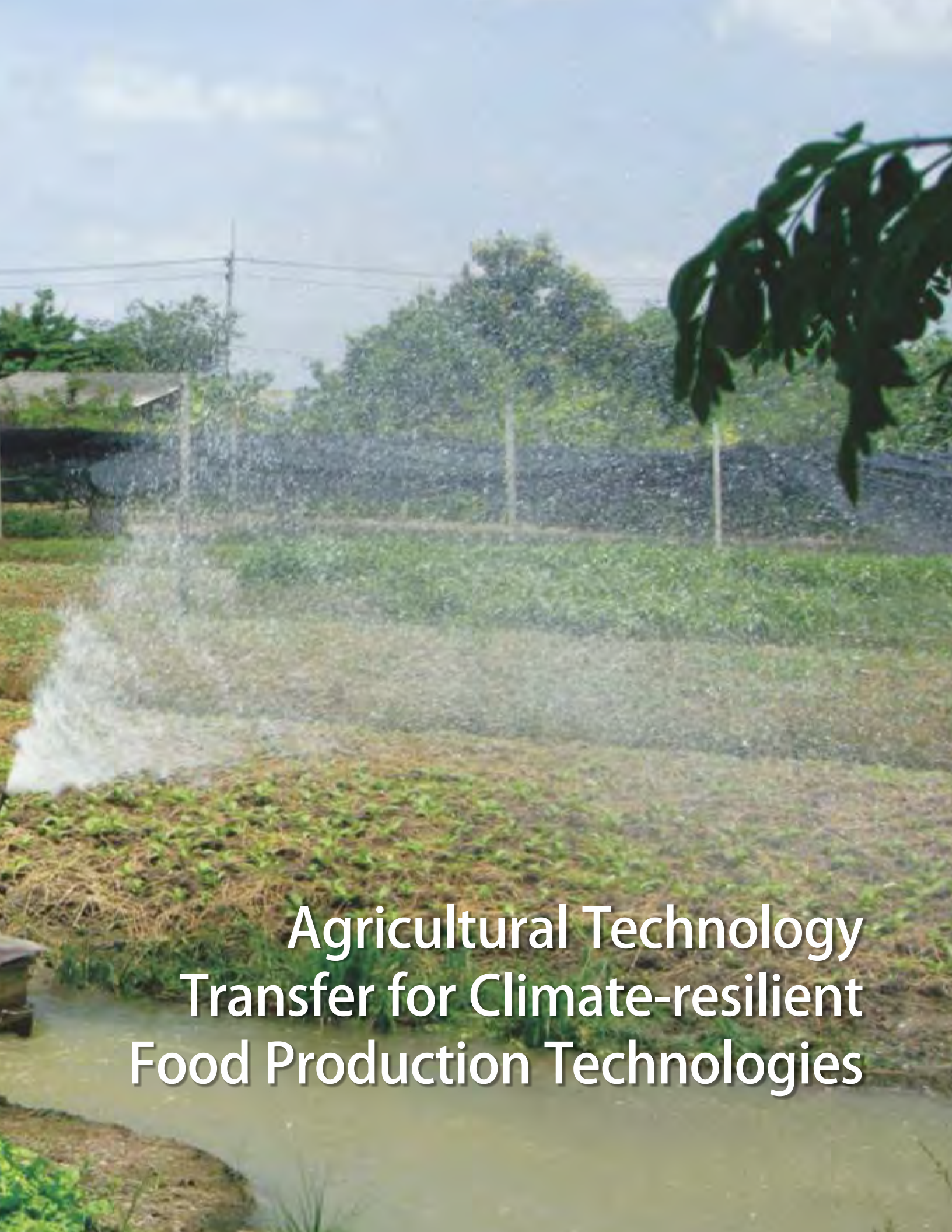
Raghunath Ghodake
Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI),
Thailand

future generations. On the other hand, civil society needs to create pressure groups to guide government policy in the right direction. Improved communication with farmers, strong commitment by all stakeholders to technology transfer with people at the centre of the technology transfer framework, are also fundamental to achieve sustainable development outcomes.

Opportunities of the post-2015 development agenda

The post-2015 development agenda offers an opportunity for better technology transfer by bringing together all Asia-Pacific stakeholders – governments, scientists, civil society, private sector and farmers – to share national strengths and knowledge on sustainable agricultural development. Such inclusive participation can improve understanding of the needs and critical role of farmers in advancing sustainable development. The addition of well-defined governance and institutional mechanisms, stronger partnership with the private sector, improved extension services and capacity development at all levels, as well as enhanced multi-stakeholder interaction and relationships, would strengthen technology transfer in the region, offering more sustainable choices to farmers.

Small farmers can be an important part of the solution to enhanced food security but need support. Investment in sustainable agricultural production systems must be made today to promote ongoing and future development activities. Increased investment in and support to agricultural development can create conditions enabling farmers to move out of subsistence farming into the marketplace and develop business linkages along the value-chain, starting from production and processing to marketing and consumption, benefiting all stakeholders.



Agricultural Technology Transfer for Climate-resilient Food Production Technologies

Representatives from Bangladesh, India and Indonesia offered an overview of good practices in agricultural technology transfer for climate-resilient food production technologies and the way forward in addressing the issues in future.

"Innovation is all about working in accordance with the local complications and predicaments along with forward linkages."

Enhancing sustainability of innovative flood-proof, farm-friendly rural sanitation system in India through local contribution

Presented by
Eklavya Prasad
Megh Pyne Abhiyan (MPA) or
Cloud Water Campaign, India

Nearly 81 per cent of the 103.8 million people in India's Bihar State depend on agriculture for livelihood. The overwhelming majority are small and marginal farmers with fields affected by floods and waterlogging every year. About 73 per cent of Bihar's 7 million hectares of land area is at risk of flooding every year, which affected some 25 million people in 2007. Floods also affect rural sanitation in Bihar where most rural people practice open defecation with individual household latrine (IHHL) coverage estimated at only 43 per cent of all families. Megh Pyne Abhiyan (MPA) or Cloud Water Campaign, a civil society initiative in India is promoting innovative sanitation technology in five flood-prone northern districts of Bihar.

The initiative uses the flood-resilient and eco-friendly toilet Phaydemand Shauchalay (PS), which produces humuanure from human excreta to improve agricultural productivity and food security of small and marginal farmers. The PS, which translates into 'beneficial toilet', has improved the environment around local habitations and helped reduce the use of chemical fertilizer, biological and chemical contamination of groundwater, while improving soil health.

The success of technology transfer and technology sustainability lies in the involvement and contribution of small and marginal farmers in programme implementation, such as construction and material development, as well as capacity-building of local stakeholders, and sharing of best practices among farmers and through the social media. A total of 33 PS units have been installed in Bihar so far.

"The transfer of technology such as improved rice varieties, fertilizers and irrigation, had made a significant contribution to the national food crop production."

Technology transfer to improve agricultural productivity and sustainability in Indonesia

Presented by
Made Jana Mejaya
Director of Indonesian Center for Food Crops Research and Development (ICFORD), Ministry of Agriculture, Indonesia

In Indonesia, technology transfer is helping bring about sustainable increases in food crop production, in particular rice, to feed the country's growing population that is predicted to reach 400 million by 2050. This increase is happening at a time when conversion of agricultural land to non-farm use has reduced the number of farmers in Indonesia from 64 per cent in 1970 to 33 per cent in 2011. Food, energy and water problems, climate change, a shortage of highly qualified extension workers and lack of access to capital for poor farmers, are also a threat to the country's agricultural future.

To achieve self-sufficiency in rice, the staple food crop which continues to be imported to meet domestic demand, the Government of Indonesia has involved the private sector and CSOs in agricultural research, extension and dietary change advocacy. The strategy to achieve this target includes decreasing yield losses by 1.5 per cent per year, reducing per capita rice consumption by 1.5 per cent per year, establishing about 130,000 ha of new rice farms and increasing rice productivity from 5.2 to 5.5 tons/ha.

The 33 Assessment Institutes for Agricultural Technology (AIATs) and the Indonesian Center for Agricultural Technology Assessment and Development (ICATAD) are coordinating and playing a crucial role in implementing this strategy, bridging research and extension with multi-stakeholder partnerships at both provincial and district level.

Agricultural productivity is also being increased through IAARD initiatives such as the Integrated Crop Management Programme, Field School for Integrated Crop Management and Nutrient Manager for Rice (in collaboration with the International Rice Research Institute – IRRI). Moreover, the Sustainable Household Food Security Programme involves women for optimal use of home yards to cultivate vegetables and fruits and raise poultry. The pilot project Food Smart Village is helping improve the local ecology by optimizing use of water resources and promoting food diversification, integrated crop-livestock systems, conservation agriculture, zero-waste and climate change adaptation.

Between 1973 and 2013, Indonesia's average rice yield more than doubled. It is estimated that by 2040 it will require 38 per cent more rice, which means that the current average rice yield of 5.1 tons/ha must increase to more than 6 tons/ha to fill the gap. The transfer of technology such as improved rice varieties, fertilizer and irrigation, have made a significant contribution to national food crop production. Modern rice varieties are more resistant to pests and disease, allowing farmers to reduce pesticide application. Efforts are under way to improve the nutritious value of rice varieties to provide more micronutrients to consumers. While integrated crop management is widespread in Indonesia, technologies such as the system of rice intensification (SRI), used by only about 5 per cent of farmers in the country, are yet to be explored.

"Intensive use of chemical inputs makes Bangladesh the second largest in the use of agro-chemicals in the world."

Local service providers promote climate-resilient agricultural technologies in Bangladesh

Presented by
Md. Shamim Hossain
Head, Food Security and Livelihoods Unit,
Concern Universal, Bangladesh

In Bangladesh, with a population of 150 million growing at an annual rate of 1.1 per cent, agricultural production levels have reached a ceiling with a utilization rate of 179 per cent of the country's arable area. The intensive use of chemical inputs has also made Bangladesh the world's second largest user of agrochemicals. To address these issues, Concern Universal, an NGO is making innovative use of community-based service providers as agents of agricultural technology transfer to farmers.

The service providers association, which includes local service providers (LSPs) based in villages, is linking the Department of Agriculture, private sector, producer groups, microfinance actors and other organizations with farmers, to facilitate development of their skills, transfer of agricultural inputs and market integration. LSPs first acquire agricultural knowledge and skills developed by the public and private sector and pass these on to rural producers. To date, LSPs have provided services to 38,258 beneficiaries.

