

*Pathways to strengthened agri-food research and
 innovation systems in Asia and the Pacific*



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EDITORIAL TEAM

- Ms. Martina Spisiakova
- Ms. Celilu Bitong
- Dr. Peter Horne
- Dr. Ravi Khetarpal

Editorial

It has been a year since APAARI started implementing the project on Asia Pesticide Residue Mitigation through the Promotion of Biopesticides and Enhancement of Trade Opportunities funded by the Standards and Trade Development Facility (STDF). It is implemented in collaboration with the IR4 project, United States Department of Agriculture (USDA), and United States Agency for International and Development (USAID). APAARI partners with Rutgers University for technical coordination of the project. The South and Southeast Asian countries benefiting from this project include Bangladesh, Cambodia, Indonesia, Laos, Malaysia, Nepal, Pakistan, Singapore, Sri Lanka, Thailand, and Vietnam.

The objectives are to help these countries boost their export by increasing technical and functional expertise, improve the knowledge on pesticide analysis and reduce the exposure of farmers and consumers to higher-risk synthetic pesticide. This is done by improving capacity to manufacture and promote the use of biopesticides, as well as capacities to collaborate and engage with various stakeholders. The project is also strengthening regional cooperation and regulatory harmonization on maximum residue levels (MRLs) within and across the Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) member states.

With no exception to COVID-19, APAARI has faced several challenges in implementing the project in partnering countries. However, taking advantage of the virtual platforms, APAARI has successfully organized pre-inception and inception workshops, lab and field training, integrating training of trainers' method. Despite the challenges, APAARI managed to sign MoUs with the partnering countries, supply equipment to the laboratories, and successfully conduct virtual lab demonstrations.

The project stands out from other projects as it is blending the development of

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functional capacities (soft skills) with technical capacities. Functional capacity development is integrated into every technical activity e.g. the basic principles of training of trainers focused on adults' learning, risk communication, engagement with farmers and policy makers, or development of business plans. By the end of each training, APAARI's knowledge management team ensures that the outcomes of the training are appropriately monitored and feed into APAARI's dissemination activities. We strongly believe that the project leads to positive impact in expansion of export markets in participating countries, and creating an eco-friendly environment.

I would like to encourage all members to let us know their priority technical and functional areas that we can use to jointly scope for new regional projects. Prioritizing activities for project development also requires budget projections, which must principally benefit APAARI member institutions and countries. Please provide us with suggestions on how we can improve our joint project development to collectively strengthen agri-food systems in the region.

Ravi Khetarpal
Executive Secretary



HIGHLIGHTS FROM THE APAARI SECRETARIAT

Steering Committee Meeting of APCoAB



Participants of the XXI Steering Committee Meeting of APCoAB

The XXI Steering Committee Meeting (SCM) of the Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB) was held virtually on 7 July 2020 under the chairmanship of Dr. Peter Horne, General Manager, Country Programs, Australian Centre for International Agricultural Research (ACIAR). Mr. Vincent Lin, Council of Agriculture (COA), Taiwan, was the Co-chair. In addition to the Chair and Co-Chair, 19 participants attended

the SCM, comprising the Committee members, special invitee, and observers, including APAARI staff. The SC recommended that there should be due focus for developing policy documents related to agri-biotechnology and bioresources in consultation with global and regional partners. On the occasion of the SC Meeting, Dr Horne, Chair, released the following APCoAB publications:

1. Regional Workshop on Underutilized Animal Genetic Resources and their Amelioration – Regional Status Reports and Strategic Papers
2. Proceedings and Recommendations of the Satellite Symposium on Dryland Agrobiodiversity for Adaptation to Climate Change
3. Regional Expert Consultation on Gene Editing and its Regulation – Proceedings and Recommendations
4. Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration- Proceedings and Recommendations
5. Banana Tissue Culture in India- A Success Story
6. Training Manual on International Hands-on Training on Genome Editing Technology
7. Training Manual on International Training Course on In Vitro and Cryopreservation Approaches for Conservation of Plant Genetic Resources

The SC endorsed the APCoAB action-taken report, work plan for 2020, and appreciated the progress made during the reporting period.



APAARI's first Executive Committee Meeting in 2020

The first APAARI Executive Committee Meeting (ECM) for 2020 was held virtually on 8-10 July 2020. It was successfully delivered under the Chairmanship of Dr. Peter Horne, ACIAR, Australia. Thirty-one participants attended the three-day meeting, including the Committee members, special invitees, and staff of the APAARI Secretariat.

Introduction

The meeting discussed and reported on the progress of APAARI activities from 1 October 2019 to 31 May 2020; revised work plan for 2020 (including the execution of Monitoring, Evaluation, Reporting and Learning (MERL)); status of secured, developed and submitted projects; APAARI membership and fee payment status, management standards, administrative matters, audit and finance reports, and other matters raised by the EC members. The meeting also discussed the implications of COVID-19, but also touched upon the issue of the locust swarm, having devastating effects on agriculture and rural development.

Key areas presented and discussed



Participants of the 1st Executive Committee Meeting in 2020

The key substantive sessions included presentations of: (i) Dr. Saliltorn “June” Thongmeensuk, Legal Consultant, APAARI, on the ongoing efforts to obtain legal status for APAARI in Thailand and the way forward; (ii) Dr. Ravi Khetarpal, Executive Secretary, APAARI, on the Action-Taken Report based on the recommendations and suggestions addressed at the last ECM of 7 November 2019; Ms. Martina Spisiakova on the Medium-Term Strategy of Center of Excellence (COE) on Value Chains, process and rationale for the development of new projects, and outcomes of the Stakeholder Survey; Dr. Norah Omot on the establishment of a Sub-regional APAARI Office in the Pacific, a deep dive into the outcomes of the ASTI project, and MERL Plan with a summary of learnings.

The presentations of progress made by APAARI during 1 October 2019 – 31 May 2020 focused on major activities delivered through APAARI programmes and projects, including Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB), Agricultural Science and Technology Indicators (ASTI), Agroecology and Safe food System Transitions (ASSET), Asia Pesticide Residue Mitigation through the Promotion of Biopesticides and Enhancement of Trade Opportunities (APRMP), and Knowledge Management (KM). Other presentations included scoping for new projects, latest publications, membership drive, collaboration and partnership, participation in various meetings, administrative and financial matters, as well as the development of APAARI Management Standards.

Appreciation of the EC Members

The Members appreciated the progress that APAARI made during the last nine months, despite the larger part of the work being delivered from remote locations. The Sub-regional Office in the Pacific was highlighted as very important for ensuring regular communication and outreach with Pacific stakeholders. Furthermore, the results of ASTI were found impressive, based on a strong partnership among ACIAR, APAARI, and IFPRI. The COA, Taiwan, particularly appreciated the efforts made through the APCoAB programme, and assured its support and development of stronger connections and cooperation with APAARI. The Members acknowledged APAARI as having the capabilities to manage knowledge and learning across

the region, which is a real and core strength of APAARI. Some key areas that require further strengthening were highlighted as well. To better contribute to agricultural development through productivity increases, APAARI should focus on capacity development and partnerships to build relevant expertise and share experience. The strategic value of the COE on Value Chains needs to be further developed to provide a clear rationale and directions for the Center’s development.

The EC noted a strong desire of partners to engage with APAARI about key developments, lessons, technologies, and ideas that can potentially influence policy. Increasingly complex challenges in agri-food research and innovation systems (AFRIS) require regional action and trans-disciplinary collaboration. Facilitation of such collaboration is a core role of APAARI and should be the focus of continued efforts.



Training of the Asia Pesticide Residue Mitigation through the Promotion of Biopesticides and Enhancement of Trade Opportunities



Participants at the Inception Meeting

Virtual Inception Workshop

APAARI organized a virtual Start-up Workshop for Asia Pesticide Residue Mitigation Project (APRMP) in collaboration with IR-4 Project of Rutgers University, USA; Standards and Trade Development Facility (STDF) and the United States Development Agency (USDA). The meeting, which took place on 6-7 August 2020, focused on the following key areas:

- Project management
- Understanding residue mitigation, as well as the project goals and timelines
- Overview of planned Lab Training and related equipment
- Potential laboratory analytical interferences
- Field training experiences and chemical compatibility
- Overview of planned Training on Microbial Biopesticide Manufacturing

- Biopesticide regulatory harmonization in ASEAN and Workshop Plan
- Plans for Bio Efficacy Workshop
- Presentation of the Guidance Document on the Exchange and Use of International Efficacy and Crop Safety Data for Minor Uses Series on Pesticides No. 101
- Introduction to functional capacities, capacity development (CD) strategy and work plan
- Knowledge Management (KM) Strategy of the project
- Monitoring, evaluation, reporting and learning (MERL)
- Administration and finance

The meeting improved the participants' understanding of the project activities and way forward, by providing an overview of each key activity that will take place within the scope of the project.

Training on Good Laboratory Practices for Pesticide Mitigation

Training on Good Laboratory Practices (GLP) was conducted virtually from 10-14 August 2020. The training was attended by 70 participants from different countries, including Bangladesh, Cambodia, Indonesia, Laos, Nepal, Philippines, Pakistan, Sri Lanka, Thailand, and Vietnam. The participants were administrators and scientists associated with different government institutions. The objective was to introduce the participants to standard procedures adopted in handling the samples, conducting the analysis, and establishing the reports on pesticide analysis related to different crops.

The training was delivered by Dr. Wayne Jiang, IR4 project Michigan State University, with technical support from Michael Braverman, Manager of Biopesticides, Organic and International Capacity Building Programmes, IR Project, Rutgers University, as well as webinar support from Celilu Bitong, Tarathip Sanboonkrong, and Sasireka Rajendran from APAARI. The training contained topics, such as:

- Good Laboratory Practices (GLP)
- Protocol (lab portion)
- Standard Operating Procedures (SOP)
- Amendments and deviations
- Sample shipping, sample receipt,
- Grinding, storage, and disposal
- Analytical reference substance
- Instrument analysis
- Data review and QC

It also included discussions on equipment handling, such as:

- Freezers and temperature monitoring
- Grinders
- Pipets, Shakers, SPE
- Analytical instrumentation
- LC-MS/MS

The five-day workshop was interactive with questions and answers during the presentations. Participants were

encouraged to seek clarifications on the lab methods and equipment operations related to the project. The first day of the training covered discussions on the content for lab training, details on the sponsors, information on the testing facility, and an outline on terms related to GLP.

Training on writing a protocol and making changes to the protocol was covered on the second day. Standard Operating Procedures (SOP) that would be followed in lab during the experiments were briefed and outlined. This was followed by 'True or False' and multiple-choice questions (MCQ) sessions to engage the participants. Information on calculation of the citation index and impact factor were hinted. The participants were advised to quote the funding agencies in all the scientific articles coming out of this project.

