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APAARI Newsletter

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

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EDITORIAL TEAM

Editorial

Crisis of COVID-19 Pandemic in Asia-Pacific

Asia-Pacific having 60 per cent of global population and home to the largest number of poor and hungry people in the world, is a region with extreme diversity of agricultural development and economic growth, apart from the weather scenario.

COVID-19 pandemic, which is known to have originated from the region, has drawn attention of one and all from public to private sectors as all have been badly impacted. A high level of global recession of the economy will certainly affect small rural producers on a much broader scale. Thus, the regional food security, which is already threated by many factors, now also has the COVID-19 pandemic factor that has aggravated the challenges.

Every step of food supply and agricultural value chain has been adversely affected right from production, storage, transport, market to export, eventually affecting the physical access to food, with volatility of prices and loss of income for certain sectors in a number of countries. The situation of food security is further compounded by labour shortages. Thousands of daily-paid workers in cities are currently deprived of work, specially in South and Southeast Asia. Without the means of buying food and out of fear of threat to life, they are migrating to their hometowns. The governments of developing and least developed countries of the region are facing a tough and chaotic situation, as they were caught napping in the absence of a well-defined emergency crisis plan and a rapid response team to effectively mitigate the problems.

The current limited inter-state movements by land, sea and air has further restricted the access to food across the region. The countries, and especially the small island states that depended on imports as the principal means of making food available to their population, seem to have been more affected. The immediate drastic reduction in trade of agricultural commodities, such as

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rice, wheat, maize, sweet potato, soybean, canola and many other important vegetable crops of regional importance, are likely to send alarming bells in days to come. Countries are likely to increase their focus on ensuring surpluses for internal consumption than for export.

Some collective actions have been fortunately taken place recently to keep food trade flowing between countries. There are encouraging signs that countries are heeding the lessons of past food price crises. Ministers of Agriculture from the G20, African Union, ASEAN countries, as well as Latin America and Caribbean, agree on the need to keep global food markets open and refrain from imposing new trade barriers to prevent lack of food. However, this effort is not seen across all Asia-Pacific.

As an initial step, FAO Regional Office for Asia and the Pacific has developed a methodology for implementing country-level assessments to evaluate the impact of COVID-19 on food security, nutrition and livelihoods. The results will inform government-appropriate responses to the crisis and put in place policies and measures to minimize the disruptions on food supply chains, trade, on-demand for food, income and livelihoods, especially for the poor and vulnerable segments of the populations.

A plethora of scientific articles from distinguished experts across the globe has been published in last few months advising on steps to be taken to manage continuing agricultural growth, and also an open letter addressed to the United Nations G-20 to express their concerns. However, what is most important are immediate specific actions on the ground, which have to be case-specific as countries in the region are in different state of agricultural development.

At the country level, the World Bank Group is working with governments and international partners to closely monitor domestic food and agricultural supply chains, track how the loss of employment and income is impacting people's ability to buy food, and ensure that food systems continue to function despite COVID-19 challenges.

Following the discussions with some members, APAARI has decided to initiate a survey among its members, specifically to see how COVID-19 has impacted their agricultural scenario, including investment in agricultural research. The assessment may provide regional inputs to the global agencies, such as the Australian Centre for Agricultural Research (ACIAR), which are doing rapid and integrated assessment on the impact of COVID-19 in the region, and may facilitate a risk management strategy.

An important initiative taken to benefit APAARI members is the development of a regional project on addressing phytosanitary concerns and strengthening public-private partnership for enhancing seed trade in the Asia Pacific region. Seed is the basic unit of agriculture and food security. This initiative being envisaged in partnership with the Asia Pacific Plant Protection Commission (APPPC of FAO-RAP), Asia Pacific Seed Association (APSA), International Seed Federation, Crop Life Asia and others, will involve working closely with public and private sectors. The objective is to overcome SPS barriers to seed trade, which has been greatly affected due to COVID-19. It is expected to remove many technical and policy-level bottlenecks that are impeding the seed supply chain due to non-compliances to the agreements of the World Trade Organization (WTO).

APAARI welcomes suggestions from all members and stakeholders for enhancing its role in facilitating and promoting further strengthening of agricultural food and research innovation system in the region.