An example of climate-resilient agricultural technology supported by LSPs is the 'floating vegetable bed' which makes it possible to cultivate vegetables during the recurring floods in Bangladesh. The technology has multiple benefits for rural families and their environment, including nutritional gains from vegetable consumption during flooding, income from the sale of surplus vegetables, production of organic fertilizer and control of aquatic weeds in water bodies.

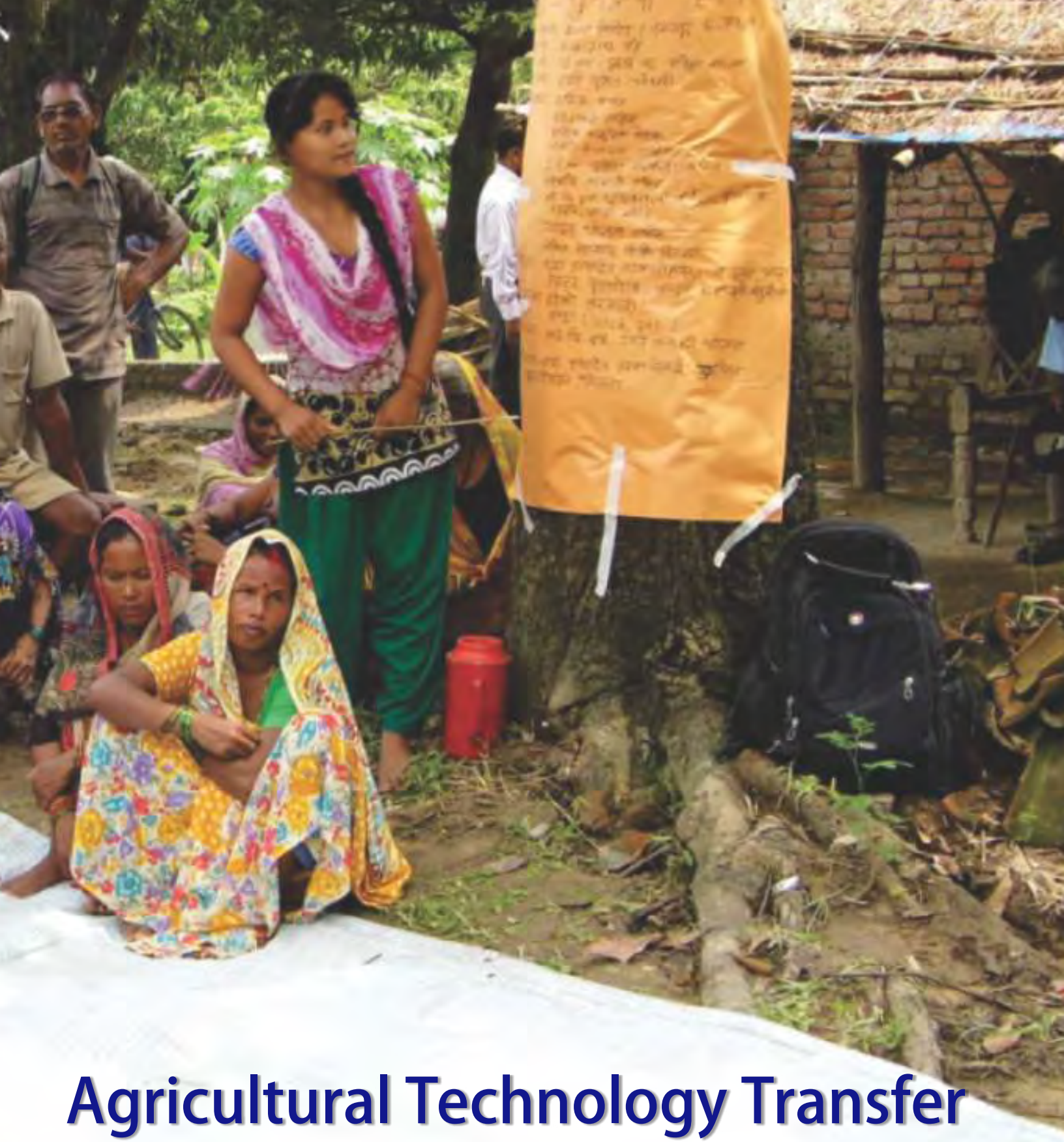
To scale up technologies such as in horticulture, Concern Universal trains local resource persons to become extension agents having an entrepreneurial bent. This is to enable them to buy and sell information and products, which then leads to the propagation of a new technology in a new area. Concern Universal identifies the resource persons in villages it works in and selects producers having similar farm endowments and character traits as their peer farmers as well as higher education.

Farmers bring produce for sale and negotiate with agricultural market representatives at 15 collection points arranged by Concern Universal. This has resulted in 261 market traders developing long-term business relations and trust with producers. The collection points have also enabled producers to increase their income with better prices for their produce and a significant reduction in transaction costs for private organizations and transport costs for producers.

Lessons learned

Climate change is a major challenge that creates losses in some places and profits in others. Attempts have been made to find solutions to help farming communities sustain themselves and agricultural production systems. However, agricultural technology transfer, aiming to provide such answers, can have both positive and negative impact on agricultural production and small farmers. Experience shows that the success of technology transfer depends largely on the involvement and contribution of small and marginal farmers in the validation and implementation of low-cost, innovative and climate-adapted technologies. This requires building farmers' capacities to equip them with key skills such as construction and material development, leading to enhanced farmer-to-farmer assistance, knowledge-sharing and technology adoption.

Similarly, the full involvement of governments, the private sector and CSOs in agricultural research, extension and dietary change advocacy, is key to ensuring the effectiveness of nutrition-improvement initiatives such as food diversification and enhancing the nutritious value of rice varieties. Community-based service providers can be important agents of agricultural technology transfer to farmers, skill development facilitation and market integration. However, their success depends on meeting key criteria, namely having 'the mind of entrepreneurs', higher education, as well as similar farm endowments and character traits as their peer farmers.



Agricultural Technology Transfer through Participatory and Community-based Approaches

Delegates from Myanmar, Cambodia, Nepal and the Philippines shared their countries' good practices in agricultural technology transfer through participatory and community-based approaches.

"Coherence and consistency of the state and regional fresh water fishery laws needs to improve to be in line with national and international instruments for protection of small-scale fish farmer registration."

Improving market access and local governance in the fisheries sector in Myanmar

Presented by
Bobby
Chief Executive Officer,
Network Activity Group (NAG), Myanmar

Myanmar is the largest mainland country in South-East Asia with three major rivers, namely the Ayeyarwaddy, Sittaung and Than Lwin. Because fishing is an important source of income, food and seasonal employment for small-scale fishers, the government is regulating entire inland fishing rights in the country to ensure ecosystem sustainability. Successful attempts have been made recently to develop an institutional regulatory framework for fisheries in the Ayeyarwaddy Delta region.

The fishery sector in Myanmar is fragile because community-based fisheries have been encroached on by tender holders and overfishing, lowering yields and market price. In 2011, the Government of Myanmar and Oxfam International initiated a joint fishery development programme in the Ayeyarwaddy Delta through the multi-donor Livelihoods and Food Security Trust Fund (LIFT). The programme organized civil society and fishing communities in clusters of 100 villages to increase fish production and incomes by providing support and improving market access and local governance.

This initiative led to the establishment of Fisheries Development Associations in Ayeyarwaddy, the development of regional fishery networks, the enactment of a fresh water fishery law, securing of access to fishing rights and the formation of communal fishery grounds. Through the establishment of a fish collection centre, the programme helped improve the access of fishing communities to markets.

While the programme has addressed many fisheries issues in Myanmar, challenges remain such as the growing conflict between off-shore and inland fisheries and weaknesses in sea safety and disaster risk reduction.
The coherence and consistency of state and regional fresh water fishery laws needs to be improved to be in line with national and international instruments for the protection of small-scale fish farmers. A lesson learned is that fishing right allocation has been driven more by the objective of mobilizing revenue rather than by the objective of resource sustainability. To address this and other issues, the Department of Fisheries has been advised to revise the Fishery Law by aligning it with international guidelines and support community-led coastal management activities in partnership with international initiatives.

"Technology alone is not enough, however links to the market are necessary to improve value chains and bring benefits to farmers."

Participatory technology transfer in Cambodia improves rice productivity and incomes

Presented by
Chantheang Tong
Senior Program Officer, Cambodian Center for Study and Development in Agriculture (CEDAC), Cambodia

About 70 per cent of Cambodia's 14.7 million people depend mainly on agriculture for a livelihood and 60 per cent are rice farmers. A major constraint to improving rice productivity is that 80 per cent of rice farms are rain-fed, making small farmers vulnerable to climatic uncertainty. Moreover, the average farm household owns 1.2 ha of land, although 48 per cent of farm households own less than 1 ha. The average rice yield of 3.3 tons per hectare is less than the potential. CEDAC is addressing the issue by promoting the system of rice intensification (SRI).

Beginning in 2000 with 28 farmers, the SRI programme has now been adopted by over 100,000 farmers in Cambodia. SRI has become a national programme supported by the Ministry of Agriculture, enabling yield improvement by 60 per cent, while reducing expense on fertilizer and seeds by 50-70 per cent per hectare. Following successful dissemination of the SRI technology, CEDAC has been supporting farmers in marketing organic rice to earn higher income. About 2,000 organic rice producers have adopted SRI, supplying 2,000 to 3,000 tons of organic paddy a year to markets. More than 200 farmers have obtained organic and fair-trade certification for international export.

CEDAC worked with innovative farmers in setting up a demonstration SRI farm, organizing exchange visits with other farmers and training them in SRI techniques. The programme is flexible and allows farmers to adopt the SRI practice by choosing measures that are easy to implement. Follow-up visits, additional training and field-days during rice harvest that bring other farmers and local stakeholders to learn about SRI, are also organized. CEDAC selects successful farmers as SRI promoters and trainers, encouraging them to share experiences and knowledge.

The technology transfer process involves changing the mindset of farmers by demonstrating the benefits of simple and incremental changes in farming techniques such as planting, irrigating and weeding. Changing practice gradually and seeing this produce good results, can create faith and self-confidence in innovation and experimentation. Farmer-to-farmer training has been an effective method for technology transfer. However, technology alone is not enough and market linkages should be developed to bring more benefits to farmers.

The CEDAC Strategic Plan, aims to make farmers self-reliant, positive and market-oriented by promoting the integration of production, fair business and marketing, and through credit support. CEDAC is also strengthening networking between local leaders and rural entrepreneurs to promote learning, empowerment of rural communities and encourage collective action for mutual benefit.

"The private sector should enhance green value chains and improve the supply chains of green inputs."