The most important aspect of the analysis, which includes the collection of samples from the field was covered during the third day. Detailed information on the handling of volatile and deteriorating samples were covered. Shipping of the products and filling out the sample receipt were covered in detail providing information on the package material and refrigeration medium to be used to keep the samples under controlled temperature. Importance of having a real time monitoring system for the low-temperature storage systems was also discussed. Furthermore, low temperature grinding of the samples to prevent the loss of volatile material, as well as different equipment available for the low temperature grinding and cryogenic grinding were provided.

The fourth day of the training workshop covered the extraction and analysis of the samples. The session started with the 'True or False' and Q&A session. The most important terms related to high-end instrument analysis were explained, as well as methods to detect the efficiency and performance of the instruments. Development of methods specific to the instrument available in the institute was elaborated. This included ideas on reference method, working method, and making changes to the available method. The participants were made aware on the importance of keeping track of the methodology (minor or major). Method validation, instrument performance analysis, sample analysis procedure, worklist, instrument usage data record, calculation sheet and lab records were advised to be used during the conduct of experiment. Data acceptance criteria was covered based on the above factors.

The last day of the training workshop focused on the importance of storing the data in digital and paper format to enable better tracking. The session followed by the set of True or False and MCQ to assess the general idea participants had on the topic. Things that are considered as the raw data including photographs, media, recorded observations from instruments that are directly recorded were elaborated and emphasized on signing the document record. Dos and Don'ts of raw data recording, golden rules and important points to be noted in documentation were taught.

The workshop attracted participants from the partner countries. They actively engaged in Q&A session to clarify on the difference in methodologies adopted in different countries and regions. The participants were encouraged to follow the GLP in conducting pesticide analysis experiments, report, and generate outputs in the form of scientific articles. Considering the current pandemic, the samples will not be shipped internationally, and the participants are encouraged to conduct the experiments in their own lab while meeting all GLP explained in the training.

To access the training resources, please visit: <https://www.apaari.org/web/good-laboratory-practices/>

Field Training Workshop

The Field Training was conducted virtually on 25-26 August 2020. It aimed to improve participants' understanding of field training, such as general field GLP, understanding protocols, SOP, sprayer calibration and walking speed, and field equipment used for pesticide reduction studies. On the first day of the meeting, Dr. Braverman discussed the overview of GLP by outlining its difference from certification. The former is designed by the United States Environment Protection Agency or Organisation for Economic Co-operation and Development (OECD) member countries. It is a system of documenting and auditing to measure an actual research activity. It also provides a framework for personnel's responsibilities, testing facilities, handling, distributing requirements, planning, and documentation processes. On the other hand, conduct future research through analysis and procedure.

The protocol serves as detailed guidance or routine activity on how the study is to be conducted later. It includes calibration, reference standards, and test study designs to visualize better specific activities outlined. It should also cover the objectives of the study clearly as approved by the director. In some way, these activities are supported by SOP to describe activities and outline general procedure and documentation. Dr. Braverman presented images on details using a sprayer and pesticide application to the plants from the field trials. Moreover, he introduced the software called "Metronome" and virtually demonstrated its functionality on walk speed. He later listed the equipment needs in the fields and laboratory, including mist blower, environmental monitor, thermometer, and other devices and gadgets required in treatment application, recording, and storage. On the second day, Dr. Ngan Chai Keong presented the experiences and chemical compatibility he was previously involved in the field training of pesticide management in mango and papaya sponsored by the STDF. He outlined through a flowchart the project details, which indicates the commodities and organizations involved. He similarly emphasized the benefit of the supervised residue field trial permitting GLP standard to partner countries, including Malaysia. Dr. Braverman concisely presented field training notebooks with aspects relating to documentation, corrections, communications, and other established

methods in the process.

To access the training resources, please visit: <https://www.apaari.org/web/field-training-stdf/>



Webinar on Knowledge Management Development in Iran's Agricultural Sector strengthens collaboration of APAARI and AREEO

APAARI, Agricultural Research, Education and Extension Organization (AREEO), and Academic Relations and International Affairs (ARIA), organized the first of a series of webinars to strengthen knowledge management systems (KMS) in the agricultural sector of Iran. It highlighted the past and ongoing KM efforts to strengthen agricultural innovation systems (AIS) and the important role of KM in the agricultural sector – particularly facilitation of knowledge sharing, learning, and cooperation among the various stakeholders in Iran.

The perspective of KM in the AIS was presented by APAARI, emphasizing the challenges in innovation, key issues in addressing research-practice gap, capacity development, and the key principles of KM that need to be applied to strengthen AIS. The webinar also showcased a success story of how KM contributed to the transformation of a national agricultural research system institution in the Philippines, which was presented by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD).

Around 220 participants attended the two-hour event, which consisted of scientists, researchers, experts, educators, extensionists, academics, university students, and other professionals. It was held on 17 August 2020.



6th Phytosanitary Expert Consultation was organized by Asia and Pacific Seed Association (APSA)

The Asia and Pacific Seed Association (APSA) held its 6th Expert Consultation on Phytosanitary Collaboration in the Asia Pacific on 26 August 2020. The meeting was held online with 69 participants worldwide, with National Plant Protection Organizations (NPPOs), Seed Associations, and APSA members. The event was also attended by government and industry observers and representatives from key stakeholders, including the International Seed Federation, APAARI, and CropLife Asia.

The meeting covered significant, timely seed industry priorities and country and region-wide updates on the

electronic phytosanitary certificate exchange system (ePhyto). Another topic discussed was the Seed Health testing laboratory accreditation practices, the systems approach concept, and an update for the annexing of ISPM 38 on the international movement of seed. It highlighted development and updates on Regional Guidelines and Standards for Phytosanitary Measures (RSPM) and the proposed standards of STDF/WTO and its ongoing capacity building initiatives. The meeting agenda was organized by the Standing Committee for International Trade and Quarantine (SC ITQ) of APSA.



Nutri-Garden: Bridging Agriculture and Nutrition

Dr. Ravi Khetarpal, Executive Secretary, APAARI, attended and participated in the second edition of "Nutri-garden: Bridge between Agriculture and Nutrition" held on 5 September 2020 and organized by the Coalition for Food and Nutrition Security (CFNS), Centre for Technology Alternatives for Rural Areas (CTARA), and IIT Bombay. The webinar was part of the celebration of National Nutrition Week and a follow-up on its successful first edition that took place on 11 August 2020. CFNS was established in 2007 under Prof. M. S. Swaminathan's leadership and a multi-stakeholder alliance of policymakers and leaders. In its second decade, the platform's vision is to raise awareness, foster collaboration, advocate programmes to further improve and achieve sustainable food and nutrition in India.



Agriculture 4.0 Conference and Exhibition

Agriculture 4.0 Conference and Exhibition 2020 provided a platform to discuss the opportunities brought by digital technologies disruption to increase further productivity, market, and service access in the agricultural sector. The meeting was held virtually from 7-10 September 2020. Various decision-makers, plantation, and farm managers, digital leaders, and stakeholders in the farming process participated in the meeting. The industry is currently transforming through digitalization, industrialization, and mechanization of the products and processes, technology, nonetheless, considered a potential to producers and consumers.

Dr. Ravi Khetarpal, Executive Secretary, APAARI, made a presentation on 'Impacting agribusiness through Agriculture Innovation Systems' on 7 September 2020. He discoursed issues related to agriculture's technical challenges, the role of the Sustainability Development Goals (SDG) in agribusiness, and artificial intelligence (AI). AI in agriculture technologies involves weather forecasting, crop and soil health monitoring, and pesticide usage. "However, millions are wasted on AI initiatives every year – and only a small portion of projects are successful," Dr. Khetarpal



stressed. The challenges in agribusiness need to emphasize the complex need for innovations. It requires a mix of instruments in "several packages", transdisciplinary approaches in research and innovation, effective collaboration among diverse actors, and good governance. Lastly, Dr. Khetarpal stressed the role of the Tropical Agriculture Platform (TAP), and an ongoing EU-funded project that are facilitating the mechanisms to improve efficiency and effectiveness of capacity development (CD) programmes and knowledge sharing to strengthen the agricultural innovation system (AIS) in the tropics and sub-tropics. In this context, while innovation refers to technologies and practices, it also denotes processes and organizational forms to advance application and change.



DeSIRA initiative launched virtually

An initiative of the European Union (EU) called Development of Smart Innovation through Research in Agriculture (DeSIRA) organized a virtual event on 8 September 2020 to discuss its contribution and the role of agricultural research and innovation for development of food system transitions. A panel discussion was organized with panelists and experts from International Cooperation and Development (DEVCO) of EU, APAARI, Pan Africa Farmers Organization (PAFO) and the Eastern Africa Farmers Federation (EAFF) and Think Tank for Sustainability.

The Directorate-General of DEVCO, Carla Montesi, discussed the importance of DeSIRA as an initiative that puts research at its core, linking innovation to fight climate change, and support national research capacity. It contributes to the continental and global governance of research and builds a

strong partnership between research organizations globally.

Dr. Ravi Khetarpal, Executive Secretary, APAARI, expressed his appreciation to the EU and DeSIRA for its role and structured approach in promoting innovation in agriculture. This is particularly in relation to the effort in putting more science into development and linking the three major continents: Africa, Latin America, and Asia. Dr. Khetarpal cited APAARI's work in the context of the Tropical Agriculture Platform (TAP) project – a multi-layer facilitation mechanism with national, regional, and global partners. Furthermore, he stressed the need to embed the TAP's Common Framework in sub-regional bodies in the Asia-Pacific sub-region, such as the South Asian Association for Regional Cooperation (SAARC), Association of Southeast Asian Nations (ASEAN), and the Pacific Community (SPC). This strategy will help to reach individual countries based on funding availability and capacity of APAARI.

Ms. Elizabeth Nsimadala, an agripreneur from Uganda and President of PAFO and EAFF, discussed about her organization's role in conducting research, negotiating and lobbying for policy regarding access to credit, mitigation, and adaptation strategies to climate change. Both PAFO and EAFF are viewed as significant stakeholders in the agricultural sector in their region; therefore, they must adopt capacities to absorb innovation better.