Ravi Khetarpal
Executive Secretary
APAARI

Highlights from the APAARI Secretariat

Learning from stakeholders on their key needs and contribution to APAARI Vision

In March 2020, the APAARI Secretariat launched a Stakeholder Survey to collect information from the members on their key needs in the areas of knowledge management (KM), partnership and networking, capacity development, advocacy, and women and youth – APAARI's key functional areas. This information will enable the Secretariat to better target and prioritize its activities aiming to strengthen agri-food research and innovation systems (AFRIS) in Asia-Pacific.

The survey also collected information on the contribution of the members to their national AFRIS. According to the APAARI Vision 2030 developed in close consultation with the members and partners, strong AFRIS is the basis for the development of national and regional agri-food systems (AFS) to bring about sustainable agricultural development in the Asia-Pacific region.

Thirty-seven respondents from member institutions participated in the survey from the following countries: Bangladesh, Bhutan, Canada, Costa Rica, Fiji, France, India, Lao PDR, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Uganda, Taiwan, Thailand, and Vietnam. Most of these respondents represented government and national agricultural research system (NARS) organizations.

To strengthen **KM** to enable the member institutions to better contribute to the development of AFS in their countries, the respondents mostly felt that APAARI needs to

put more efforts into collection and sharing of information and knowledge on good practices at the regional level. On the other hand, sharing of the member organizations' knowledge and experience to support innovation and development in the region was indicated as their most important contribution to AFRIS development.

Regarding how APAARI can help the members improve partnership and networking, coordination of the development of joint project proposals was indicated as the most important expectation from APAARI. Further, the most stated envisioned contribution of the respondents to strengthened AFRIS through partnership and networking was organization of regional knowledge-sharing and learning events, and initiation and coordination of joint project proposals.

Capacity development is another key programme area for which APAARI sought feedback from its members. In this respect, facilitation of regional expertise sharing in technical and functional areas was indicated as the key expected area of support of APAARI to the members. The respondents were also asked to indicate how their institutions could use their existing capacity to contribute to the strengthening of AFRIS in Asia-Pacific. Prioritizing and promoting the development of technical capacity of researchers and scientists was the strongest area where they felt they could provide support. Furthermore, the major gaps in the respondents' organizations were stated as: financial resources, followed by trained human resources and partnership.

In terms of **advocacy**, sharing of the findings of the Agricultural Science Technology Indicators (ASTI) project to influence policy and decision makers was considered the most important advocacy effort that APAARI should support. The respondents also mostly indicated that they could contribute to the advocacy efforts through their improved engagement in national policy dialogue on the issues of regional importance, using evidence promoted by APAARI.

Women and youth is a cross-cutting area mainstreamed in every APAARI programme and project. The respondents mostly felt that APAARI needs to document and share success stories of women and youth in key innovation areas of AFS. On the other hand, they demonstrated their willingness to encourage women and youth to contribute to their institutional and national knowledge-sharing and learning processes, as well as to facilitate national and regional policy dialogue on women and youth issues.

Lastly, APAARI took the opportunity to get feedback on the need of the members for various thematic knowledge-sharing and capacity development webinars. APAARI took a stock of various topics and clustered them according to more general topics, such as food security, food safety, nutrition, soil and plant health management, agribiotechnology, biodiversity, agricultural policy, knowledge management, technology and innovation, and youth development. The list of almost 70 topics related to the above categories enabled the APAARI Secretariat team to have a discussion on feasibility, prioritization, and planning of webinars for this year, especially in the context of continuous physical social distancing.

The stakeholder survey served as an excellent eye opener for APAARI to get its members' perspectives on the areas where the Association needs to fill their needs. APAARI now also better understands how the members are willing to contribute to the collective action of strengthening AFRIS. As such, the survey results will be integrated in the Association's work plan.

APAARI integrates capacity development for agricultural innovation systems in a new STDF/ WTO-funded project on Asia Pesticide Residue Mitigation Project

Many less developed economies in Asia still face increasing challenges in conforming to the Codex Alimentarius – a globally recognized body responsible for setting food safety standards to help in the facilitation of international trade in safe foods. This is because the maximum residue limit (MRL) that results from pesticide residues on agricultural commodities is either not established or it is too low to reasonably comply with real-world use patterns of farmers. As a result, Asian trade is significantly constrained by rejections at the global market due to food safety issues, including excess MRLs for permitted pesticides, presence of prohibited pesticides, presence of quarantine plant pests, and pathogens and food-borne pathogens.