Local farmer organizations strengthen agricultural marketing in Nepal

Presented by
Komal Pradhan
National Program Director,
International Development Enterprises (iDE), Nepal

Nepal's high dependence on subsistence agriculture means that only around 14 per cent of agricultural produce is marketed. Other major constraints to commercial sale of farmers' produce include inadequate rural business volume, limited marketing opportunities, farmers' lack of knowledge, training and skills, difficulty in accessing agricultural inputs from distant district capitals and major towns, the limited market negotiating ability of farmers, and lack of trust in and among input sellers and output traders.

To address these issues, iDE, an NGO is promoting smallholder commercial agriculture through a value-chain approach with support from the United States Agency for International Development (USAID), the EU, the United Kingdom Department for International Development (DFID) and other donors. The aim is to help farmers produce marketable vegetables, creating sufficient volume of production to attract business. This is to enable the establishment of a community-managed collection centre for market access and to develop profitable private service providers to train farmers along with sales of their inputs and services.

iDE has helped to establish a local community-based farmer organization known as the Marketing and Planning Committee (MPC) to strengthen marketing of agricultural produce in Nepal. As a service provider, MPC aggregates produce from small farmers, creating volume to attract traders. It has facilitated marketing of vegetables by establishing a weighing facility at the collection centre, setting prices through negotiation with traders using wholesale market prices and crop price broadcasts as well as by providing a storage facility and sales of agriculture inputs to farmers. MPC also helps farmers plan vegetable crop production to meet market demand, recommends varieties suited to crop calendars, provides technical support, organizes milk collection and technical testing of its quality, facilitates farmers' access to agricultural inputs and credit, and provides a link to government services.

MPC has assured market access to local farmers and fair prices for their produce without them being cheated in the process of weighing and pricing. This enables farmers to sell even very small quantities and save time and money on transport. As a result, farmers have been motivated to expand cropped area. Traders have also benefited as they can buy a variety of crops in large volumes regularly. Consumers at the local, district and regional level benefit from fresh food as a result of improved links with farmer groups and local service providers.

The MPC has also enhanced the social standing of farmers by providing opportunities for participation in programmes developed by farmers themselves. Farmers have developed a better relationship with government and NGOs, enabling them to make better use of grants and subsidies. The recent EU-funded Agriculture and Nutrition Extension Project (ANEP) and USAID projects have directly brought over 300,000 smallholder households into commercial agriculture. The government and other donors are now developing this commercial collection centre approach in Nepal.

"Participatory, community-based approach to technology transfer is an important investment in building social capital in rural communities. It is a vehicle for developing more sustainable cooperation, dialogue and common agenda."

Participatory approach empowers farmers' organizations in the Philippines

Presented by
Mag T. Catindig
Program Officer, Asian Partnership for the Development of Human Resources in Rural Asia (AsiaDHRRA), the Philippines

AsiaDHRRA is a network promoting partnership and human resource development for rural communities and their organizations. AsiaDHRRA works at the centre of farming communities to better understand local needs and find appropriate solutions to farmers' problems. It works with members and other CSOs in 11 Asian countries to empower farmers' organizations. In the Philippines, a number of good practices have been promoted based on the group development model that encourages farmers to organize around and collectively address a common issue.

Examples of this model include farmers-to-farmers (F2F), farmers' organization-to-farmers' organization (FO-FO) and participatory technology development. The F2F and FO-FO offer farmers an effective channel for expressing their needs through farmer exchange visits and farmer/fisher agricultural technicians' volunteering that provides training, extension services, and promotes sharing of information and monitoring. Participatory technology development includes participatory farm planning and design that guides farmers to strategically plan family farming activities based on available resources. Other programme, such as participatory action research, are designed to encourage participation of vulnerable groups in analysing their experiences and addressing vulnerabilities.

"Small-scale farmers, who live in rural areas, lack of capital to invest on farm land."

Cambodian farmers' federation forms a network for advisory support in technology transfer

Presented by
Yap Thoeurn
Cambodian Farmers Association Federation of Agricultural Producers (CFAP), Cambodia

Cambodian farmers are challenged by lack of access to agricultural information, extension services, irrigation, capital and online connectivity, as well as limited opportunities to sell their produce when market demand is at its peak. CFAP is promoting sustainable agriculture by addressing issues Cambodian farmers face in technology transfer.

CFAP has 19 farmer cooperatives and associations from 5 of Cambodia's 24 provinces as members. It is also a national implementing agency with 30 farmer organizations in nine provinces of the country, representing a network of around 150,000 Cambodian households. The organization has conducted training workshops on soil improvement, water and pest management as well as farmer field schools (FFS), and organized farmer contests. The farmers were also taken on field visits, encouraged to network and share knowledge, and provided face-to-face extension advice to each other.

The CFAP experience shows that there is still a big gap in collaboration between farmers' organizations, NGOs and the government. Firstly, farmers' organizations are often mistaken for NGOs, lack strategic business plans and have little or no knowledge of produce processing and packaging. To continue its advisory support to farmers' organizations, based on lessons learned, CFAP has set clear targets to be achieved by 2017.

Lessons learned

For many fishing communities, access to fisheries to sustain their livelihoods is difficult, in particular when the government has competing priorities between revenue mobilization and enhancement of resource sustainability. Fishing right allocation needs to be based on maintaining the equilibrium between sustainable revenue and sustainable fishing to ensure sufficient food for local communities that depend on fisheries for their livelihoods, as well as to prevent overfishing and unsustainable resource use to benefit future generations. Participation of fishers in the management of fisheries and the development of related technology can promote sustainability of the water bodies they depend on.

The technology transfer process involves changing the mindset of farmers who depend on unsustainable practices, by demonstrating the benefits of simple and incremental changes in farming techniques. Changing practice gradually and seeing the good results this produces, can build faith and self-confidence in innovation and experimentation. Working with innovative and successful farmers can set an example for other farmers to adopt improved technologies, share knowledge and encourage them to choose and adapt technologies according to their priorities and circumstances, speeding up innovation in agriculture.

Although F2F and FO-FO training models have been effective in technology transfer, market linkages also need to be developed to bring more benefit to farmers. If well organized and trained, community-based farmer organizations can facilitate marketing by aggregating small farmers' produce to create volume and attract local business, which is fair to both producers and traders. Participatory, community-based approaches to technology transfer have also proved to be an important investment in building social capital in rural communities and making cooperation sustainable as well as promoting dialogue and a common agenda. While farmers' organizations play an increasingly important role in promoting sustainable agricultural practices and businesses, their activities need to be enhanced, for example, by improving their strategic business plans and engagement in value added processing of raw produce and packaging. Continuous investment in the agriculture sector to build skills is crucial for livelihood security.

Agricultural Trade Facilitation

Participants from Cambodia, Lao People's Democratic Republic (PDR) and Nepal made presentations on good practices in technology transfer in agricultural trade facilitation in their countries.

"Cambodia has reemerged as a global rice exporter but with no intention to stand still."

Rapid increase in rice exports in Cambodia owed to improved technologies and marketing

Presented by
Dao Cambodochine
Trade Facilitation Consultant,
Asian Synergy Consulting Services Co. Ltd., Cambodia

Rice is a staple food in Cambodia accounting for 90 per cent of all agricultural production. The country is also the fifth largest exporter of rice in the world and the second biggest exporter of premium jasmine rice. Since 2009, the trade and marketing of rice in Cambodia has been rising due to the huge demand for food across Asia and other regions. The country exports rice to more than 100 destinations in the world. Cambodian rice paddy production has increased significantly since 2001, reaching 9.3 million tons and engaging 80 per cent of farmers in rice cultivation. It was not until 2008 that Cambodia exported its first measurable milled rice surplus. Impressive developments have taken place at all levels of the rice supply chain since then with a rapid increase in exports. Public-private partnerships have invested huge amounts in technology for rice milling industries to facilitate trade and commerce for export and supply management in Cambodia.

However, new rice mills in Cambodia are highly automated and computer-controlled facilities, requiring increased capacities. Improved quality management in rice production also helps meet international standards. The inception of seed multiplication projects provided access to higher-quality seeds of the most valuable rice varieties, leading to improved homogenous crop yields. As a result, Cambodian rice is considered 'green' and 'clean' – naturally grown with limited use of chemical fertilizer and pesticide. Subsequently, rice mills are obtaining various quality management and food safety certifications such as ISO, HACCP and GMP.

Despite much success, the rice industry in Cambodia needs upliftment to better implement the country's rice action plan. Logistics also need to be improved, such as rejuvenation of underutilized waterways for trade, maximizing land use and improvement of water bodies.

To address challenges linked to successful technology adoption by farmers, different ways to involve the profit-driven private sector in technology transfer need to be explored. The private sector needs to make profit to be sustainable and the business of new technologies is risky, which means that private companies need to analyse potential technologies and incorporate the idea into their business plans. On the other hand, if there is no money, new technologies cannot be sustained. The private sector, therefore, needs to collaborate with NGOs in transferring technologies, both parties complementing each other's knowledge, skills and building trust. Market needs should also be taken into account in government policies which should promote the involvement of the private sector in technology transfer.

"It is necessary to develop private sector capacity to trade efficiently in compliance with rules and regulation."

Lao People's Democratic Republic implements measures to address challenges to agricultural trade facilitation

Presented by
Chanhphasouk Vidavong
Deputy Director of Technical Division,
Economic Research Institute for Trade,
Ministry of Industry and Commerce, Lao PDR

Seventy per cent of the population of Lao People's Democratic Republic depends on agriculture for a livelihood, the majority being smallholders. Nevertheless, limited value-addition in agricultural products and the lack of production expertise and innovation capacity in many agribusinesses has lowered the competitive advantage. There is also limited understanding of the implications of technical barriers to international agricultural trade, including sanitary and phytosanitary (SPS) measures. Being landlocked and with limited trade facilitation infrastructure, is also a major challenge.

Despite these challenges, there are good practices in trade facilitation of agricultural products that can be models for other countries. Government ministries in Lao PDR dealing with agriculture, fisheries, industry and commerce are formulating policies to accelerate technology transfer for trade facilitation, encouraging producers to incorporate contract farming into their business. A national trade facilitation body is being set up to improve coordination among government agencies responsible for border management issues. Lao PDR is also implementing a national single window for export and import and has set up the Lao Trade Information Portal (www.laotradeportal.gov.la) to enhance trade transparency and information sharing among stakeholders about practices, policies and issues related to technology transfer in trade.