Mr. Alexander Muller of Think Tank for Sustainability and a study leader, pondered on the challenges they are facing in research and innovation. He recommended that DeSIRA can make a difference on two fundamentally overarching issues like food and climate change. Lastly, Dr. Leonard Mizzi, DEVCO's Head Unit on Rural development, food security, and nutrition, delivered the closing remarks. He summarized that DeSIRA is a relatively new and pre-programming phase identifying priorities at a country, sub-continental, regional, and global level. Moreover, there will be research on the nexus approach, socio-economic research, equity and equality across the value chain, enhancement of rural livelihoods, youth engagement, and gender mainstreaming in agriculture.



GFAR Ad hoc Steering Committee

Dr. Ravi Khetarpal attended the virtual Steering Committee Meeting of the Global Forum on Agricultural Research and Innovation (GFAR) on 14 October 2020. Mr. Raffaele Maiorano, Interim Chair, initiated the discussion, introduced the meeting's agenda, and noted some unfortunate situations involving GFAR activities' interruption. However, he expressed trust in the new Interim Secretary – Mr. Matthew Montavon – who will bring confidence to start its endeavors again.

Ms. Beth Bechdol, Deputy Director-General for

Partnerships and Outreach, made a brief description of the new organizational design of the Food and Agriculture Organization of the United Nations (FAO) that promotes modular management. The new Interim Secretary detailed the focus of his recruitment priorities, website status, and reopening of the GFAR dialogue to identify new and collective actions.

Mr. Andre Zandstra of the CGIAR reported a single board for all CGIAR entities and current alignment to this new structure with the executive management team guiding the transition. The possibility of the Global Conference on Agricultural Research for Development (GCARD) was also raised by the participants.

Mr. Christophe Larose of the EU appreciated FAO's action to fully operationalize GFAR and emphasized the need for collective efforts. He stressed GFAR's role as a voice in international fora and important facilitator of dialogue between its members.

The following are collective actions proposals:

- Inclusion of small farmers in digital agriculture
- Addressing farmer's needs in climate change
- Building on previous GFAR collective actions
- Revival of forgotten foods
- Higher education curriculum development
- Post-harvest value addition
- Key guidelines and principles for effective agriculture innovations systems
- Youth-related components and community empowerment

The Chair thanked the contributions made by the participants and reminded the deadline for collective actions. The Executive Committee will review the proposals and be presented to the Steering Committee for final approval. Also, he noted the services provided by [Impakter](#) and the importance of working with them on communications. Moreover, participants recommended the need for translation to be addressed on any upcoming future GFAR meetings.



Regional Expert Consultation on Agriculturally Important Microorganisms (AIM)

The Regional Expert Consultation on Agriculturally Important Microorganisms was organized virtually in collaboration with the Indian Council of Agricultural Research (ICAR) and ICAR-National Bureau of Agriculturally Important Microorganisms (ICAR-NBAIM), India, on 28 October 2020. Dr. T Mohapatra, Director General, ICAR; Dr. Ravi Khetarpal, Executive Secretary, APAARI; and Dr. TR Sharma, Deputy Director-General, ICAR, introduced the meeting. About 134 participants from 16 countries attended the meeting,

namely, from: Australia, Bangladesh, Bhutan, Fiji, Iran, Japan, Republic of Korea, Malaysia, Nepal, Philippines, Papua New Guinea, Samoa, Sri Lanka, Taiwan, Thailand, and Vietnam. They represented institutions belonging to NARS, universities, related ministries, and CG Centres. Twenty four per cent of participants were women scientists and experts.



Participants of the consultation meeting

The Regional Expert Consultation on Agriculturally Important Microorganisms was organized virtually in collaboration with the Indian Council of Agricultural Research (ICAR) and ICAR-National Bureau of Agriculturally Important Microorganisms (ICAR-NBAIM), India, on 28 October 2020. Dr. T Mohapatra, Director General, ICAR; Dr. Ravi Khetarpal, Executive Secretary, APAARI; and Dr. TR Sharma, Deputy Director-General, ICAR, introduced the meeting. About 134 participants from 16 countries attended the meeting, namely, from: Australia, Bangladesh, Bhutan, Fiji, Iran, Japan, Republic of Korea, Malaysia, Nepal, Philippines, Papua New Guinea, Samoa, Sri Lanka, Taiwan, Thailand, and Vietnam. They represented institutions belonging to NARS, universities, related ministries, and CG Centres. Twenty four per cent of participants were women scientists and experts.

The consultation aimed to discuss the knowledge gaps and way forward in defining regional priorities concerning agriculturally-important microorganisms (AIMs). It also aimed to formulate strategies for strengthening the institutional framework for AIMs management, as well as legal and policy framework to promote conservation and sustainable use of AIMs at the regional level.

A panel discussion on regional priorities for AIMs for Asia-Pacific invited experts to share the global status of AIMs, regulatory policies, sub-regional linkages, public-private partnerships, the role of biotechnology and conservation strategies, and sustainable use of AIMs. The discussion also covered the areas of value addition, commercialization, and export; biotechnology for enhancing utilization and IPRs; South-South Cooperation for enabling policy development and advocacy; partnership and capacity development; digital sequence information and sharing system; and microbial taxonomy issues and information system.

The major recommendations that emerged from the Expert Consultation on AIMs are as follows:

Research priorities

- A system needs to be developed to maintain the quality of the bioinoculant in the entire value chain, including mother culture, culture scale-up, carrier material mixing, packing, storage, transportation and farmer's field. The quality bioinoculants at affordable price at the hand of farmers could enhance the adoption rate of bioinoculants by the farmers.
- Microbes having multifarious role need to be conserved for sustainable agriculture production.
- Emphasis should be given on trait-specific categorization of microbes and for further utilization. Quality parameters must be maintained in its entire value chain.
- *In situ* conservation of valuable and rare species of microbes belong specific eco-system needs to be prioritized.
- Being an efficient nitrogen fixer, the utilization of Rhizobium species for nitrogen fixation in legume crops should be strengthened through the schemes similar to NRP.
- Digital platform/gateway should be utilized effectively for sharing knowledge and information at the regional level.

Regional Priorities

- To strengthen the regional priorities for AIMs in the Asia-Pacific region, capacity building programmes shall be taken up through exchange of expertise and resources between the member countries in the areas of culturing of unculturable; preservation techniques for lyophilization recalcitrant cultures; and genome editing.
- South Pacific Asian countries could partner with ICAR-NBAIM, India, for exchange of materials and information on AIMs.

Policy advocacy

All the panelists showed their concern that there is a poor attraction among the students towards conventional microbial taxonomy, which needs revision and attention. They recommended that microbial taxonomy, including mycology, should be included in the microbiology course. Students should be motivated in the branch of microbial taxonomy by giving incentives, awards and remuneration, and bringing employment opportunities.

In his concluding remarks Dr. Ipek Kurtboke emphasized that FAO opens the window for South-South cooperation between the governing countries in exchange of knowledge, information and capacity building in conservation and utilization of AIMs. Dr. Ravi Khetarpal highlighted that South Pacific Asian countries could partner with ICAR-NBAIM, India, for exchange of materials and information on AIMs.

The new website 'Common Microbial Biotechnology Platform (CMBP) Network' (<https://www.cmbp-network.org/>), developed by CIAT-Bioversity Alliance, Vietnam,

was also introduced to the participants. It aims to foster collaboration and partnership in research and capacity development in AIMs at the Asia-Pacific level. The proceedings and recommendations are being finalized for further distribution among the various stakeholders in the region.



Smart Food Executive Council Meeting 2020

APAARI participated in the Smart Food Executive Council Meeting held virtually on 3 November 2020 and chaired by Dr. Jacqueline Hughes, Director-General of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The council reviewed and approved topics from the previous meeting held in June 2020 and the action-taken reports. The discussion covered the development of a communication strategy within the Smart Food Framework, strengthening the social media component and clarifying the connection between Smart Food and ICRISAT.

Dr. Abdou Tenkouano, Executive Director of the African Council for Agricultural Research and Development (CORAF), reported the next convening of the Food Crisis Prevention Network (RPCA) in December 2020 and a webinar on 5 November 2020.

Dr. Ravi Khetarpal, Executive Secretary, APAARI, informed the council that a webinar on Smart Food is scheduled in APAARI's 2021 Workplan that envisions participation of its members. In addition, discussion on capacity building has already commenced with the Food for Security in Delhi. Opportunities will be pursued to add value to capacity-building programmes integrating the broader aspects of Smart Food into nutrition, processing, and more.

Dr. Yemi Akinbamijo, Executive Director of the Forum for Agricultural Research in Africa (FARA), confirmed that the coordination of Smart Food Africa is now focusing on the development of a Smart Food Africa Strategy and included in FARA's 2021 Operation Plan.



International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling

The International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling was organized jointly by the Food and Fertilizer Technology Center for the Asian and Pacific Region (FFTC) and the Taiwan Livestock Research Institute (TLRI), COA, on 5-6 November 2020 in Taipei, Taiwan. In light of the COVID-19 pandemic, the Symposium was held both on-site and online.

The Symposium focused on the following themes:

1. New Challenges and Opportunities to Minimize Agricultural and Food Wastes and Residuals;
2. Modern Technologies of Agricultural Waste and Residual Recycling and "Low External Input Farming";
3. New Aspects on "Optimization of the Use of All Resources and Value-adding"; and
4. Small Farmers' Material Matching, Basic Education and Policy Promotion.



Participants of the International Symposium

The Symposium attracted over 200 participants (off-site and on-site), with speakers from Denmark, Japan, Indonesia, Netherlands, South Korea, Taiwan, and Vietnam focusing on circular agriculture. APAARI, as a co-organizer under its APCoAB programme, facilitated participation from its member-countries in the Asia-Pacific region. APAARI sponsored 40 participants comprising members from Fiji, India, Iran, Malaysia, Nepal, Thailand, and Vietnam. About 44 per cent of these were women scientists and researchers. Various policymakers, scientists, researchers, students, agriculturists, and the private sector participated in the Symposium. The following recommendations focused on the need to:

1. Minimize food loss and wastes and efficiently utilize all resources under the food systems by harnessing innovative technologies. These are particularly important to feed the growing world population, which is projected to be 9 billion people in 2050.
2. Link and involve the private sector, policymakers, enterprises, and farmers, with good policy, to successfully transform linear agriculture to circular agriculture. The great potential of future circular agriculture market will be opened by the rapid technological innovation and expanding connections.
3. Reduce food loss and wastes in the Asia-Pacific region to generate multiple dividends, such as creating economic values and new jobs, avoiding excessive greenhouse gas emissions, reducing waste of freshwater use, and recovering meals for food security.
4. Internationalize science investments to maximize efficiencies and facilitate collaboration.
5. Emphasize co-benefits for sustainable development to achieve buy-in and remove barriers to the action of achieving the goal of circular agriculture.