APAARI recognizes that to develop technical capacities alone is insufficient to ensure successful application and coordination of technical capacities and technologies in the long run. As such, its experience as an active partner in the Tropical Agriculture Platform (TAP) on promoting capacity development (CD) for agricultural innovation systems (AIS), was a basis for integrating development of functional capacities and AIS perspective in the design of a project titled 'Asia Pesticide Residue Mitigation through the Promotion of Biopesticides and Enhancement of Trade Opportunities'. Through designed project activities, this very technical project integrates the focus on people, particularly communication, negotiation, and collaboration skills, as well as building more effective and dynamic relationships among the multiple actors involved in pesticide residue mitigation.

The Asia Pesticide Residue Mitigation Project, which had a kick start in February 2020 through a pre-inception webinar, is funded by the Standards and Trade Development Facility (STDF)/World Trade Organization (WTO) and implemented by APAARI, IR-4 Project/ Rutgers University and the United States Department of Agriculture (USDA). The project aims to increase awareness of how pesticide residue issues

impact trade and develop methods for overcoming these trade barriers.

The primary participants of the project are national pesticide regulatory authorities, farmers, industry associations, agri-food export companies, and domestic consumers. Women play a key role in the global value chains for many agri-food products and face particular challenges in the context of compliance with international trade standards for pesticides. Hence, the project ensures their participation and capacity development as well.

> *"Innovation is not just research output," said Dr. Ravi Khetarpal, Executive Secretary, APAARI, at a recent pre-inception webinar of the project. "Innovation provides a socio-economic value, so functional capacities enable more partners to strengthen innovations," he pointed out.*

The concept of CD for AIS was felt to be absolutely necessary to blend with technical capacities in order to enhance the outputs and long-term outcomes of this project. In a recently conducted pre-inception webinar, it was highlighted that innovation and capacity development cannot be looked at in isolation from a perspective of one player. They need to be viewed from the system perspective, involving all innovation actors (individuals, organizations and enterprises), that together with supporting institutions and policies, can bring existing or new agricultural products, processes and practices into social and economic use.

The TAP Common Framework on CD for AIS emphasizes capacity to navigate complexity, collaborate, reflect and learn, and engage in strategic and political processes that together enable innovation. In addition, APAARI has identified other functional capacities that are critical to realize the potential of innovation, particularly in the context of this technical project.

Firstly, capacity to learn and adapt quickly to the food safety standards, changing consumer demands, and industry changes is absolutely crucial as new challenges are constantly presenting themselves in today's complex agri-food systems. These challenges must be addressed quickly by adopting new methods advanced by technological innovation.

Secondly, interpersonal skills are incredibly important in the context of pesticide mitigation, as they are required to interact with farmers, work with producers, exporters and importers, and consumers. Effective listening can ensure that all needs and targets are met, ultimately developing enduring long-term relationships and collaboration that can lead to sustainable development outcomes. The ability to negotiate is critical, particularly when entering formal and informal dialogue with independent regulatory bodies, key stakeholders, and of course, the government on policy-related matters.

Other soft skills to be included in the project, particularly in the work with farmers, will be organization skills since trade implies the work in logistics, variety of agricultural products and producers. It needs to be ensured that raw materials are properly transported, stored and delivered from producer to consumer. As farming depends on climate, weather conditions need to be factored to ensure that consumer demands are met, while sustaining farming activities during the off season. Finally, the project envisions the project participants to become more tech-savvy and better understand the technology trends and development related to integrated pest management and pesticide use.

The enhanced technical and functional capacities are envisioned to ensure growers' access to important export markets, increase biopesticide availability, and decrease the costs and barriers to biopesticide availability. Further, they will contribute to the Sustainable Development Goals (SDGs) of improved human and environmental health, as well as poverty reduction and economic growth in Asia and the Pacific and beyond.