Enhanced trade facilitation in the country requires addressing constraints posed by the low level of farmer education in technology use, poor marketing skills, limited coordination among concerned agencies in the harmonization of trade regulations and the lack of information and communications technology (ICT) systems to document declaration and collect customs duties and tax.

The Government of Lao PDR is developing private sector capacities to comply with trade rules and regulations, upgrading technology to transform raw material for agroprocessing, strengthening cross-agency collaboration to facilitate trade procedures, enhancing training on accessing market information, upgrading and improving laboratory facilities for SPS implementation, and improving ICT systems for efficient trade.

It is important to note that while free flow of goods is important, different countries have different problems and concerns, which need to be considered in technology transfer. For example, the main problem for Lao PDR is logistics while Cambodia struggles to maintain a balance in its service sector with a significant part of its labour migrating to Malaysia and Thailand.

"The level of IT applications in Nepal is low. We need highly developed information technology such as single window, paperless trade and e-traceability."

Technology transfer helps facilitate agricultural trade in Nepal

Presented by
Pushpa Raj Rajkarnikar
Chairman, Institute for Policy Research and Development (IPRAD), Nepal

Agriculture accounts for 33.1 per cent of Nepal's GDP and 17.4 per cent of its national trade. The country faces a number of trade constraints to realizing its immense potential to export a variety of agricultural and processed food products such as large cardamom, ginger, honey, lentils, tea, medicinal herbs, coffee, mustard, essential oils, jute and instant noodles. However, the country faces a number of trade constraints that need to be addressed.

The key challenges to agricultural trade include a lack of skills, technology and labour as well as inadequate market access and knowledge. The difficulty of meeting SPS requirements and obtaining quality certification due to the lack of a recognized accreditation agency, lengthy trade procedures, high transport costs, irregular electricity supply and inadequate use of ICTs are other major constraints.

The Government is promoting technology transfer for agricultural trade facilitation by developing an integrated strategy for agricultural trade and strengthening trade-related capacities of both public and private sector. It is focusing on improving transport and communication systems and quality assurance.

For example, the introduction of ICT such as the e-filling of custom declarations and a broker-and- risk-based selectivity module, have modernized Nepalese customs. Being a landlocked country is a hurdle and the Government of Nepal is working with the Government of India, its main agricultural trade partner, to facilitate trade harmonization. Other examples of technology transfer in trade facilitation include compilation of explanatory notes for a harmonized system code, establishment of inland container depots at some trading points and the launch of integrated check points at different border points.

The introduction and implementation of the Customs Reform and Modernization Strategies and Action Plan (2013-2017) has supported the economic and fiscal policies of the Government of Nepal, guiding the Department of Customs in providing systematic, transparent and accountable services. Nepal is also preparing to enact a new Foreign Investment and Technology Transfer law to attract foreign investment and strengthen trade to benefit the economy and trading community.

Lessons learned

Good agricultural trade facilitation practices in some countries can be models for others. Governments are increasingly formulating policies to accelerate technology transfer for trade facilitation, strengthening trade-related capacities of both the public and private sector, as well as improving coordination among government agencies responsible for border management issues to ensure that the problems and concerns of each country are reflected in technology transfer. Policies are also being implemented to encourage producers to incorporate contract farming into their business, introduce a national single window for export and import, improve transportation, assure quality of traded products, and strengthen trade transparency and sharing of information among stakeholders on trade-related matters.

The Policy Dialogue discussed ways to enhance private sector engagement in agricultural technology transfer. From a market perspective, obtaining quick economic returns on investment in agricultural technology may not be easy. Private sector initiatives should, therefore, create supply chain partnerships with farmers to support sustainable agricultural practices. Collective marketing can help improve the farmers' bargaining power with traders, wholesalers, input suppliers and other stakeholders. Collaboration with NGOs is also needed to support capacity-building to enable famers and their communities to add value to produce. The partnership should complement each party's knowledge and skills and build trust.

Evaluating Impact of Technology Transfer

"Economists always want to see numbers, but the numbers don't tell the full story, don't give us understanding of how people change and how they make decisions, so they have to be backed by narratives."

Assessing impact of rural advisory services on smallholders

Presented by
Elske Van de Fliert
Director and Associate Professor, Centre for Communication and Social Change, University of Queensland

Evaluation is an important process that brings together two different frameworks of development. On the one hand there are programmes, policies, technologies and economics, and on the other, there are people and processes that help move beyond underlying thinking towards more listening and sharing. The combination of these frameworks is necessary to help generate evidence-based results that can be used for adaptive management and to guide policies.

From the viewpoint of sustainable development, evaluation and impact assessment is even more important to assess gains in poverty reduction, food and nutrition security and environmental preservation. However, achieving these goals depends on the behaviour, practice and actions of people on the ground. Behaviour, on the other hand, depends on people's choice of technology to use. How do people make these decisions that would make them achieve their goals?

Access to appropriate and suitable technologies – their identification, dissemination, adaptation and adoption – is highly important for helping farmers reduce the yield gap and/or increase cropping intensity to achieve desired production growth. Access to inputs, credit, labour, markets and learning is equally important. Knowledge and skills, both practical and critical, are key to development.

Technology transfer is, therefore, only one of many important processes that need to be consistent to show, teach and facilitate technologies and collective action to bring about positive development change. These processes need to be recognized through evaluation methods, to enable understanding of what has happened and the kind of processes that are occurring. Without this understanding, it is not possible to understand the cause of impacts. We also need to recognize external factors such as droughts and floods.

Evaluation methods need to be mixed and designed on a case-by-case basis with consistency between objective, method and output. Numbers are important but statistics do not show the real picture as the social elements are not covered. This makes it highly important to combine statistics with narratives for a more comprehensive picture of the evidence of the impact of innovations and processes. Monitoring, evaluation and impact assessment must also be linked and built into the project design to ensure that indicators of importance to stakeholders are included in the process.

For reporting to be effective, its format should be stakeholder-specific and provide evidence-based causality between content, process designed to deliver this content, change at each level and external factors. Reports need to provide evidence of effectiveness and indicate areas where there is a need to adapt and learn. Both M&E and impact assessments need to be participatory, holistic, people-centred, evidence-based and well communicated.

It is important for evaluation to be: (i) participatory, in order to understand the different levels listed above; (ii) holistic, in order to understand the dynamic context, networks and the interrelationship of different systems; (iii) critical, in order to assess inequalities, challenges and contradictions in the process of social change; (iv) realistic, in order to understand how systems behave and are grounded in local realities; (v) learning-based, in order to provide opportunities to foster continuous learning, evaluative thinking and better communication and trust, as a basis for development of evaluation capacities and learning organizations; (v) emergent, in order to reflect social change and continuous feedback loops, and depict unexpected outcomes and ripple effects; (vi) and complex, in order to understand the dynamic context and unforeseen outcomes, which require analysis of social norms and mixed evaluation methods. Fundamental to these processes is the aim to develop mutual trust, partnership, two-way communication and mutual learning.

"Networks are very important tools to speed up technology transfer but their impact is very difficult to quantify."

Data and methodological issues in evaluating knowledge networks for technology transfer

Presented by
Hannah Jaenicke
Consultant, Project Management and Evaluation,
Agrobidiversity, Marketing and Rural Devleopment, Germany

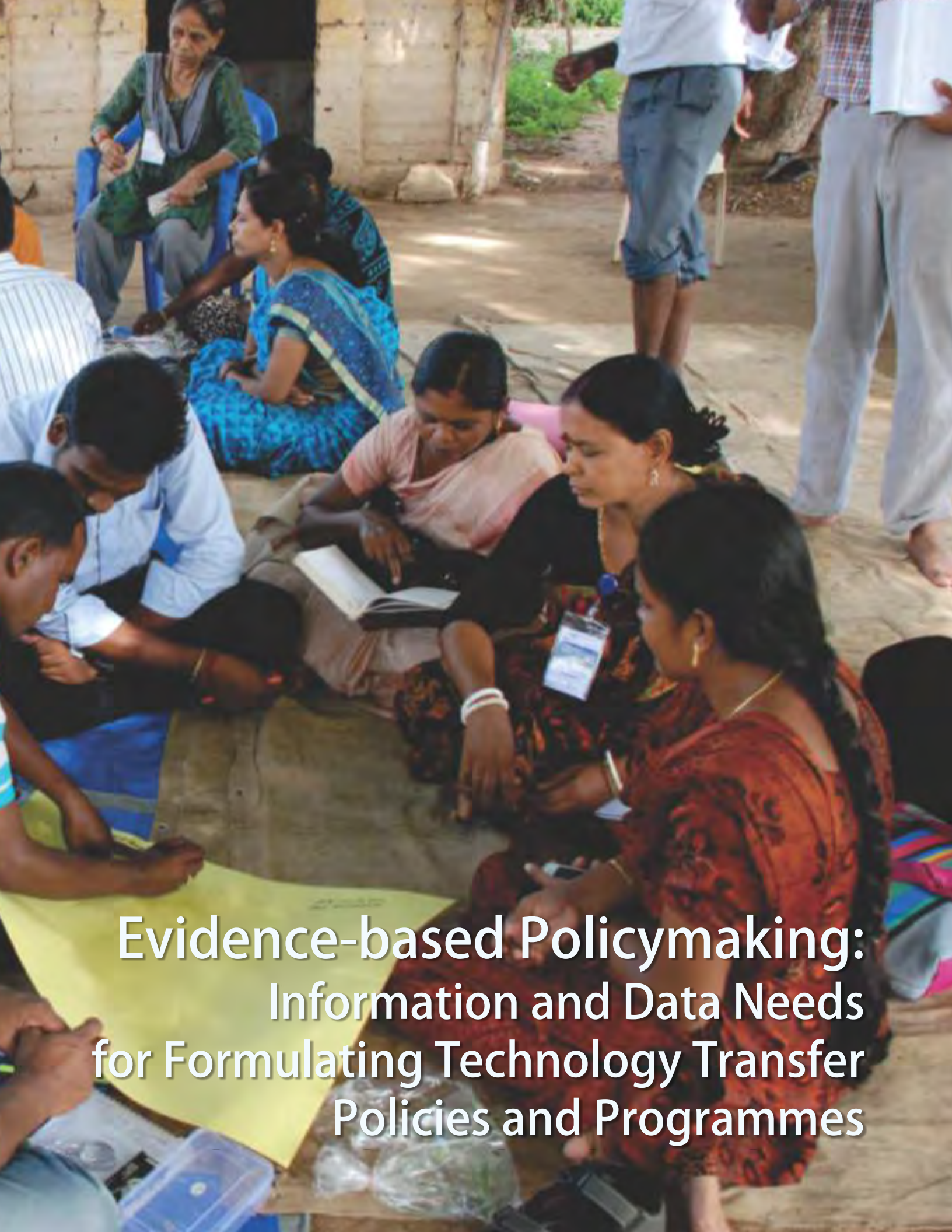
Social capital and knowledge networks are increasingly recognized as having an important role in promoting sustainable development by speeding up the transfer of knowledge with the participation of the recipients, thereby increasing the sense of ownership of the knowledge. They create collective value and benefits from trust, reciprocity, information and cooperation for those who are connected. As such, the key to what makes networks special and the main reasons for networks to be established include obtaining and sharing of information and advice, and promoting collaboration, trust and friendship among practitioners across institutional boundaries.