6. Scale-up investments in both public and private sectors to retain human capability and research infrastructure.
7. Establish regional industrial symbiosis parks as an important model for industrialized utilization.
8. Make value-added final products to maximize circular agriculture.

The above recommendations may be implemented or integrated with existing policies by the NARS in developing countries in Asia-Pacific region which may be useful to optimization of all resources in sustainable manner and minimizing the wastage of food and other agricultural residuals.



ASSET Inception Meeting brought together 27 partners from Asia



Regional partners and participants during the inception meeting

In 2020, APAARI signed a Consortium Agreement for the project on Agroecology and Safe Food System Transitions (ASSET) in Southeast Asia. The five-year project is funded by the European Commission and French Development Agency (AFD), and implemented by the Agricultural Research Centre for International Development (CIRAD) and partner organizations. Twenty-seven organizations from Cambodia, Laos, Myanmar, and Vietnam, as well as regional partners, such as APAARI, are partners in the project.

Shifting cultivation has largely disappeared due to increased population pressure and adverse government policies. The intensification of conventional agriculture is leading to a simplification of agricultural landscapes, land degradation, and biodiversity depletion, and increased health risks for farmers and consumers. Agroecological practices have developed in response to managing soil fertility and soil health while maintaining productivity. The project will explore the transition to systems that address critical issues, such as soil fertility and biodiversity depletion, water scarcity, or increasing biotic constraints to crop and livestock production.

An official launching workshop of ASSET took place from 10-12 November 2020. With the prevailing pandemic situations, the workshop was conducted with face-to-face meetings in Laos and Vietnam, and other international partners joining virtually. As a key partner of the project, APAARI hosted the three-day inception meeting virtually. Almost 160 participants registered for the event.

Various sub-components of the project activities were presented along with the guidance on methodology and approaches, activities planned, and partners involved. Lucie Reynaud, Regional Project Coordinator, stressed that: "In terms of capacity building, we will also start the project with training needs assessments that will target ASSET partners."

World Café with five groups (Cambodia, Laos, Myanmar, Vietnam, and cross-cutting) was conducted with participation of the different country partners to discuss the expected deliverables. Dao The Anh, Vice-President of the Vietnam Academy of Agricultural Sciences (VAAS)- a partner of the project- pointed out that: "When farmers supply agroecological products, they need a market. This, therefore implies not only providing techniques but also acting at every stage of the value chain, right up to consumer recognition of the nutritional value of these products".

APAARI's key role in the project will be the coordination of Sub-component 1.3 on capacity development, communication, and visibility actions, together with the Institute of Technology Cambodia (ITC). The overall project communication strategy will be prepared in consultation with all the partners. An initial assessment will find the information related to different communication and knowledge needs, looking at the existing scenario and gaps.

The meeting was the first step towards implementation of ASSET, providing opportunities for clarification of the partners' roles, expectations from the project, and way forward. APAARI looks forward to working with all ASSET partners in the implementation phase.



APAARI chairs the TAP Partners' Assembly and contributes to panel discussions

APAARI was privileged to chair the seventh Partners' Assembly of the Tropical Agriculture Platform (TAP) hosted by the Food and Agriculture Organization of the United Nations (FAO) under the chairmanship of Dr. Ravi Khetarpal, Executive Secretary, APAARI. The event was virtually held from 16-20 November 2020, and discussed the TAP Action Plan, future work plan, and improved collaboration among the partners. Specifically, the meeting endorsed the TAP governance and related matters arising from the TAP Steering Committee, and revisited the TAP Charter for possible amendments. Participants also discussed the status of implementation of the TAP Action Plan (2018-2021), and

identified priority areas of the new TAP Action Plan 2022-2025. Furthermore, the partners received an update on the revision of the Common Framework by the TAP Capacity Development Expert Group. Most TAP partners were represented in the meeting.

Main event

During the main event chaired by Dr. Khetarpal, the meeting focused on: (i) sharing of preliminary results of an online questionnaire; (ii) update on the TAP progress; (iii) integration of the TAP Common Framework in TAP's partners' programmes/projects; and (iv) experiences and lessons learned from TAP partners.

APAARI also presented its approach of integration of the TAP Common Framework and key lessons learned from the Asia Pesticide Residue Mitigation through the Promotion of Biopesticides and Enhancement of Trade Opportunities, funded by STDF/WTO. The approach focuses on the blending of technical capacities related to pesticide reduction and manufacturing of biopesticides with functional capacities, such as in influencing decision-making processes in domestic pesticide issues related to biopesticide regulations, and engagement of farmers to impact pesticide use. The key lessons from this work are outlined below:

1. **Understanding** the science behind the project in order to come up with the “blending” ideas is crucial for non-technical people, while the meaning of “functional capacities” needs to be clarified for technical people right from the beginning.
2. **Convincing** technical people that the scientific part alone is insufficient to ensure sustainable outcomes and impact of the project requires thinking from a system perspective, which may take some time and efforts to understand.
3. **Mindset of the scientists** tends to be set on seeing the development of functional capacities as a completely separate activity; and the role of facilitation – links with KM as underestimated. These areas require dialogue and convincing.
4. **Creativity and innovation** are stimulated through collective learning of all project stakeholders – including the coordination team. This means that the team is considered a ‘project beneficiary’ as well.

Side events

The side events were organized on the following topics: (i) developing capacities for AIS; (ii) assessment of AIS and development of country profiles: sharing experiences from the inception phase of the TAP-AIS Project; (iii) Agricultural Science and Technology Indicators (ASTI): a critical resources for agricultural system CD; and (iv) regional dialogue on CD in AIS in Asia, Africa, and Latin America: lessons and

experiences from the Joint Rapid Appraisal (JRA).

APAARI was actively involved in two side events, namely Agricultural Science and Technology Indicators: A Critical Resources for Agricultural System Capacity Development; and Regional Dialogue on Capacity Development in Agricultural Innovation Systems in Asia, Africa, and Latin America: Lessons and Experiences from the Joint Rapid Appraisals (JRA).

Agricultural Science and Technology Indicators (ASTI): A Critical Resources for Agricultural System Capacity Development

The ASTI side event at the TAP meeting was organized by USAID and IFPRI. APAARI had the opportunity to provide reflections on its role in Asia-Pacific. Dr. Ravi Khetarpal, Executive Secretary, APAARI, highlighted the achievements of ASTI under the current strategic partnership between APAARI and IFPRI, and the ACIAR-funded ASTI project in Southeast Asia and Pacific.

The key achievements of ASTI were highlighted. ASTI established a well-functioning network of country focal points, and collected detailed agricultural research investment and capacity data from roughly 400 individual research agencies across the region. It has focused analytical research agenda on issues related to agricultural research investment and capacity, and mapped key stakeholders and policy influence pathways to ensure that the outcomes of all this work can be effectively disseminated for up-taking into policy- and decision-making processes. ASTI published country briefs for eight countries in the region and one regional report for Southeast Asia countries. Currently, it is undertaking a variety of outreach efforts, including webinars and social media infographic posts to create awareness on the ASTI findings. It is also working on creating opportunities for engagement with stakeholders in discussions on institutionalizing ASTI and its integration into policy mechanisms.

The APAARI-IFPRI partnership in Asia-Pacific is part of ASTI's current strategy to gradually devolve ownership of data collection and management functions to national and regional partners, while focusing on the relevance, uptake, and impact of ASTI's analytical and outreach functions. The current partnership sets the pace for other such partnerships between IFPRI and other regional bodies.

Investments in strengthening AIS

The session on JRA particularly explored the findings of a joint assessment that APAARI conducted with the Asia-Pacific Islands Rural Advisory Services Network (APIRAS). The assessment teams from Asia, Africa and Latin America highlighted some key lessons from their respective regions on strengthening AIS, as well as the main gaps in approaches for strengthening the system. Furthermore, they discussed how TAP tools and approaches can be integrated or

institutionalized to fill the gaps.

The Asia team also shared the highlights of various investment options for strengthening AIS in the region. The study particularly found that in many countries, governments and donors have been investing mainly in building and strengthening agricultural R&D capacities, such as the quality of research, and focusing on support to science and technology. However, increasingly we also see a growing trend of including the development of non-technical capacities in various development programmes. While generally across the regions, countries do not tend to refer to these capacities as capacities for innovation, the study in Asia found three types of such capacity development interventions that Asian countries have been investing in to contribute towards boosting the innovative capacity of the AIS in the region. These are;

Education and training, which includes, for example, entrepreneurship and agri-business management in the form of vocational training for farmers and agro-business professionals, university education, as well as various capacity improvements in the quality of extension and advisory services.

Multi-stakeholder projects and platforms that focus more on rural transformation through facilitation of collaboration, partnership and engagement among different actors and institutions for catalyzing change, particularly in the areas of market system development and value chain improvement.

Institutional development that improves capacities, such as institutional coordination, leadership, research management systems, gender-integrated planning for strategy development and collaboration between research institutions and the private sector.

While these initiatives are ongoing across Asia, the assessment found that more efforts need to be invested in the development of functional capacities and promoting the AIS perspective. The culture of innovation is generally lacking to build integrated and well-functioning national innovation systems, which need to be built systematically. Since it takes long-term efforts to change the existing AIS, often due to a complex set of institutional, political and socio-economic constraints, the study recommends that the focus of capacity development investments should be on developing capacity for collaboration and engagement between research institutions, universities and the private sector. However, this requires innovative ways of collaboration, moving beyond the current arrangements based on linear technology transfer that is still prevailing, especially in Asian public research institutions. Farmers need to be part of these innovation systems, playing an active role, not just the recipients of technologies.

Furthermore, national governments need to invest in removing the obstacles for innovation – an area where the TAP AIS model can assist countries to help identify these

obstacles at different levels. Country governments need to look beyond their expenditures on R&D activities and start improving innovation enablers, which includes capacities of key innovation actors. This may be possible through different ways of working, rather than significant financial investments. Furthermore, top-down national policies are often obstacles to fostering innovation, so addressing them is part of creation of the enabling environment for innovation and bringing more coherence.

A key concluding point highlighted by APAARI was that there is no doubt that capacity development for innovation is very important. However, capacity development for innovation and development of KM systems need to go hand in hand. While countries increasingly invest in capacities for R&D, many of them face issues in dissemination and demonstration of research and good practices for other countries to follow. Building KM capacities to develop outreach models that enable large-scale adoption of good practices; as well as facilitation of learning and documentation of these good practices is equally important, and is a crucial part of functional capacity development. Combined, such efforts can play a huge role in promoting a shift of mind set and attitudes for building innovation culture in the region.