The project, and the blending of functional and technical capacities has attracted attentions of other regions, seeking APAARI's inputs into new project development. An example is a recent collaboration of APAARI with the International Centre for Genetic Engineering and Biotechnology (ICGEB) in South Africa, Southern Africa Network for Biosciences and Rutgers University, to develop a similar project targeting African stakeholders.

Read more:

Synthesis of the webinar

APAARI signs a Consortium Agreement with 17 partners to implement the EU-AFD-CIRAD funded project on Agroecology and Safe food System Transitions (ASSET) in Southeast Asia

The agricultural sector of Southeast Asian countries is at a crossroads between intensive agricultural models relying heavily on chemical inputs and capital, and innovative agroecological systems, which are less dependent on agrochemical inputs and rely on a wide range of healthier, environmentally and socially sustainable practices. This includes conservation agriculture, agroforestry and crop diversification, landscape redesign, sustainable rice intensification, integrated crop-livestock and tree systems, and organic farming.

A key challenge for the research and development community is to support the transition from a relatively

standard and simple model of intensification, to diversified production models with increasingly diverse connections to export and domestic value-chains, and food systems. A comprehensive approach that includes research, capacity development, networking, policy advocacy and communication, is needed to engage governments, civil society and the private sector (including small producers) in transforming knowledge outputs into sustainable innovation processes, while promoting youth and gender equality.

The five-year project on Agroecology and Safe Food System Transitions (ASSET) in Southeast Asia funded by the European Commission Directorate-General for International Cooperation and Development (DG DEVCO), French Development Agency (AFD), and Agricultural Research Centre for International Development (CIRAD), aims to develop and promote a shared vision of ASSET in Southeast Asia through mobilizing the theory of change, build capacity towards this vision, and strengthen and broaden the existing partnerships to enable agroecology and safe food system transitions.

In May 2020, APAARI signed a Consortium Agreement to work directly with 17 partners to implement this project. These partners are as follows:

- GRET – Professionals for Fair Development
- CIRAD
- National University of Laos (NUoL)
- Institute of Technology of Cambodia, (ITC)
- National Institute of Animal Sciences (NIAS)
- Vietnam Academy of Agricultural Sciences (VAAS)
- Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD)
- International Center for Tropical Agriculture (CIAT)
- International Livestock Research Institute (ILRI)
- French National Research Institute for Sustainable Development (IRD)
- PIN-Educational and Scientific Services for the University of Florence (PIN)
- University of Hohenheim (UHOH)
- University of Bern
- Stiftelsen The Stockholm Environment Institute (SEI)
- Swisscontact
- Mediaseeds
- Louvain Cooperation and Eclosio

The role of APAARI in the project

Widely harnessing the potential of ASSET entails a broad-based capacity development and outreach processes toward raising awareness and actions to mobilize diverse stakeholder groups. These groups include farming communities, service and input suppliers and extension agents, as well as consumers and citizens to help shift agricultural and food practices, and demand for changes. They also include researchers, professors and students to revisit agricultural and food research agendas and university curricula. Policy makers are an important group to feed ASSET results into policy development. Finally, development practitioners need to adapt their support to innovation processes. Under this general ambition, APAARI will implement specific activities to ensure communication and outreach of the project outcomes, aligned with the actions plans of the stakeholders of the Agro-ecology Learning Alliance in South East Asia (ALISEA).

Working closely with all ASSET partners, APAARI's key role in the project will be the coordination of the design and implementation of the ASSET communication and outreach strategy. This will include the development of various communication tools and processes to ensure wide-scale dissemination to promote exploitation of agroecological practices in Southeast Asia and beyond. With its regional focus, APAARI will facilitate participation of APAARI members in targeted knowledge-sharing and capacity development programmes of ASSET, and also participation of ASSET's stakeholders in key APAARI-supported regional events of importance to the project. It will also deliver a number of capacity development focused on development of functional capacities of ASSET partners, including face-to-face training and webinars. Lastly, APAARI will participate in broad-based outreach processes focusing on raising awareness of policy makers to feed into policy development.