However, cumbersome methods of data collection and analytical limitations make it difficult to quantify the impact of these networks. For example, data collection can be highly time consuming and the use of knowledge produced by networks and the quality of networking can be difficult to quantify. Visualization of network diagrams can be misleading due to the connections of one 'super networker'. Furthermore, the qualitative information received through evaluation surveys may be incomplete or superficial.

Another issue in evaluating network programmes is related to limitations of certain indicators. For example, the SATNET Asia network has set as an indicator of success to show that at the end of the project, at least 70 per cent of key stakeholders indicate enhanced regional networking on implementing actions related to sustainable agriculture and trade facilitation. The project evaluation found the data set too thin to measure this. It suggested, as an indicator that could be both a qualitative and quantitative measure of the value of networking, the addition of questions such as "how many opportunities came up through the project" or "did networking help you define your role within the community better?".

Baseline information collected at the beginning of a project or activity can provide an information base for monitoring and evaluating progress and effectiveness, both during implementation and after the project/activity is completed. Knowledge, Attitude, Practice (KAP) surveys can complement this approach and provide an opportunity to measure the success of capacity development programmes immediately on their completion as well as 6 to 12 months later. The surveys collect information on the knowledge retained by trainees, changes in their work as a result of the training and their application of the acquired knowledge.

The evaluation of the SATNET Asia project found that networks and their vibrancy can be visualized (i.e. depicted through visual aids) but their effect in transferring new knowledge remains difficult to quantify. Narrative evidence of the importance of networking in acquiring and sharing knowledge was important for the evaluation findings. Training and capacity-building for intermediaries conducted by the SATNET Asia project was also valuable in transferring new knowledge. Networks are important instruments that help build trust across institutional boundaries, which is important for successful technology transfer.



Evidence-based Policymaking: Information and Data Needs for Formulating Technology Transfer Policies and Programmes

"Developed countries do not have a monopoly on innovation. The most innovative ideas are emerging from the least developed countries."

Michael Williamson
Head, Asian and Pacific Centre for Transfer of Technology (APCTT), ESCAP, India

The benefits of technology transfer have not reached all farmers, while productivity growth is declining. The excessive use of pesticides and fertilizer has led to questioning of the long-term sustainability of Asia-Pacific agricultural systems. The lack of evidence about what is effective for smallholders and how the successful application of improved technology can be scaled up, requires improved documentation and data management to inform policymaking for effective technology transfer to promote sustainable agriculture, food security, poverty reduction and environmental preservation. This calls for priority attention to addressing information and data gaps in policy implementation for technology transfer.

These issues were taken up during the second panel discussion of the Policy Dialogue. The panel was moderated by Michael Williamson, Head, Asian and Pacific Centre for Transfer of Technology (APCTT), ESCAP, India and included Mr. Kipp Sutton, Agricultural Team Leader, USAID Regional Development Mission – Asia, Thailand; Dr. Mak Soeun, Deputy Director General, General Directorate of Agriculture and In Charge, Food Security, Agricultural Extension and Agricultural Cooperatives, Cambodia; Dr. Ramesh Chand, Director, National Centre for Agricultural Economics and Policy Research (NCAP), ICAR, India; Dr. Rozhan Bin Abu Dardak, Director, Economic and Technology Management Research Centre, Malaysian Agricultural Research and Development Institute (MARDI), Malaysia; and Dr. Virginia Cardenas, Deputy Director-Administration, Southeast Asian Regional Center for Graduate Study and Research in Agriculture, the Philippines.

"Farmers need to believe in technology in order to adopt it."

Kipp Sutton
Agricultural Team Leader, USAID Regional Development Mission — Asia, Thailand

Policymaking information requirements for effective technology transfer

Policy, defined as the setting of a strategic direction for a sector, requires policymakers to have information about the sector. However, data is needed to indicate the impact of technology transfer on the national economy and help farmers develop sustainably. Policymakers need data that can help them lead all development sectors and that can be used by farmers and government officials. While research generates the key scientific data for technology transfer, the government also needs information directly from farmers for a better assessment of how agricultural productivity and produce quality can be improved in order to address food production challenges. The evidence base is always growing and evolving because it takes into consideration the socioeconomic and environmental context of agriculture-based livelihoods. Therefore, it is important for policymakers to be supported and advised by research.

Offering a donor perspective, USAID explained the four key aspects it focuses on in the design and implementation of development projects and programmes it supports. Lack of understanding of the problem and the technology to be transferred, often leads to failure in its adoption by farmers. It is, therefore, important to define from the farmer's perspective, the problem to be addressed. We also need to explore agricultural technologies that are already available and those that have already been accepted by farmers. Understanding the farmers' preferences and socioeconomic circumstances is also crucial to provide a basis for technology adoption because every

farmer group, community or village is different. Finally, good evidence and data need to be generated to enable an assessment of what is successful and can be successfully scaled up.

Information needed for enhanced agricultural technology transfer impact

The many competing research data requirements include productivity, efficiency, national and regional equity (inclusiveness), self-sufficiency, surplus, production inputs and food safety. The supply and demand side, intellectual property rights and responsibilities of government and funding agencies, institutions for commercializing research output, communications support and advocacy, need to be taken into account.

"The primary role of SATNET should be related to networking, followed by policy research."

Mak Soeun
Deputy Director General of General Directorate of Agriculture, Ministry of Agriculture, Forestry and Fisheries, Cambodia

Reducing information gaps

It was pointed out that the most important challenge for researchers was the sharing of information because of reluctance to lose ownership of their research. Researchers must be convinced to share knowledge by acknowledging their ownership of the research they produce. A proper licensing system is required for the commercialization of technology.

Another major technology shortcoming is forgetting that adopters need simple and not complex technologies. An understanding of real needs is key to reducing the information gap. Evaluation at different stages of technology development and transfer is crucial to better understand how the technology is adopted.

Panelists expressed the view that much information of value to farmers was not being shared with them and wondered how information could be taken out of the silos in which it was slotted and used for informed decision-making. It was pointed out that the biggest gap was between what is already available and what is needed.

In today's information age, it is a challenge to sift through the huge amount of online information available to find what is relevant. Websites such as Wikipedia are useful but do not address the needs of those seeking highly specialized and reliable information. It was suggested that SATNET could play such a role.

"Sometimes, technology meant for farmers is exaggerated. We need to keep in mind that technology is used by adopters. This is where the biggest technology gap comes from."

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

Role of SATNET in improved sharing of knowledge and good practices

It was suggested that SATNET should become the lead knowledge management institution, particularly on issues relevant to agriculture. It could help mobilize global initiatives on and connect with other knowledge-sharing platforms as well as create simple online tools for knowledge-sharing. However, rather than focusing on technology and trade facilitation alone, the primary role of SATNET could be to promote networking in policy research, sorting out (organizing) information and developing and implementing simple knowledge-sharing tools for those who need to access information quickly and easily.

"It is very difficult to formulate general policy that can fit all."

Rozhan Bin Abu Dardak
Director, Economic and Technology Management Research Centre, MARDI, Malaysia

"SATNET could be the lead institution in knowledge management, particularly on issues relevant to agriculture."

Virginia Cardenas
Deputy Director-Administration, Southeast Asian Regional Center for Graduate Study and Research in Agriculture, the Philippines

Providing information to smallholder farmers in future

Supporting farmers' development involves recognition of their knowledge, aggregation of agricultural information for them and good agricultural extension systems for places without access to ICT. While SMS can partly address the problem, the future seems to be in smartphones that are increasingly used by service providers to disseminate information. Policymakers also need data from researchers and farmers themselves for a better assessment of agricultural information in order to address food production challenges. ICT has, therefore, tremendous potential to promote technology transfer that would lead to desired policy change.

Regional and South-South cooperation can speed up innovation. International cooperation is important for developing and sharing knowledge to speed up the process of technology diffusion. There is need to increase the amount of knowledge that is shared to make it easier for farmers to access the information they need. However, bottlenecks in the sharing of information have to be addressed, particularly by acknowledging research ownership and establishing an appropriate licensing system for commercial technology. Development cooperation facilitated through networks can also bridge the demand-supply gap for knowledge, addressing the problem of information deluge and bring specialized and reliable information to those who need it.

Working Groups

Four working groups discussed the following topics:

1. how to **promote technology transfer** to scale up low-cost, farm-level innovation;
2. what are the main **bottlenecks in information sharing on good technologies** and practices, and how can they be addressed;
3. what is the **role of different stakeholders** in technology transfer and how to ensure coordination; and
4. how to better **monitor and document** the development impact of technology transfer.

The following question were put to each group: “what **institutional mechanisms** are required to achieve the stated objective of the group?”, “what **policy priorities** are needed to enable such institutional mechanisms?”, and “**what the participants and their organizations can commit** to achieving the group's objectives?”. A matrix of action items was developed, based on information and ideas presented by each group (contained in Annex 3). The matrix contributed to the development of a 'Regional Framework on making technology transfer work for sustainable development outcomes’ presented in the next section.

Regional Framework on Making Technology Transfer Work for Sustainable Development Outcomes

A key output of the Policy Dialogue was the development of a Regional Framework on making technology transfer work for sustainable development outcomes. The deliberations during the Working Groups (please see matrix in Annex 4) as well as presentations and panel discussions outlined a range of areas for further action which are presented below in a structured framework. The Regional Framework is intended to serve as a key resource to guide different stakeholders including governments, civil society, private sector and development agencies in Asia and the Pacific on future technology transfer initiatives in agriculture.

Institutional mechanisms

To promote technology transfer to scale up low-cost, farm-level agricultural innovation, specific institutional mechanisms are required for different technologies. It is important to conduct a feasibility assessment of technologies to determine their potential and identify the different pathways of technology transfer. Working with farmers and their organizations to develop low-cost technologies and build their capacities to use, validate and adapt improved technologies to local needs and circumstances, is critical for speeding up agricultural innovation. Low-cost technologies can also be promoted through networks such as SATNET Asia that facilitate knowledge transfer among public, private and civil society institutions to promote South-South cooperation. Such networks can offer technical and institutional options for technology transfer that are flexible, and also inform policy.