Regional Capacity-Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ Conservation



Participants of the capacity-building programme

An online Regional Capacity Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ Conservation was jointly organized with Indian Council of Agricultural Research (ICAR) on 7-18 December 2020. It was hosted by ICAR-National Bureau of Plant Genetic Resources (NBPGR), which is considered one of the best institutes for aquaculture resources in Asia with experts and technologies focusing on characterization and ex situ conservation of fish genetic resources.

Thirty-five scientists and researchers attended the course, representing 14 countries, including Bangladesh, Bhutan,

Fiji, Iran, Malaysia, Nepal, the Philippines, Pakistan, Papua New Guinea, Samoa, Sri Lanka, Taiwan, Thailand, and Vietnam. All the participants were active mid-career researchers, 72 per cent of whom were women. In addition to ICAR institutes, the faculty was also drawn from Michigan State University, FAO, Network of Aquaculture Centres in Asia-Pacific (NACA), the Pacific Community (SPC), and the WorldFish.

This ten-day training covered comprehensive course content on aquatic genetic resources (AqGR) and its management, comprising the state of the world's AqGR for food and agriculture; aquatic food systems: integrating biodiversity and ensuring sustainability; ornamental marine genetic resources, conservation and livelihood promotion; utilizing genetic diversity through selective breeding for genetic improvement; taxonomy, radiography, morphometry; shape morphometric analyses; chromosome preparation and karyotyping; strategies and sampling procedures for genetic diversity studies; automated genotyping; genotype data analysis and interpretation; gene expression: RNA isolation, quality check; quantitative PCR, surveillance, disease diagnosis and cell culture; aquaculture certification and standards; ex-situ conservation: sperm cryopreservation, procedure and quality; ex situ conservation of fish genetic resources; biological traits and intra-specific diversity, parameters and tools; fish scale data, age and growth analysis; as well as the repository of fish cell lines and fisomic portal.

Dr. T Mohapatra, Director General, ICAR; Dr. Ravi Khetarpal, Executive Secretary, APAARI; and Dr. JK Jena, Deputy Director-General, ICAR, encouraged the trainees to share and apply the newly-acquired knowledge. The training opened up new avenues for collaboration with institutes in other countries working on similar lines or setting up their research facilities in the area of AqGR management. The training also provided opportunities for South-South Cooperation and collaboration in capacity development in the area of biotechnology for the conservation of AqGR.



Future Agriculture: Introduction of Space Farming (Seed x AI x Space)

The National Chung Hsing University (NCHU) and APAARI organized an international online seminar on "Future Agriculture: Introduction of Space Farming (Seed x AI x Space)" on 8 December 2020. It was attended by scholars from Russia, Taiwan, Thailand. The event explored the possibilities of future agriculture in the context of artificial intelligence (AI), space seeds, and customized farming in space.

In March 2020, the College of Electrical Engineering and Computer Science, NCHU, signed a memorandum

of cooperation with the National Samara University of Technology in Russia to collaborate on AI, smart agriculture, smart manufacturing, smart transportation, supply chain, and other related fields. APAARI, on the other hand, jointly established the Center of Excellence (CoE) on Value Chains with the Xingda International Agricultural Center in 2019, with a focus on enhancing collaboration of scientists and researchers for value creation to help elevate knowledge and capacities of relevant domains of interested countries. Mr. Li Zongru, the forum organizer, was positive that by next year the forum would be organized face-to-face, to provide a deeper understanding of the concept and opportunities for networking.

Dr. Ravi Khetarpal, Executive Secretary, APAARI, discussed the challenges of space farming, namely, long duration of the journey, supply and high cost of food to space stations, limited energy for artificial lighting and available space, as well as threats of contaminants/dangerous organisms

National Chung Hsing University (NCHU) & Asia-Pacific Association of Agricultural Research Institutions (APAARI) proudly present

FUTURE AGRICULTURE: INTRODUCTION OF SPACE FARMING (Seed x AI x Space)
online conference
Tuesday, December 8, 2020 at 03:30 – 05:00 p.m. (CST)

- Opening (03:30-03:35) and Q&A session (04:35-05:00)**
Dr. Lee Tzong-Ru
Professor of Marketing Department, NCHU, Taiwan
- Space Seeds for the Future (03:35-03:50)**
Dr. Hwang Shaw-Yhi
Professor and Director of International Agriculture Center, NCHU, Taiwan
- AI in crop monitoring on UAV images (03:50-04:05)**
Dr. Yang Ming-Der
CEO of Intelligent Agriculture Research Center, NCHU, Taiwan;
CEO of Innovation and Development Center of Sustainable Agriculture, NCHU
- Challenges in Space Farming (04:05-04:20)**
Dr. Ravi Khetarpal
Executive Secretary of Asia Pacific Association of Agricultural Research Institution (APAARI), Thailand
- Smart Digital Twin of Plant for Customized and Optimized Farming in Space (04:20-04:35)**
Dr. Petr Skobelev
Professor, President of Knowledge Genesis Group,
Head of Department of Samara Technical University, Russia

on space, plants' exposure to radiation, and sustainability on wastewater recycling, oxygen generation, and air purification. He listed recommendations for policymakers to consider integrating applications of geospatial information to planning and actions towards achieving the Sustainable Development Goals (SDG).

Dr. Petr Skobelev, Professor, National Samara University of Technology, Russia, highlighted the use of digital clones of plants to simulate the state of space on Earth and experimented on the results of effects on the state of space in the growth of crops.

The meeting also discussed topics, such as the growth of species in space, use of drones and AI in identifying the damage of natural disasters efficiently, the selection of Taiwanese seeds to be sent to space and study the environment, and the follow-up research when it returns to Earth.



Promotion of the use of ASTI evidence in the region



Participants of the regional webinar

In the strategic partnership with the International Food Policy Research Institute (IFPRI), APAARI is leading the ASTI project in the Asia-Pacific region. The APAARI/IFPRI team working on ASTI has collected, analyzed and provided data and information on the structure, status, funding, and focus of agricultural research performers in low-and middle-income countries in Southeast Asia. The data allowed for comparative analyses across countries, regions and globally. A large number of international organizations, as well as national-level decision makers around the world have been using ASTI data and analyses to assess agricultural research in developing countries, and to influence policy for increased agricultural growth and productivity.

As part of its outreach efforts, ASTI organized seven webinars during July-December 2020, to present the key trends and challenges of the agricultural research systems in Southeast Asia, and explore avenues through which ASTI evidence can be integrated into national and regional policy processes. The webinars targeted different stakeholder groups. For example, two webinars aimed to inform APAARI's Executive Committee and ACIAR managers in Canberra. Other two webinars focused more on the country level targeting Laos and Myanmar. The last three webinars were conducted at the regional level reaching out to ASTI project partners, multilateral regional stakeholders and interested actors in the region, as well as ACIAR alumni in East and Southeast Asia countries.

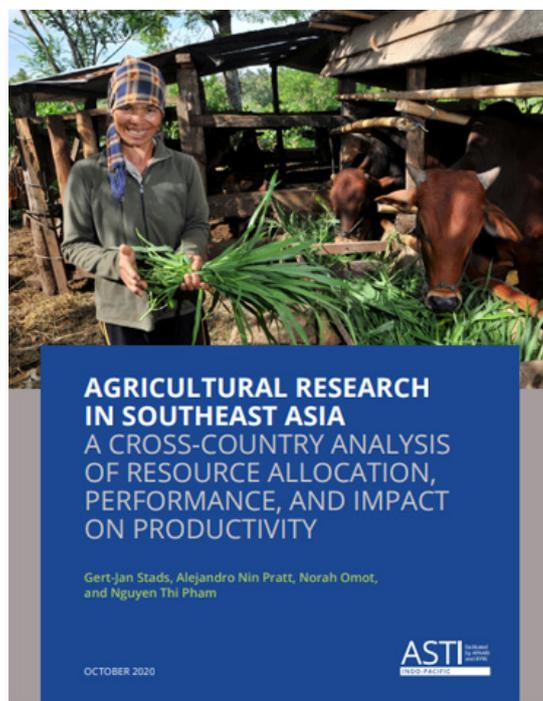
Lessons learned, views and feedback was sought from the participants on how APAARI and IFPRI can better promote

the policy uptake of ASTI evidence; how ASTI evidence can be integrated into national R&D decision making and policy processes; what APAARI and IFPRI can do to help institutionalize ASTI data collection and analysis in respective countries and enhance in-country ownership in the long run; what are the capacity needs; and what additional data collection and analytical activities can ASTI conduct in these countries to ensure that its products and services better support R&D investment decisions. The feedback has been very useful and will guide ASTI implementation in the region.



Launching ASTI's Regional Report for Southeast Asia

Evidence from ASTI data and other research shows that higher levels of investment in agricultural research are key to increased agricultural productivity. Despite this fact, many low- and middle-income countries struggle with serious capacity and funding constraints in their agricultural research and higher education systems. Over the past three years, the ASTI program, led by APAARI and IFPRI, has collected and analyzed detailed data on the structure, capacity, funding, and focus of agricultural research systems in Southeast Asia and Papua New Guinea. The key results of this work for Southeast Asia have been bundled in a regional synthesis report, which was launched recently. The report can be accessed here: [Agricultural Research in Southeast](#)



[Asia: A Cross-Country Analysis of Resource Allocation, Performance and Impact on Productivity.](#)

The report highlights large-scale underinvestment in agricultural R&D, as well as major research capacity gaps across Southeast Asia. It urges countries to step up their

agricultural R&D investment to enhance future agricultural productivity, food security, and poverty reduction, and to respond more effectively to challenges posed by climate change and environmental degradation.

In addition to the regional report, a series of country briefs and datasets, featuring national-level trends in agricultural research investment and capacity, have been made available on the ASTI website, accessible here: <https://www.asti.cgiar.org/ap-outputs>.



Mid-Term Review of implementation of the APAARI Strategic Plan

In 2017, APAARI launched its Strategic Plan 2017-2021. The Plan maps the key pathways to achieve APAARI's Vision 2030, which is to strengthen agri-food research and innovation systems (AFRIS) in Asia and the Pacific, as a way to develop agri-food systems (AFS) and ensure sustainable agricultural development in the region.

The Plan directs APAARI, its partners and other stakeholders to focus on four main themes to strengthen AFS in the Asia-Pacific region: i) mobilization, management and use of natural resources for sustainability; ii) management of risks and uncertainties; iii) inclusive development and integration of value chains targeted at benefiting smallholders; and iv) analysis, strengthening and formulation of public policies and overarching regulatory frameworks in support of the transformation and development of AFS.