Read more:

ALiSEA

University professors learn from experts on the role of experiential learning in preparing students for complex challenges

A Webinar on Experiential Learning in Agricultural Education was organized on 2 June 2020 as a collaborative initiative of the Kellogg Foundation Project on Transformation of Higher Education implemented by the Global Confederation of Higher Education Associations for Agricultural and Life Sciences (GCHERA), and Asia-Pacific Association of Agricultural Research Institutions (APAARI). The American University of Beirut (AUB) – the project coordinating partner – brought together four speakers from around the world, including Canada, Costa Rica and Lebanon – and facilitated the webinar together with APAARI.

"We do not learn from experience. Rather, we learn from reflecting on experience, said Prof. BouJaude, quoting John Dewey.

Around 250 university professors from around the world, mostly from the member universities of APAARI, participated in the webinar to get inspired about current practices in experiential learning applied in various universities aiming

Prof. Michel A. Wattiaux from the Department of Animal and Dairy Science, University of Wisconsin-Madison, USA, explaining the roles of learners and instructors in the learning process

to address agriculture and food security issues through education of youth.

Dr. Roula Bachour, Project Manager of the Transforming Higher Education Project, AUB, introduced the project that aims to introduce five key elements of success in higher education namely: experiential and participatory learning, community engagement, social entrepreneurship, ethical and value-based leadership, and conflict resolution through dialogue. The objective is to transform higher education in selected universities in Mexico and Haiti as the main focus, but universities from other regions, e.g. the Tamil Nadu Agricultural Universities, are part of the initiative.

Prof. Saouma BouJaude from AUB presented the theoretical foundations and objectives of experiential learning. Referring to several important foundational scholars of experiential learning, he presented a theory of the process of acquiring knowledge as a dynamic cycle composed of four modes of learning namely: experiencing, reflecting, thinking, and acting in a recursive manner. He also underlined constructivism, learning styles, and adult learning, as important factors contributing to experiential learning.

Prof. Daniel Sherrard from Earth University discussed the implementation of experiential learning, particularly in getting the faculties involved. He outlined the qualities of agricultural professionals that the future needs, including solid leadership, strong positive values and ethics, excellent communication, teamwork, solid technical and scientific knowledge, management skills, and commitment to social development and environmental conservation. He suggested that to get the faculty on board, the most critical step is to clearly articulate that this in not just a priority, but a requirement.

Prof. Michel A. Wattiaux from the Department of Animal and Dairy Science University of Wisconsin-Madison, USA, focused on the roles of the learner and instructor in the learning process. Learners can make predictions, generate options, but must also have experience to engage in observation, conceptualization, and experimentation. On the other hand, instructors must play multiple roles to motivate learners. The instructor therefore must be a content expert to ensure that learners have a proper mental model, a standard-setter to shape learners' work, and a coach to help learners improve their skills.

Prof. Frank Robinson from the Department of Agricultural, Food and Nutritional Science of the University of Alberta, Canada, highlighted examples of experiential learning in animal agriculture that help broaden students' horizon in research and practice. He particularly highlighted 'out-of-the-box' processes, such as using "drama" presentations, agricultural speed dating between students and farmers, and role-playing designed for groups in developing a farm. These approaches were proven effective and the engagement of students is very high.

The number of questions to the presenters showed enormous interest of the participating universities in the topic. After the webinar, the organizers collected feedback from the participants on suggestions for future webinars related to universities, which will be prioritized and integrated in AUB's and APAARI current work plans.

Those who missed the webinar and are interested in the topic can watch it and see the presentations at the following link:

Experiential Learning in Agriculture Education

Importance of web platforms and online communication for APAARI

In line with its vision and objectives of strengthening agri-food research and innovation systems in Asia-Pacific, APAARI values the significance of effective communication to attain the impact of its programmes, projects and activities. By adopting the latest web platforms, APAARI continues to engage its community, particularly in the face of COVID-19, which has challenged any face-to-face knowledge sharing and communication.

This year, APAARI organized two major webinars on: (i) the Asia Pesticide Residue Mitigation Project; and (ii) experiential learning, both using a cloud video conferencing tool. At the same, it held various thematic meetings with staff and partners in the context of the ongoing travel restrictions and social distancing. APAARI continues this way of doing its business, constantly employing and enhancing its role as a facilitator of networking, advocacy, capacity building, and partnerships among its members, partners and other stakeholders in this very challenging situation.