However, barriers to the sharing of information on good technologies and practices can be created by those who have access to, control and interpret information. Most researchers tend to work in their own area of interest that might or might not be useful to farmers. The lack of a mandate, motivation and understanding of the need to share information and its importance for sustainable development, are also impediments to change and information sharing. A territorial mindset is often responsible for low institutional linkages and competition for financial resources, which also results in poor information sharing. Lack of effective coordination of information sharing and knowledge management systems for already developed information is another bottleneck. However, farmers' preference for quick results and short-term solutions, with no regard for long-term benefits, can also be a constraint. Finally, the assumption that information should be taken to farmers needs to change. Much crucial information on agricultural technologies not only needs to be brought back from farmers to governments, research and other development actors but also acted upon through adaptive research. Institutional mechanisms to promote this two-way information flow need to be improved.

An institution mandated to monitor all scientific publications and assess what can be useful to farmers in different agroecological areas will improve access to technologies, promote the sharing of information on good practices, and reduce the risk for farmers in adoption of new technologies. Farmers must be involved in the research process right from the beginning to ensure that the information shared with them is relevant to their needs. The process, therefore, needs to be demand-driven, participatory and understandable to farmers. There is also a need to ensure protection of intellectual property to encourage researchers to share research results.

Stakeholders in agricultural technology transfer include: (i) relevant public sector institutions such as agricultural extension, universities, research institutes and investment agencies; (ii) the private sector, including financial institutions, farmers, entrepreneurs and agro-industry actors; (iii) civil society; and (iv) international and regional organizations. A public-private working group or a technical cooperation advisory group is needed to coordinate and facilitate consultation among the diverse stakeholders. This forum can also define strategies and policies and ways to implement these. Effective coordination requires development and strengthening of horizontal and vertical linkages between all relevant public and private institutions from central to local government level and from policy to programme level. An acceptable entity with a strong mandate is needed to play a lead role and promote coordination among various stakeholders. Capacity development systems should also be designed to build farmers' skills and better enable them to work with diverse stakeholders.

A transdisciplinary approach to collaboration with all stakeholders, including farmer communities, is required to determine collectively agricultural technologies most beneficial to small farmers and monitor and document their impact. A strong monitoring and evaluation (M&E) system for technology transfer from design to implementation and completion within the set timelines is essential for effective technology transfer. During the design phase, the system requires reliable baseline data, stakeholder analysis and strong success indicators, which may vary at the local, national and regional level, as well as standardized methods including the logical framework approach (LFA) and results-based management (RBM). The implementation phase implies collection and organization of targeted quantitative and qualitative information for regular monitoring of project/activity/output. The completion phase demands internal and external impact assessment to assess key outcomes and attribution of the impact to the project/activity.

Policy priorities

Agricultural development, including scaling up low-cost, farm-level innovation, requires that agriculture be recognized as an industry by changing the policymakers' attitudes. The development of such an industry requires an appropriate policy and regulatory framework to define and promote good practices in technology development, validation and promotion. The framework requires a strategy to develop a partnership to facilitate participatory validation of grassroots innovation and a clear road map to inform stakeholders of the steps needed to scale up low-cost, farm-level innovation. Farmers, NGOs, the private sector and other stakeholders can participate in enhancing sustainable adoption of technologies and selecting acceptable technologies for scaling up. Policy also needs to take into account the need to develop an information and technology exchange platform, encourage private companies to work with farmers on technology transfer, invest in strengthening the extension system and minimize transportation cost.

Policy support to institutional mechanisms to remove bottlenecks to the sharing of information on good technologies and practices, include the mandatory incorporation of the extension component into research projects to be supported by donor agencies, the mapping of traditional knowledge and practices, record-keeping of traditional knowledge and farmers' daily practice, decentralization of the process of sharing information, as well as encouragement to regional networking for South-South knowledge exchange.

To promote coordination among stakeholders in technology transfer, government policies must empower coordination bodies and ensure funds for coordination. Policy support is also needed for universities and research institutes as autonomous figures that play a vital role in the innovation process and the assessment of the benefits of technologies for end users who are farmers. Farmer organizations should have better representation in the coordination mechanism in order to incorporate their voices in the innovation agenda. Capacity-building support is required for agricultural extension to ensure effective dissemination and coordination of technology transfer.

Knowledge generated by monitoring the impact of technology transfer needs to be documented to guide government policies in support of technology transfer. The government should create an enabling environment for effective working of the M&E system. Policy priorities should include a good definition of roles and responsibilities, statistics and qualitative data with objective assessments, guides and templates, as well as a common terminology to enable clear and effective communication in policy dialogue, formulation and implementation.

Commitments

To support policy priorities to scale up low-cost, farm-level innovation, engagement of farmers in technology development and validation should be promoted and incorporated in services for farmers. Other important factors in achieving the desired change include increased access of farmers to information on new technologies, the sharing of technology with more stakeholders, enhanced investment in monitoring and evaluation of technology transfer, and better prices for farm produce through farmer collectives or procurement policies to incentivize technology adoption.

An outreach programme is needed to remove bottlenecks to the sharing of information. Without adequate outreach, communication and engagement, farmers may perceive the introduction of new technologies as being imposed on them and against their interest. One mechanism to provide a participatory, user-centric platform for stakeholders in technology transfer is a social laboratory for change. This mechanism could help address development challenges and resistance to change, by encouraging and facilitating cooperation and creating innovative solutions to complex problems. While information and communication technology (ICT) provides opportunities for sharing of information, incentives for information sharers and continuing enhancement of communication and knowledge management coordination should not be ignored.

Different stakeholders have different roles in the technology transfer process. The public sector must take the lead in technology transfer, setting the national agenda, formulating the strategic direction for development, crafting policies, undertaking research for innovative technology, as well as verifying and demonstrating technologies to farmers along with allocation of funds for further outreach. The private sector must invest and provide sources of funding, and collect and transfer effective technologies to farmers. Civil society, international and regional organizations should focus on coordination.

To guide the monitoring and documentation of the impact of technology transfer, governments must commit finances, policy support to inclusive and participatory M&E processes, and provision of data through censuses and surveys. Research institutes and universities should provide methodological guidance and capacity-building support, and produce manuals and templates. NGOs should play an advisory role, flagging concerns and issues, as well as monitoring activities at the field level. The private sector should develop appropriate tools using ICT such as mobile phone applications for M&E. Donors should support with funds and guidelines on monitoring priorities.

Agenda

DAY 1: Tuesday, 10 February 2015

Time	Session	Activities
08.00 – 09.00 am	**Registration**	**Registration of participants**
09.00 – 09.45 am	**Inaugural Session**	**Welcome remarks** ▪ Dr. Katinka Weinberger, Director, CAPSA-ESCAP **Inaugural address** ▪ Mr. Hari Priyono, Secretary General, Ministry of Agriculture, Government of Indonesia **Group photo**
09.45 – 10.15 am	Coffee break	
10.15 – 10.55 am	Session 1 **Theme overview**	*Session Chair:* ▪ Dr. Rusman Heriawan, Researcher and former Vice Minister, Ministry of Agriculture, Indonesia **Opening keynote: Technology transfer and the Sustainable Development Agenda** ▪ Dr. Haryono, Director General, Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture, Indonesia **Presentation: Strengthening agricultural innovation systems in Asia – the role of technology transfer for sustainable agriculture** ▪ Dr. Katinka Weinberger, CAPSA **Brief Q&A**
10.55 am – 12.00 pm	Session 2 **Panel discussion**	**Technology transfer from Green Revolution to now – A boon or a bane for sustainable development?** *Moderator:* ▪ Dr. Raghunath Ghodake, Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions, Thailand *Panelists:* ▪ Dr. Iftikhar Ahmad, Chairman, Pakistan Agricultural Research Council, Pakistan ▪ Dr. Kong Thong, Dean of Faculty of Agro-Industry, Royal University of Agriculture, Cambodia ▪ Mr. Muhammad Zeshan Saqib, Director Quality Assurance & Traceability System, Star Farm Pakistan (Pvt.) Limited, Pakistan ▪ Mr. Shimpei Murakami, Chairperson, Asian Farmers Association, Japan/the Philippines ▪ Ms. Ranny Mutiara Chaidirsyah, Head of Farming Institution Empowerment Division, Agency for Agricultural Extension and Human Resources Development (AAEHRD), Ministry of Agriculture, Indonesia **Discussion** **Summary by Moderator**
12.00 – 01.00 pm	Lunch	

Time	Session	Activities
01.00 – 02.00 pm	**Session 3** **National perspectives**	**Good practices in agricultural technology transfer for climate resilient food production technologies** *Session Chair:* ▪ Mr. Kencho Thinley, Chief Planning Officer, Policy and Planning Division, Ministry of Agriculture and Forests, Bhutan *Presenters:* ▪ Mr. Eklavya Prasad, Managing Trustee, Megh Pyne Abhiyan, India ▪ Dr. Made Jana Mejaya, Director, Indonesian Center for Food Crops Research and Development, Ministry of Agriculture, Indonesia ▪ Mr. Md. Shamim Hossain, Head of Food Security and Livelihoods Unit, Concern Universal, Bangladesh **Discussion** **Summary by Session Chair**
02.00 – 03.30 pm	**Session 4** **National perspectives**	**Good practices in agricultural technology transfer through participatory and community-based approaches** *Session Chair:* ▪ Dr. Teodoro S. Solsoloy, Director III/Scientist 1, Bureau of Agricultural Research, the Philippines *Presenters:* ▪ Mr. Bobby, Chief Executive Officer, Network Activities Group, Myanmar ▪ Ms. Chantheang Tong, Senior Program Officer, Cambodian Center for Study and Development in Agriculture, Cambodia ▪ Mr. Komal Pradhan, National Program Director, International Development Enterprises (iDE), Nepal ▪ Ms. Ma. Genesis Tenido Catindig, Program Officer, Asian Partnership for the Development of Human Resources in Rural Asia, the Philippines ▪ Mr. Yap Thoeurn, Agriculture and Advisory Manager, Cambodian Farmers Association Federation of Agricultural Producers (CFAP), Cambodia **Discussion** **Summary by Session Chair**
03.30 – 04.00 pm	Coffee break	
04.00 – 05.00 pm	**Session 5** **National perspectives**	**Good practices in agricultural trade facilitation** *Session Chair:* ▪ Dr. Md. Azizur Rahman, Chairman, Bangladesh Tariff Commission, Bangladesh *Presenters:* ▪ Mr. Cambodochine Dao, Consultant and Trade Facilitation Expert, Asian Synergy Consulting Services Co., Ltd., Cambodia ▪ Mr. Chanhphasouk Vidavong, Deputy Director of Technical Division, Researcher and Lecturer, Economic Research Institute for Trade, Ministry of Industry and Commerce, Lao PDR ▪ Dr. Pushpa Raj Rajkarnikar, Chairman, Institute for Policy Research and Development, Nepal **Discussion** **Summary by Session Chair**
05.00 – 05.30 pm	**Session 6** **Plenary discussion**	**Key messages from the day** *Moderators:* ▪ Takashi Takahatake, Programme Officer, CAPSA ▪ Anshuman Varma, Knowledge Management Coordinator, CAPSA **Discussion** **Wrap up** ▪ Dr. Katinka Weinberger, CAPSA
06.00 – 08.00 pm	**Dinner Reception**	**Welcome reception for all participants** *(Venue: Padjadjaran Suites Hotel)*