The Plan further provides key programmes through which these themes are being addressed, namely: knowledge management (KM); partnership and networking; capacity development; and advocacy; as well as two cross-cutting areas: women and youth, and foresight and visioning; governance components: APAARI Governance and Development, and Planning, Monitoring and Evaluation System (PM&E).

The Plan is now half-way through the five-year timeline (2017-2021). As such, APAARI is in the process of conducting an internal mid-term review (MTR) to assess the implementation progress of the Plan. The review will enable APAARI to adjust priorities in response to changes and needs in the operating environment, and include these in its biennial operation plan 2021-2022. The scope of the MTR has been developed and is being implemented by the APAARI Secretariat under the guidance of Dr. Raghunath Ghodake, Senior Advisor.



APAARI and ACIAR start a new knowledge partnership on linking research to policy

Research plays a vital role in providing evidence for knowledge and technical changes that can potentially impact the economic, social and environmental systems. Research evidence can influence policies to be more effective and to better respond to realities on the ground. However, the research-to-policy pathway is complex. Even if they are published and available, research knowledge and evidence do not necessarily get incorporated into policy formulation and implementation. The process involved is often challenged by numerous factors, including values and priorities of decision makers.

Furthermore, there is a lack of understanding by researchers in general, of the process of integrating research into policy mechanisms. As a result, research findings often just end up in publications, and researchers do not take further steps to engage with policy makers on important research evidence. A small project on linking research to policy to improve economic, social and environmental systems is currently underway at APAARI. The project funded by ACIAR started in October 2020 and will end in August 2021. It aims to generate information from the research community within Asia-Pacific on how research in the region can be integrated into policy mechanisms.

The research initially scopes for views and perspectives of selected researchers and agricultural policy experts in the region, of which the results can be a basis for policy dialogue in the future. Data for this analysis will be collected from a number of sources, including secondary data, online surveys, and virtual discussions.

The project invites interested stakeholders, who would like to participate in sharing their views on the research to policy pathway challenges and opportunities. Please contact Norah Omot at norah.omot@apaari.org to share your views.



Regional Consultation Meeting on Developing SAARC Agriculture Vision 2030

The South Asian Association for Regional Cooperation (SAARC) and APAARI organized a virtual Regional Consultation Meeting on 'Developing SAARC Agriculture Vision – 2030' on 14-15 December 2020. The regional meeting was attended by 40 participants from eight member states, namely: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, and experts from APAARI and SAARC Agriculture Center (SAC), academicians, researchers, and development partners and activists. The objective was to develop SAARC Agriculture Vision 2030 to guide the region in agriculture transformation for the next ten years.

Lack of focus on technological productivity, value chain inefficiency, and low investment are the significant challenges faced by agricultural R&D in South Asia – home to nearly 1.74 billion people. The region is projected to grow by 2.04 billion in 2030 according to United Nations' estimates, displaying a serious challenge on food security and achieving the SDGs.



Regional consultation participants

In 2013, SAC developed the SAARC Agriculture Vision 2020. A new SAARC Vision 2030 is now being formulated to guide the Centre in the right direction to address contemporary issues and achieve its objectives. The Consultation Meeting included keynote speeches relative to overall agriculture, associated disciplines, challenges and opportunities, and SAC's long-term vision.

A technical team presented a framework for the SAARC Agriculture Vision 2030, while focal point experts highlighted national issues, challenges, perspectives, and country-specific vision in their presentations. Working group sessions focused on five strategic and thematic areas. The meeting succeeded in finalizing SAARC's mission and vision statements, strategic areas of objectives and goals, and associated focused programmes, which were embedded in the SAARC Agriculture Vision 2030.



PROFILE

College of Bioresources and Agriculture, National Taiwan University (CBA-NTU)



The National Taiwan University (NTU) was founded by Japan in 1928 as Taihoku (Taipei) Imperial University (TIU), with two faculties. The Faculty of Science and Agriculture and the Faculty of Literature and Politics were first established with only 59 students. By 1943, the Faculty of Science and Agriculture was divided into two colleges, one of which being the Faculty of Agriculture, the predecessor of today's College of Bioresources and Agriculture (CBA), which got the current name in 2002.

Today, NTU has a total of eleven colleges, three professional schools (dentistry, veterinary medicine, and pharmacy), 56 departments, 112 graduate institutes, 18 Master's and PhD degree programs, and over 50 research centres. The number of students reached nearly 32,000 and the faculty members over 2,000.

CBA – the leading agricultural higher education institute in Taiwan – has played an important role in Taiwan's higher education and agricultural research in different aspects. It also acts as a hub for preparing students for agriculture-related industries or academics.

The mission of CBA lies in finding smart and sustainable ways for agricultural development, economic well-being, and improved quality of life through educational curricula focusing on animal, crop and human health, as well as environmental and advanced technology development.



NEWS UPDATE FROM NARS

Agricultural Research, Education and Extension Organization (AREEO)

Biological control: The main integrated pest management strategy in the sugarcane fields of Khuzestan, Iran

Sugarcane is one of the main agricultural crops in Khuzestan province, located in southwest of Iran. Its cultivation area is more than 80,000 hectares per year. As a result of the increasing cultivation area for sugarcane in Khuzestan province, damage of important pests increased.

These pests include: sugarcane stem borers, *Sesamia* spp., and in some cases sugarcane yellow mite, *Oligonychus sacchari*, *McGregor* and sugarcane whitefly, *Neomaskellia andropogonis* Corbett increased. Among these, sugarcane stem borers, *Sesamia* spp. (Lepidoptera: Noctuidae) are the most important pests in Iran's sugarcane fields (See Figure 1).

Two species of sugarcane stem borers are active in Iran's sugarcane fields, namely: *Sesamia cretica* Lederer and

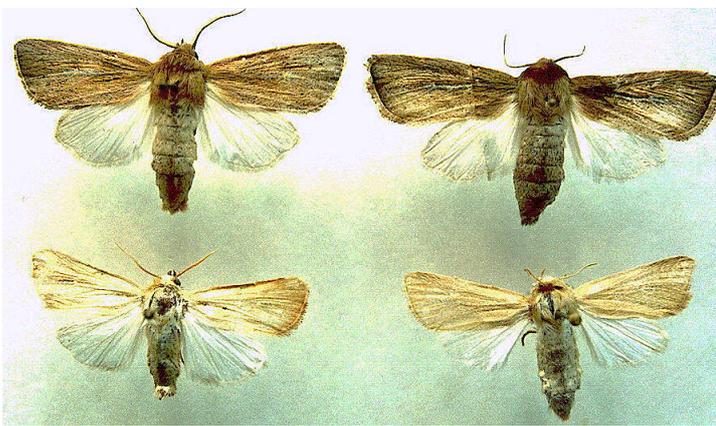


Figure 1. Sugarcane stem borers, in the upper row, *Sesamia nonagrioides*, female (right) and male (left), in the lower row, *Sesamia cretica*, female (right) and male (left) (Original, photographs by Ranjbar Aghdam)

Sesamia nonagrioides Lefevre. However, their dominance is different in Northern and Southern districts of the mentioned province. *S. cretica* is dominant in the sugarcane production agroindustry companies located in South of Ahvaz (e.g. Amir-Kabir and Salman-Farsi Agroindustry Co.), and *S. nonagrioides* is dominant in the North of Ahvaz (e.g. Emam Khomeini and Karoun Agroindustry Co.).

Chemical pesticides spraying was the first pest management strategy in Iran's sugarcane fields. However, despite more insecticides spraying, damage of the sugarcane stem borers has increased in the sugarcane fields. To improve efficacy of pest management requires the use of new controlling methods, considering the increases in pest population, its damage on sugarcane, and changes in Khuzestan's agricultural ecosystems.

Field studies have shown that stopping chemical control provides a better ground for natural pest control by its specific egg parasitoid wasp, *Telenomus busseolae* Gahan (Hym.: Platygastridae). Further studies also showed that the egg parasitoid wasp has many favorite capacities regarding flying radius, searching efficacy, host specificity, parasitism rate, and many other ecological compatibilities. Due to specific oviposition behavior of the sugarcane stem borers and laying their eggs under the leaf sheath of the host plants, general natural enemies cannot destroy them in protected oviposition substrate (See Figure 2).

Iran's biological control programme

In order to develop a biological control programme, along with other integrated pest management (IPM) strategies, the use of *T. busseolae* was suggested as one of the best IPM strategies against the sugarcane stem borers in Iran. Hence, biological control of sugarcane stem borers by using their egg parasitoid wasp started. Accordingly, mass rearing and releasing of the egg parasitoid wasp have been considered as the main object of the IPM programme. High host specificity of the parasitoid wasp, *T. busseolae* was the main problem for using this method, so its mass rearing is possible just by using its main hosts. However, mass rearing of the egg parasitoid wasp started by rearing sugarcane

stem borers on cutting sugarcane stems until recently. Field dependence, high rearing cost, microbial contamination, and possibility of rearing during growing season were the most important limits of this method.

Achievements

Nevertheless, according to the latest findings of the Iranian Research Institute of Plant Protection, mass rearing of the high quality parasitoid wasp, *T. busseolae* is now possible. This is possible with a lower cost and time-savings using a newly-developed semi-artificial diet for mass rearing of the larvae of sugarcane stem borers under controlled conditions (See Figures 3 and 4).

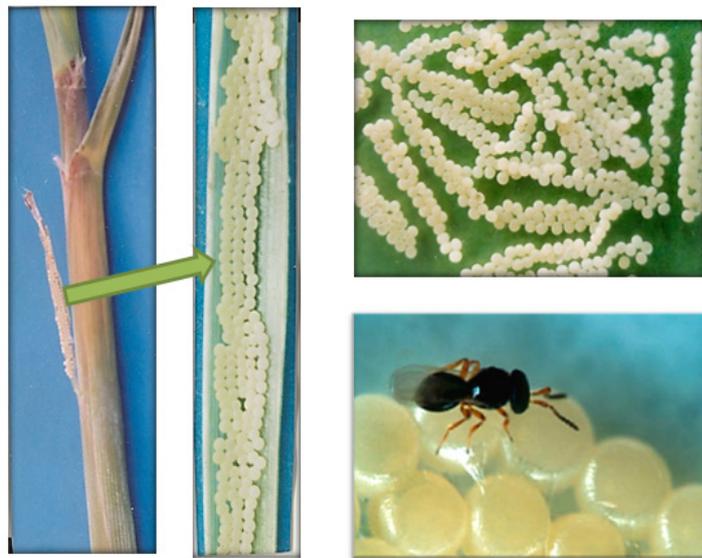


Figure 2. The egg mass of the sugarcane stem borer, *Sesamia nonagrioides* (Original, photographs by Ranjbar Aghdam) and its egg parasitoid wasp, *Telenomus busseolae*

This finding, along with climatological and ecological changes during the recent years, was more important, considering increasing sugarcane infestations by the stem borer. Because of serious efforts of the managers of sugarcane production agroindustry companies to avoid spraying insecticides while using IPM programme, biological control is considered as the main pest management strategy in the sugarcane fields of the Khuzestan province now.