DAY 2: Wednesday, 11 February 2015

Time	Session	Activities
08.00 – 09.00 am	**Registration**	**Registration of participants**
09.00 – 10.15 am	**Session 7** **Evaluating impact of technology transfer**	**Recap of Day 1 & overview of Day 2** *Session Chair:* ▪ Mr. Mesah Tarigan, Director, International Cooperation Center, Ministry of Agriculture, Indonesia **Keynote presentation: Measuring impact of rural advisory services on smallholders** ▪ Dr. Elske Van de Fliert, Director and Associate Professor, Centre for Communication and Social Change, University of Queensland, Australia **Keynote presentation: Data and methodological issues in evaluating knowledge networks for technology transfer** ▪ Dr. Hannah Jaenicke, Consultant in Project Management and Evaluation: Agrobiodiversity, Marketing and Rural Development, Germany **Discussion** **Summary by Session Chair**
10.15 – 10.45 am	Coffee break	
10.45 am – 12.00 pm	**Session 8** **Panel discussion**	**Information and data requirements for formulating technology transfer policies and programmes** *Moderator:* ▪ Mr. Michael Williamson, Head, Asian and Pacific Centre for Transfer of Technology (APCTT), ESCAP, India *Panelists:* ▪ Mr. Kipp Sutton, Agriculture Team Leader, USAID Regional Development Mission-Asia, Thailand ▪ Dr. Mak Soeun, Deputy Director General of General Directorate of Agriculture and In charge, Food Security, Agricultural Extension and Agricultural Cooperatives, Cambodia ▪ Dr. Ramesh Chand, Director, National Centre for Agricultural Economics and Policy Research, India ▪ Dr. Rozhan Bin Abu Dardak, Director, Economic and Technology Management Research Centre, Malaysian Agricultural Research and Development Institute, Malaysia ▪ Dr. Virginia Cardenas, Deputy Director-Administration, Southeast Asian Regional Center for Graduate Study and Research in Agriculture, the Philippines **Discussion** **Summary by Moderator**
12.00 – 12.15 pm	**Session 9** **Working groups**	**Development of a regional framework document 'Making technology transfer work for sustainable development outcomes'** Explanation of group work
12.15 – 01.30 pm	Lunch	

Time	Session	Activities
01.30 – 02.30 pm	**Session 10** **Working groups (contd.)**	**Working group discussions** Working groups to discuss the following questions: 1. How to promote technology transfer to scale-up low-cost, farm-level innovation? 2. What are the main bottlenecks in information sharing on good technologies and practices, and how can they be addressed? 3. What is the role of different stakeholders in technology transfer and how to ensure coordination? 4. How to better monitor and document the development impact of technology transfer? 5. What is the role of international organizations in regional cooperation for technology transfer?
02.30 – 03.00 pm	Coffee break	
03:00 – 04.15 pm	**Session 11** **Plenary discussion**	**Working groups presentations on outcomes of group work** *Session Co-Chairs:* ▪ Dr. Katinka Weinberger, CAPSA ▪ Dr. Fenton Beed, Regional Director, AVRDC – The World Vegetable Center East and Southeast Asia (Thailand) **Working group presentations** **Discussion**
04.15 – 04.45 pm	**Closing session**	*Moderators:* ▪ Mr. Takashi Takahatake, CAPSA ▪ Mr. Anshuman Varma, CAPSA **Closing statements** **Closing** ▪ Dr. Katinka Weinberger, CAPSA
04.45 – 05.00 pm	**Evaluation**	**Meeting Evaluation**

About the Participants

A total of 85 persons participated in the event (see **Annex 2** for list of participants). They included 59 government and NGO/private sector representatives from the following 18 countries: Afghanistan (2 representatives), Australia (1), Bangladesh (4), Bhutan (3), Cambodia (6), Fiji (1), India (5), Indonesia (16), Japan (1) Lao PDR (1), Malaysia (1), Mongolia (1), Myanmar (5), Nepal (5), the Netherlands (1), Pakistan (3), the Philippines (2) and Sri Lanka (1). Nineteen representatives from regional/international organizations (22 per cent of participants) and seven journalists/social media reporters (8 per cent) also participated.

The majority of participants were from South-East Asia (32), followed by South Asia (24), Australia and the Pacific (2) and Europe (1). The rest (19) were representatives of regional and international organizations. In terms of gender, 72 per cent (56) of all participants were men and 28 per cent (22) were women.

Regarding organizational type, 42 per cent of the participants (33) represented governments (staff from ministries and national research centres). Thirty per cent (23) represented NGOs, 24 per cent (19) represented United Nations/intergovernmental/donor organizations and 4 per cent (3) represented the private sector. The complete list of participants is contained in **Annex 2**.

Figure 1. Participants by geographical region

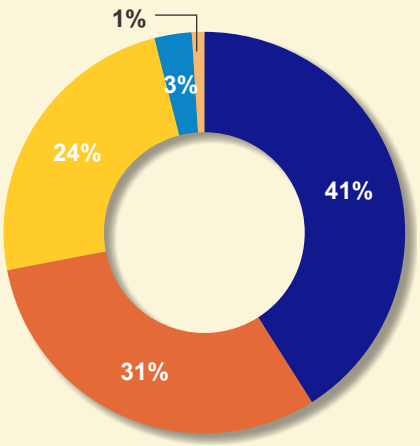


Figure 2. Participants by type of organization

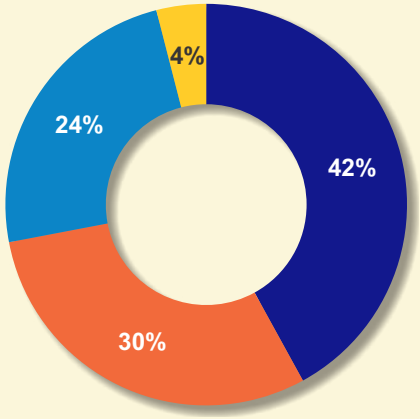
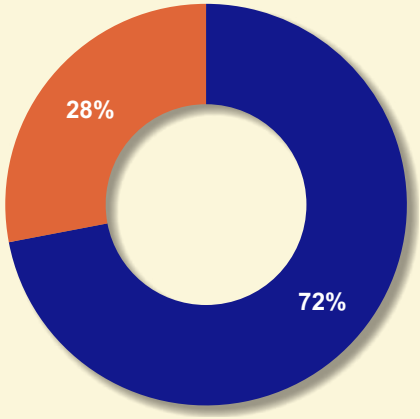


Figure 3. Participants by gender



List of Participants

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Outcome of Working Groups Discussion (Matrix)

Group work theme	Institutional mechanisms required	Policy priorities for the institutional mechanisms	Commitments by organizations
Promotion of technology transfer to scale up low-cost, farm-level innovation	▪ Develop processes and systems for defining technology transfer and conduct feasibility-assessment evaluation of technology. ▪ Introduce flexible institutional mechanism to accommodate different technology transfer pathways. ▪ Design capacity development systems to adapt technology to local needs, build farmers' skills, and develop capacities to work with diverse stakeholders. ▪ Allow working with farmer organizations for low-cost technology dissemination through cooperative and marketing groups.	▪ Develop/strengthen partnership with government to facilitate validation of grassroots innovation. ▪ Facilitate supply chains for sustainable adoption of technologies. ▪ Design a platform for information and technology exchange between research agencies and promoters (users). ▪ Facilitate participatory development and validation of technology. ▪ Develop a clear road map to inform stakeholders of the steps needed to scale up low-cost, farm-level innovation. ▪ Implement a simple regulatory framework for defining and promoting good practices in technology validation and promotion. ▪ Encourage private companies to work with farmers on technology transfer. ▪ Invest in strengthening the extension system. ▪ Recognize agriculture as an industry.	▪ Ensure farmer engagement in technology development and validation. ▪ Increase access of farmers to information on new technologies. ▪ Share technology with more stakeholders. ▪ Invest in monitoring and evaluation of technology transfer. ▪ Ensure better prices for farmers to incentivize technology adoption. ▪ Scale up successful technologies. ▪ Dovetail technology transfer with existing farmer services.

Group work theme	Institutional mechanisms required	Policy priorities for the institutional mechanisms	Commitments by organizations
Main bottlenecks to information sharing on good technologies and practices, and ways to address these	▪ Ensure intellectual property rights for those with access to and control over information to address the resistance and fear to information sharing. ▪ Assist researchers, scientists and farmers in interpreting information. ▪ Improve coordination among institutions. ▪ Enhance technology economics to improve knowledge-sharing. ▪ Improve effectiveness of the knowledge management system, especially for technologies already developed. ▪ Motivate farmers to realize the benefits of technology in the long term. ▪ Promote two-way communication between demand for and supply of knowledge.	▪ Make technology transfer and extension mandatory in every development (including research) project. ▪ Map and monitor technologies developed through science and research, and categorize these by usefulness to farmers in different agroecological areas. ▪ Promote record-keeping of traditional agricultural knowledge and farmers' daily practices. ▪ Promote decentralization of information sharing.	▪ Develop an outreach programme. ▪ Introduce social laboratory for change. ▪ Provide incentives for information sharers. ▪ Enhance communication and coordination.
Role of different stakeholders in technology transfer and ways to ensure coordination	▪ Engage and create horizontal and vertical linkages among all multi-stakeholders for effective coordination. ▪ Establish public-private sector working groups for coordination. ▪ Appoint a credible entity(ies) with a strong mandate to coordinate various stakeholders.	▪ Empower coordination bodies. ▪ Support universities and research institutes as autonomous bodies involved in innovation and assessment of benefits of technologies for end users. ▪ Include farmers' representatives in coordination mechanisms and incorporate their voices in the innovation agenda. ▪ Secure funds for coordination. ▪ Provide capacity-building support to agricultural extension for effective dissemination and coordination of technology transfer.	▪ Governments to lead technology transfer, define the national agenda, provide strategic direction for development, formulate and implement policies, undertake research for innovative of technologies, and verify and demonstrate technologies. ▪ Private sector to invest in support of national agenda, provide sources of funding and collect and transfer effective technologies. ▪ Civil society, international and regional organizations to focus on coordination.

Group work theme	Institutional mechanisms required	Policy priorities for the institutional mechanisms	Commitments by organizations
Improved monitoring and documentation of the impact of technology transfer	▪ Introduce a transdisciplinary approach for collaboration with all stakeholders, including farmers to monitor and document the technology's impact. ▪ Ensure inclusive and participatory process in M&E. ▪ Establish a strong M&E system with strong baseline data, stakeholder analysis, strong indicators of success, and standardized methods and tools such as LFA and RBM. ▪ Collect and organize targeted quantitative and qualitative information for regular monitoring of project/activity outputs. ▪ Perform internal and external impact assessments to assess key outcomes and attribute impact to project/activity. ▪ Enable field visits by experts.	▪ Define roles and responsibilities. ▪ Provide good statistics (aggregated government data) and qualitative data with objective assessments. ▪ Provide guides and templates for monitoring and documentation. ▪ Define common terminology for clear and effective communication.	▪ Governments to formulate policy, provide data (census, surveys) and ensure monitoring through local government. ▪ Universities/ research institutions (national and international) to provide methodological guidance, capacity-building support, manuals/templates. ▪ NGOs to flag concerns and issues, and monitor farm-level progress. ▪ Private sector to develop mobile phone applications to facilitate monitoring. ▪ Donors to provide financing, guidelines and set monitoring priorities.

Evaluation

Out of 85 participants, 53 completed the evaluation questionnaire, which had two parts – General Feedback and a Knowledge, Attitude, Practice (KAP) Survey. The completed questionnaires provide a good baseline for improving similar future events. The KAP survey will provide a basis for evaluating how much of the knowledge acquired in the meeting is actually planned to be put to practice and will be compared with results from a second, follow-up KAP survey to be conducted 6 to 12 months after this meeting. The current KAP survey results are, therefore, not included in this report.

Table 1. Usefulness and quality of the meeting

		Excellent	Good	Average	Poor	Average score
Content	Theme overview	52%	46%	2%		3.5
	Panel discussion on 'Technology transfer from green Revolution to now - A boon or bane for sustainable development?'	47%	43%	10%		3.4
	National perspectives on 'Good practices in agricultural technology transfer for climate resilient food production technologies'	28%	68%	4%		3.2
	National perspectives on 'Good practices in agricultural technology transfer through participatory and community - based approaches'	48%	48%	4%		3.4
	National perspectives on 'Good practices in agricultural trade facilitation'	27%	61%	12%		3.2
	Evaluating the impact of technology transfer	48%	44%	8%		3.4
	Panel discussion on 'Information and data requirements for formulating technology transfer policies and programmes'	40%	52%	8%		3.3
	Presentations on outcomes of group work	26%	69%	5%		3.2
Process	Agenda and flow	57%	39%	4%		3.5
	Facilitation and feedback	58%	42%			3.6
	Knowledge-sharing processes (e.g. keynotes, panel discussions, reflections, working groups)	50%	48%	2%		3.5
Logistics	Pre-meeting communication	61%	35%	4%		3.6
	Meeting facilities	54%	42%	4%		3.5
	Food	39%	51%	10%		3.3
	Administrative assistance during the meeting	61%	37%	2%		3.6

Usefulness and quality of the meeting

Participants were invited to rank the usefulness and quality of the meeting in terms of its content, processes and logistics, ranging from 'excellent' to 'poor'. Table 1 below shows results with four evaluation criteria (excellent, good, average and poor).

Content

In terms of content, participants evaluated each key session. The session that was rated ‘excellent’ by more than half of the participants (52 per cent) was the theme overview on technology transfer and the sustainable development agenda. The two sessions rated ‘excellent’ by 48 per cent of participants include: (i) National perspectives on good practices in agricultural technology transfer through participatory and community-based approaches; and (ii) Evaluating the impact of technology transfer. The first panel discussion on 'Technology transfer from Green Revolution to now - A boon or bane for sustainable development?' was rated as excellent by 47 per cent of participants. More than half of the participants rated the other four key sessions as 'good', namely Presentations on outcomes of group work (69 per cent), National perspectives on good practices in agricultural technology transfer for climate-resilient food production technologies (68 per cent), National perspectives on good practices in agricultural trade facilitation (61 per cent), and Panel discussion on information and data requirements for formulating technology transfer policies and programmes (52 per cent). No session was rated as poor. The average score for all content was calculated as 3.3 (4 – the highest).

Figure 4. Extent to which the meeting met participants' expectations

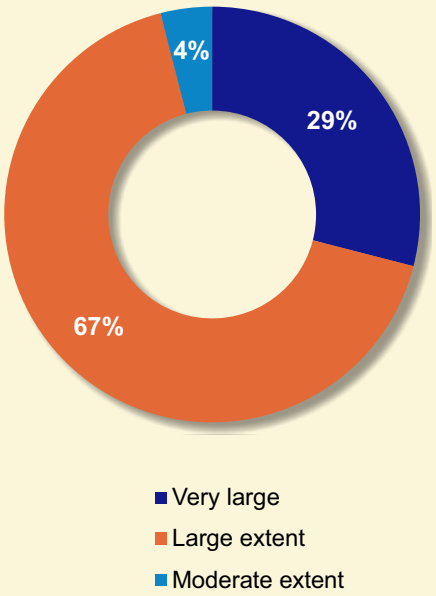
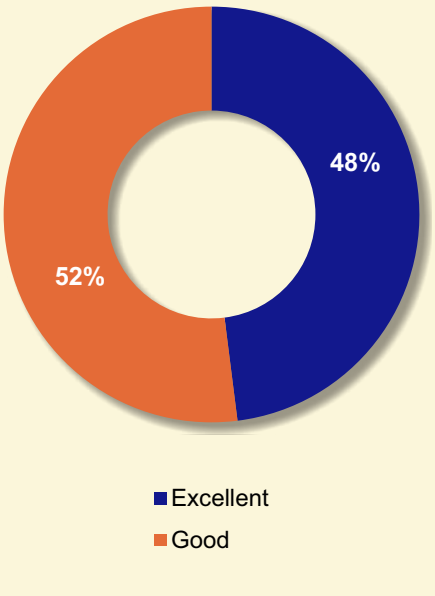


Figure 5. Participants' overall ranking of the meeting



Process and logistics

More than half of the participants rated processes such as agenda and flow, knowledge-sharing, facilitation and feedback as 'excellent'. Logistics received the highest rating with pre-meeting communication and administrative assistance during the meeting rated as 'excellent' by 61 per cent of participants. The overall score for processes and logistics was calculated as 3.5.

Expectations

Most participants (67 per cent) indicated that the meeting met their expectations to a large extent. For 29 per cent and 4 per cent of respondents, expectations from the meeting were met to a very large and moderate extent, respectively.

Overall ranking of the meeting

Forty-eight per cent of participants ranked the meeting as 'excellent' while 52 per cent ranked it as 'good'. No one ranked it as 'average' or 'poor'.

Aspects to be improved in future

This section indicates key areas that will be taken into consideration in the organization of similar events by CAPSA in future. These areas are based on suggestions by participants during the evaluation and relate to process (time management and interaction), content (focus), logistics (venue, food and communication), field trip and participants.

Process

Thirteen participants (25 per cent), out of the 53 who filled the questionnaire, felt the need for an improvement in time management. For example, they suggested reducing the session contents to allow more time for discussion, increasing the time for presentations for a deeper understanding of the theme and key topics, limiting the number of presenters and panelists, and allocating more time to help participants know each other.

Three participants (7 per cent) recommended more group work, another two mentioned the need to support brainstorming in working groups with cards and avoid too many presentations that made the meeting too 'heavy'. Two participants (4 per cent) felt the need to encourage more interaction among participants, for example, by using name plates and mixed seating in view of the participants' tendency to stick together by country, which limits interaction among them.

Content

Five participants (9 per cent) commented on the need to improve the content of similar events in future by focusing on specific issues. For example, the focus could be on specific technologies, methods and/or practices. The topic of the panel discussion could also be more specific to narrow the gap between an academic and practitioner perspective. One participant felt that the quality of presentations needed to be improved.

Logistics

Nine participants (17 per cent) recommended improvement in logistics with the following suggestions: changing the venue to another city or country; accommodation in a different hotel; more vegetarian food options; an additional day of meeting; at least a half-day sightseeing visit; improved pre-meeting communication to find how participants can contribute to the meeting; and advance availability of discussion material.

Field trip

Nine participants (17 per cent) commented that a field trip or a study visit should be organized in future to promote a success model of a technology and obtain insights to field problems from participants. For example, participants can visit a farmers' group or a traditional farm.

Participants

Three respondents (6 per cent) felt that a representative from the Ministry of Planning as well as a farmer should be included/involved in future meetings.

Additional comments by participants

- "Everything was excellent. Good job."
- "I like the thoughts and ideas discussed during the meeting that need to be promoted and advocated to related stakeholders."
- "Properly managed dialogue."
- "Pleasant atmosphere, great opportunity to meet a diversity of people."
- "Good management."
- "Hospitality of CAPSA is very appreciated."
- "Panel discussion was impressive but feed back needed more time."
- "By far, this was the most engaging meeting we have had in SATNET."
- "The presentation interaction was excellent."
- "Looking forward to the proceedings. Can we translate few fact sheets in Hindi for further dissemination?"
- "Overall, the meeting was good, my favorite sessions were: (i) good practices in agricultural technology transfer through participatory and community-based approaches; and (ii) evaluation impact of technology transfer."
- "Overall, the meeting was very beneficial placing the whole region at the table to share ideas."
- "I really liked the presentations on good practices from each country to share ideas and context."
- "I liked the team work."
- "I liked the resource persons, diverse participation and venue."
- "National case studies and best practices was an interesting aspect."
- "I learned many things from the sharing of different stakeholders from the field of policy and research. I met people that can build my network for possible future collaboration."

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