Moreover, it provided a better condition for conservation of native natural enemies in Iran's sugarcane fields, and has



Figure 3. Mass production of the larvae and pupae of the sugarcane stem borer, *Sesamia nonagrioides* by using semi-artificial diet



eliminated secondary pest outbreak, e.g., favorite activity of predatory coccinellid, *Stethorus gilvifrons* (Mulsant), as the most important natural enemies of the yellow sugarcane mite in Khuzestan sugarcane fields. Consequently, sugarcane production is currently based on developing biological control programme without using chemical insecticides to control sugarcane stem borers in Iran's sugarcane fields.

Author: Hossein Ranjbar Aghdam, Associate Professor, Iranian Research Institute of Plant Protection, AREEO, Iran, hrap1388@gmail.com

Figure 4. Mass production of the sugarcane stem borer, *Sesamia nonagrioides* eggs (left photo) and its egg parasitoid wasp, *Telenomus busseolae* (right photo) by using semi-artificial diet, (Original, photographs by Ranjbar Aghdam)



Ministry of Agriculture, Fiji

The role bacterium culture in Fiji's agriculture

Small Island Developing States (SIDS) responsible for their pristine habitat, which tropical countries are known for, are at risk due to fast developments in the sector they rely on the most- agriculture. Fertilizers and chemicals used in developed production systems enter watersheds and pollute rivers, swamps and the ocean. These practices, if unchanged, may lead to severe damage to SIDS' ecosystems and ecologies. Fiji needs a production system, which relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.

Fiji's agriculture sector is largely driven by small-scale growers, which the Ministry of Agriculture (MOA) aims to develop into commercial scales that could automatically drive more inputs into production systems. "The introduction of organic agricultural inputs into Fiji's production system is the best option to ensure the sustainability of our natural resources", said Dr. Mahendra Reddy, Hon. Minister for Agriculture, when launching the Ministry's first ever formal production of the Bacterium Culture.



Hon. Minister for Agriculture Dr. Mahendra Reddy launching the product (left) and posing with farmers (right) who received the batch of Bacterium

Lactobacilli or Lactic Acid Bacteria (LAB) are found in the gut and on the skin of all living organisms. They are found in every soil and on every leaf surface. Their abundance signals their importance. LAB have been used for decades in agricultural systems to improve soils, control diseases and promote plant growth.

Other benefits of LAB include:

- high effectiveness in improving pore space in soil and soil ventilation
- direct promotion of plant growth or seed germination, as well as alleviating various abiotic stresses
- neutralization of ammonia gas produced where the immature compost is applied
- survival with oxygen (LAB is conditionally anaerobic)

- solubilization of phosphate (using LAB in phosphate-accumulated soil will increase its capacity to absorb the insoluble form of phosphates and helps overcome the saline disorder as a result of decomposition of the phosphates)
- effective bio-control agent (e.g. recently LAB has been effective in the control of a wide variety of fungal and bacterial phyto-pathogens)
- improvement of nutrient availability from compost and other organic material

A component of the bacterium fertilizer launched in Fiji is *Lactobacillus* – facultative anaerobic bacteria, which fortifies fertilizers. When applied in the soil, it immensely improves cultivation. It also allows for a slow release of nutrients found in the rhizosphere to be absorbed by plants slowly

over time. Lactobacillus acts as the soil probiotic, which makes it a perfect medium for organic farming. Hopefully on Fiji's farms, it will populate in the soil and staves out pathogens.

To date, the MOA has distributed almost 2,000 liters of the culture to a large number of farmers around the country. Cultures will be produced in large quantities and placed in the Extension Offices around the country to be easily accessible by farmers.

Further reading:

From yogurt to yield: [Potential applications of lactic acid bacteria in plant production](#)

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Ministry of Agriculture and Forests – Bhutan

Sustainable rural agricultural marketing model in Bhutan: Agriculture marketing case study from Chhukha District, Bhutan

A sustainable market for agriculture products has been a perennial problem for smallholder Bhutanese farmers. Low volume of production and lack of economy of scale emanating from subsistence nature of farming are the driving factors that make agricultural marketing unprofitable and challenging in Bhutan. Bhutanese farmers practice subsistence farming in small land holdings in challenging mountainous terrain where farm mechanization is difficult.

Bhutanese agriculture is typically characterized by low productivity and volume of production. Production areas are located in far flung areas. Thus, agricultural production and marketing in mountainous areas needs special attention and approaches. Sustainability, rather than profitability, is of utmost importance for Bhutanese mountain agriculture.

To address the marketing problems of the subsistence farmers, in 2017, a market driven production approach was initiated in Chhukha Dzongkhag District. Unlike the farmers' producer groups, the Dzongkhag has initiated the formation of at least one Farmers Marketing Group (FMG) in each Gewog (county). The primary mandate of the FMG is to aggregate the surplus agriculture produce from villages, consolidate it to a sizable volume, and transport it for sale in the nearest vegetable markets.

FMGs are a type of service providers to farmers. FMGs can also undertake value addition, processing, packaging and branding of products wherever feasible. They are entrusted



Figure 1: Dungna FMG selling their produces in Thimphu

to create market for their produces and support fellow farmers in marketing.

To strengthen the FMGs, the Dzongkhag Administration registered them as formal farmer-based organizations with support from Department of Agricultural Marketing and Cooperatives (DAMC). Furthermore, the Dzongkhag Tshogde (DT-District Council), which is the key decision-making body of the local government in Dzongkhag, has unanimously approved and recognized the FMGs.

To make these groups operational and sustainable, the Council has created business opportunities authorizing FMGs to supply local vegetables and dairy products to boarding schools in the Dzongkhag District. Following this initiative, a total of ten FMGs have become operational in eleven Gewogs by December 2019.

The ten FMGs are supplying vegetables and dairy products to 19 schools, which are valued at Nu. 14 million (USD 190,464). This money, which otherwise used to flow out of the country, has been ploughed back to the communities. Most of the FMGs are run by young and educated youth farmers.

The FMG model helped to increase the surplus production by more than 50 per cent in rural areas due to assured markets created by FMGs for the produces and products of farmers.

The Food Security and Agriculture Productivity Project (FSAPP) of the Department of Agriculture (DoA) has played a huge role in strengthening the Dzongkhag's initiative regarding the FMGs.

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Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)

Developing agribusinesses based on R&D in the Philippines

Gone are the days when outputs of R&D initiatives were left to gather dust in shelves. The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development, an agency of the Department of Science and Technology (DOST-PCAARRD), aims to change this mindset and assist researchers in diffusing the outputs of their R&D.



1st National Conference of the Agri-Aqua Technology Business Incubation (ATBI) Program

This initiative is being conducted under the DOST-PCAARRD's National Agri-Aqua Technology Business Incubation (ATBI) programme – a direct policy intervention adopted under the Science, Technology, and Industry Chapter of the Medium-Term Development Plan – to create greater demand for science, technology, and industry. ATBI is one of the technology transfer mechanisms identified in the DOST Technology Transfer Protocol (2015). Moreover, ATBI is a direct support to the implementation of the Innovative Startup Act (R.A. 11337) of 2019, and the Philippine Innovation Act (R.A. No. 11293) of 2019.

Role of ATBI in developing agribusinesses

Through the ATBI programme, an office is established in state universities and colleges (SUCs) or government R&D institutes across the country, which is responsible for enhancing agribusinesses and empowering entrepreneurs. To date, a total of 16 ATBIs had been established. In turn, they have generated 469 jobs and an aggregated revenue of almost 24.6 million Philippine pesos (USD 506,000).

The SUCs and R&D institutes where these 16 ATBIs are located include: Benguet State University (BSU), Central Luzon State University (CLSU), Cavite State University (CvSU), Isabela State University (ISU), Don Mariano Marcos Memorial State University (DMMMSU), Forest Products Research and Development Institute (FPRDI), Laguna

State Polytechnic University (LSPU), Western Philippines University (WPU), and Mariano Marcos State University (MMSU) in Luzon; the University of the Philippines Visayas (UPV), Visayas State University (VSU), and Capiz State University (CapSU) in the Visayas; and in Central Mindano University (CMU), Sultan Kudarat State University (SKSU), Western Mindanao State University (WMSU), and University of Southern Mindanao (USM) in Mindanao. A total of 100 pre-incubatees and 154 incubatees are supported under the programme. Pre-incubatees and incubatees are entrepreneurs, who own the products generated by R&D.

Before an entrepreneur becomes an incubatee, he or she should have undergone a more intensive training and has already developed a business plan. Moreover, the incubatee should have signed a memorandum of agreement (MOA) with ATBI, which officially lets the entrepreneur own the technology developed by a SUC or R&D institute. If the technology is for commercialization, a MOA and Fairness Opinion Report (FOR) are required. FOR is a document wherein the price or selling amount of the technologies are detailed.

Technology commercialization is a process wherein private entities are licensed to mass production and sale of products or technologies. After officially graduating as an incubatee, the entrepreneur develops his/her own start-up or spin-off company, which is still supported by ATBI.



1st National Conference of the Agri-Aqua Technology Business Incubation (ATBI) Program

The support that the ATBI programme provides to incubatees includes: office space at concessionary rates, access to shared-use facility; as well as technical support on agricultural production, product development, business counseling, financial sourcing, market linkages, and legal advice on business registration, as well as intellectual property.

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NEWS FROM INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

International Association for Agricultural Sustainability (IAAS)

IAIC 2020 – Experts from 26 nations gather to discuss sustainable agriculture of post-COVID-19 era



Participants of the four-day online innovation conference

Climate change intensifies global warming and crop production losses driven by the extreme climate and natural disasters. Since 2020, the globe has faced a challenge – COVID-19 pandemic. The outbreak has seen declines and stagnation of food trading and transportation between nations, which raised attention to the global supply chain.

Agricultural technology has potential to produce maximum quantities of quality agricultural products to cope with the future volatility of the natural environment. An innovative agribusiness model could shorten the distance to market and allow consumers to buy fresh produce at reasonable prices. Investing in sustainable agriculture, with technology and innovation as the main axis, should be the development direction all countries in the post-COVID-19 era.

The International Association of Agricultural Sustainability (IAAS) cooperated with the Department of Nutrition and Food Science, University of Maryland, U.S.A, to organize the 2020 International Agricultural Innovation Conference (IAIC 2020) from 6-9 November 2020. The webinar focused on topics associated with sustainable agriculture, technology, innovation and investment. Professors, scholars and experts from 26 countries attended the webinar to present their projects in developing sustainable agriculture and share their insights and perspectives.

The keynote speaker included: Dr. Simon Y. Liu, Associate Administrator from USDA Agricultural Research Service; Dr. Edwini Kessie, Director of Agriculture and Commodities Division, World Trade Center (WTO); Dr. Ravi Khetarpal, Executive Secretary of APAARI; and Dr. Marco Wopereis, Director-General of WorldVeg. The speakers pointed to agricultural development from the perspectives of artificial intelligence application in innovative agriculture, the SDGs, innovative approaches in the area of capacity development, as well as pursuing green growth of the vegetable sector in low-income countries.

2020 was a difficult time for all human beings around the world. The virus and natural diseases have disturbed human activities and even threatened livestock and crops. This is a sign that reminds the development community to reconcile new agriculture and focus on sustainability for the next generation.

Read more: <https://iaas.org.sg/>

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International Centre for Integrated Mountain Development (ICIMOD)

Markers of sustainability in mountain farming systems

Sustainability is often about balance of the environmental, economic, and socio-cultural dimensions of a socio-ecological system. As a part of its continuing work on mountain farming systems, the International Centre for Integrated Mountain Development (ICIMOD), along with its partners in Bhutan, China, India, and Myanmar, facilitated a [regional study](#) on assessing the sustainability of farming systems in the eastern Himalaya.

The study unbundled sustainability indicators at the farm level and defined seven composite markers for sustainability. These are referred to as 'sustainability space components' and defined as: space organization, the use of physical land spaces; resource efficiency, the efficient use of ecological and socio-economic resources; adaptive features, the capacity to diversify risks and cope with changes; social well-being, the promotion of local and traditional value systems; economic prospects, the prospects and aspirations for livelihoods and economic development; integrated approach, the interdisciplinary processes and strategies aiding the management of farming systems; and external support, the necessary enabling mechanisms, investments, and partnerships. Collectively, they defined "sustainability space", or the current sustainability scenario of a farming system based on the performance of each component, and as perceived by the community and stakeholders engaged in managing the farming system.

The assessed systems included heritage farming system (India), traditional shifting cultivation (India, Myanmar), transforming traditional agriculture (India, China), integrated mixed farming (Bhutan), integrated organic farming (India), and integrated commercial farming (China). The study indicated that the integrated mixed farming model, practiced in Barshong, Bhutan, has the highest sustainability space score, and the traditional lopil-based hill farming from China and Myanmar has the lowest.

In terms of sustainability, integrated mixed farming scored high since it featured diversified use of agro-ecological spaces and good connectivity between farm and natural ecosystems, optimal use of local resources and less reliance on external inputs, high demand for local farm produce and commodities, and efficient connectivity to multiple markets. The system also showed adequate motivation and interest among farming communities towards agriculture, involvement of the younger generation in farming, efficient farm-level institutions and networks for exchange of agrodiversity resources and associated knowledge, and application of both empirical and experimental knowledge on integrated farm management. All of this was backed by strong policy support and extension services from the

government.

The sustainability space framework provides a quick visualization of how balanced the farming systems are in terms of advancing environmental, economic, and socio-cultural objectives, and in terms of facilitating integrated processes and support mechanisms. The more uniform and balanced these seven components become, the higher the sustainability of a system. This is because it means a comparatively better situation for all components rather than a strong performance of any single sustainability space component. These markers thus reiterate the need for balanced progress of farming systems to make them more resource-efficient, resource-conserving, environment-friendly, socially-acceptable, and commercially-competitive.

Author: [Bandana Shakya](#), Agrobiodiversity Specialist, ICIMOD



World Vegetable Center (WorldVeg)

Truly growing against the flow: Grafted tomatoes inundated by floodwaters produce fruit and smiles for researchers

Although heavy, frequent rain drenched Cambodia during the first two weeks of October 2020. The researchers running a tomato grafting trial for the World Vegetable Center's Grow Against the Flow project at Kbal Koh Vegetable Research Station were delighted to find a silver lining in some of those dark thunderclouds.

From 9-11 October 2020, flood waters covered about one-third of the height of the planting beds in the plot. By 12 October, the water level rose to two-thirds of the bed height. By 13 October, the plots were completely inundated. Yet, when they checked the experimental plots, the research team members discovered that all the grafted tomato plants survived the flood. The non-grafted check was not so fortunate: 30-40 per cent of those plants wilted due to the excess water.

Grow Against the Flow promotes off-season vegetable production to help ensure nutrient-rich food is available to consumers at times of the year when the supply is usually low. "Grafting is a simple practice farmers can use to overcome some difficult climatic conditions in the rainy months," said Uon Bonnarith, Project Manager.

Grafting involves attaching the rootstock, or bottom, of a flood- or disease-resistant tomato or eggplant variety to the scion, or top, of a preferred tomato variety that lacks resistance. The simple process requires a bit of bicycle tubing, a razor blade, and nimble fingers. The stems of two young plants are joined with the tubing and placed in a dark,

moist enclosure to allow the joint to heal, which usually takes about a week. The grafted plants are then set out in the field with the graft above the soil line.

When farmers are able to produce tomatoes despite the rain and keep up a steady supply to markets, consumers can more often enjoy the taste and nutritional benefit of fresh tomatoes. Farmers' incomes increase from off-season production as well. Researchers harvested fruit from the experimental plots on 8, 11 and 14 October. They tracked data including the number of plants transplanted, number of plants that survived flooding, days to first harvest, yield (2-3 times), fruit size (width and length), fruit weight measured by ten fruits from each plot, calcium deficiency and pest and disease damage. WorldVeg improved line VI041996 served as the rootstock.

Based on the collected data, Uon has concluded that the grafted plants are resistant to flooding, despite the roots and stems being underwater for at least six days. His team is now pumping floodwaters out of the fields to continue the fruit harvest for other aspects of the experiment. The Grow Against the Flow project is funded by the German Federal Ministry of Cooperation and Development (BMZ).

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NEW APPOINTMENTS

Bidyut C. Deka, Vice Chancellor, Assam Agricultural University, India



A distinguished academician and administrator Dr. Bidyut C. Deka is known nationally and internationally for his contributions in the field of post harvest management and value addition in horticultural crops and farming system research. He worked in various capacities at the Assam Agricultural

University, Jorhat; ICAR Research Complex for North-eastern Himalaya Region, Umiam, prior to joining as Director at ICAR's Agricultural Technology Application Research Institute (ATARI), Umiam, Meghalaya. He joined the Assam Agricultural University, Jorhat, Assam, as its 13th Vice Chancellor on 22 October 2020. A Fellow of Indian Academy of Horticultural Sciences, New Delhi, Dr. Deka is also known as an institution builder in Northeast India. He received the Fakhruddin Ali Ahmed Award of ICAR for outstanding research in farming systems in tribal areas, and four other national awards for his contribution in the field of post-harvest management and value addition.



Phichest Wiriyapha, Director-General, Department of Agriculture (DOA), Thailand



Mr. Phichest Wiriyapha is the new Director-General of the Department of Agriculture (DOA), Thailand. He earned a Master of Science in Applied Statistics from the National Institute of Development Administration (NIDA) and a Bachelor of Agriculture in Agricultural Extension and Cooperatives from

Sukhothai Thammathirat Open University. He worked as a Director-General of the Cooperative Promotion Department and served as a Cooperative Officer in various DOA provincial offices.

Previous achievements and works highlight Mr. Wiriyapha's significant role as the Chairperson of a working group on reforming the management system and supervision of Thrift and Credit Cooperatives and Credit Union Cooperatives under the Ministry of Finance.

He also chaired the plan formulation committee to uplift and strengthen classified cooperatives' levels through increased participation of members, improved administration, and reduced value damage costs.

In addition, Mr. Wiriyapha also managed a group in resolving problematic issues by providing guidance and supervision to carry out cooperatives' operations under relevant laws and regulations. He was awarded as an Outstanding Alumni from NIDA on 15 October 2016 and obtained a Certificate of Academic Excellence Award (3rd place) in course for executives under the Ministry of Interior on 30 October 2013.



Pema Gyamtsho, Director General, ICIMOD



Dr. Pema Gyamtsho is the new Director-General of ICIMOD effective October 2020. The position is the second stint for him in the organization where he worked as a watershed specialist. He earned his Ph.D. in Natural Sciences from ETH Zurich, Switzerland, and completed a Masters in Agriculture Science

from New Zealand. He served as Deputy Secretary of the Ministry of Agriculture, Bhutan, and worked as a member of the Planning Commission, the Forestry Development Corporation Board, and the Centre for Bhutan Studies.

Dr. Gyamtsho's notable past achievements as an experienced leader focused on the environment, include: public financing, sustainability, and stewardship through the enactment of the legislation, enabling policy, conservation and climate change mitigation, and several community-based initiatives on forest management. He also made efforts in promoting high-quality research and evidence-based decision making on environmental issues and a representation within globally significant platforms. His position as the new Director-General is a commitment to address the challenges in the Hindu Kush Himalaya's (HKH) mountain environments and his deep passion for the people in the region.

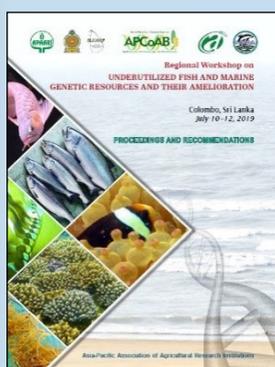


UPCOMING EVENTS

- 1st APAARI Executive Committee Meeting 2021, Virtual, 30-31 March 2021
- 16th APAARI General Assembly 2021, Virtual, 8-9 April 2021



NEW PUBLICATIONS

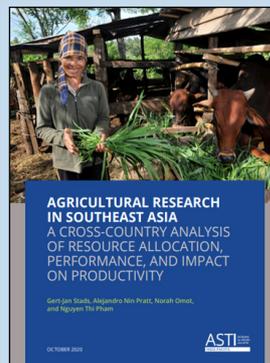
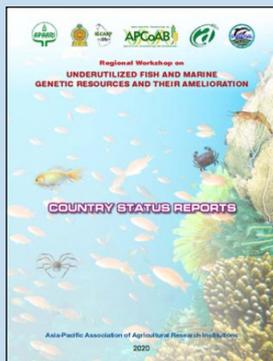


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APAARI acknowledges the partnership and support of all the members and stakeholders

THANKS



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