A paradigm shift

In the past several years and to date, APAARI has charted

communication strategies that steered significant transformation from face-to-face and print-based media to contemporary web-based practices to foster impact on agricultural research and innovation systems. All APAARI publications are available in a public online library, an online contact database is used for targeted information dissemination within the APAARI Community, as well as web 2.0 applications and cloud video conferencing tool. These tools have proofed their potential and capability for outreach and engagement even before COVID-19, and have been widely used by different development organizations.

Indeed, adaptation to online media leads to improved opportunities for knowledge workers, their partners, clients and other stakeholders. However, it also poses challenges to some stakeholders in Asia-Pacific related to infrastructure. Connectivity stands as a crucial challenge. Often, webinar efficiency may benefit only those with technologically-advanced locations of the region. Fortunately, in its work with its research and science community in Asia-Pacific, APAARI has only experienced these kinds of challenges to some extent.

The benefits of services

Webinars have become a convenient and cost-effective vehicle to engage agricultural research stakeholders from anywhere in the globe, as compared to physical meetings. They allow participants to communicate and share a variety of information via real-time interactions. This can lead to increased efficiency mainly in the decision-making and project-related processes, but also capacity development as the APAARI-supported webinars have demonstrated. More importantly, webinars contribute to environmental protection as they reduce the amount of carbon in the environment brought by traveling and printed media.

The availability of web platforms is vital for APAARI to keep pace in supporting its members, partners and other stakeholders in strengthening their agri-food research and innovation systems. These platforms can be a real catalyst for change when utilized effectively, as they ensure enhanced participation and engagement leading to collaboration and collective decisions making. APAARI has been and will be optimizing their use – before, during and post-COVID 19.

Read more: Transforming Higher Education Project

Enabling policies, public awareness and acceptance of gene editing: Need of hour for Asia-Pacific countries

Gene editing refers to making specific targeted changes in the genome of an organism, be it insertion, deletion, modifications or replacement of sequences. In case of insertion and replacement, the sequence/fragment can be from the same (cis) or different (trans) species. Gene editing is done using engineered endonucleases that mainly belong to four categories: meganucleases, zinc finger nucleases, transcription activator-like effector-based nucleases (TALEN), and clustered regularly interspaced short palindromic repeats (CRISPR/Cas9) system. Since 2012, CRISPR-Cas has been the most favoured system for gene editing. On 17 December 2015, the journal Science voted Crispr-Cas9 'Breakthrough of the Year', saying that it had “matured into a molecular marvel”. Gene editing (SDN1 and 2) does not introduce any foreign DNA. Instead, it modifies existing genes in a precise manner, in contrast to large and random genetic changes caused by chemical mutagenesis. Therefore, the genes are indistinguishable from conventionally bred plants’ genes. Hence, they need regulations and governance that optimizes the promotion of the technology with its safe and sustainable use.

To promote and harness the full potential of any new technology, enabling policies, public awareness and public acceptance are crucial. During 10-12 October 2019, APAARI, under its APCoAB programme, collaborated with the International Crops Research Institute for the Semi-

Arid Tropics (ICRISAT) and Federation of Seed Industry of India (FSII) to organize an expert meeting on gene editing. Participating experts made valuable recommendations to develop regulatory guidelines for gene-edited products that can be found here: Regional Expert Consultation on Gene Editing in Agriculture and its Regulations – Proceedings and Recommendations

In line with the above recommendations, India is in the process of development of regulatory guidelines for gene editing in plants. Other countries, such as the Philippines have taken due cognizance for developing such regulation processes. While consultations on technology regulation

are ongoing in different countries, it is essential to make the public aware of the novelty and benefits of gene editing.

Though the technology has been discussed and evaluated in academic circles, not much has been said in the public domain, other than a few international reports highlighted with negative connotations. India is a key player in the agricultural technology sector and is in dire need of new technologies to address its problems. Therefore, it is critical that the gene editing technology is well understood and accepted by the masses for harnessing its benefits in different fields of agriculture. Gene editing crops/organisms are indistinguishable from the natural population and can be considered similar as conventionally bred crops. In pursuance to develop such understanding, a project on 'Outreach and Communication Strategy for Gene Editing Acceptance in India' is being implemented at APAARI to create public awareness about gene editing. The project is using digital platforms, such as websites, Facebook, Twitter, and blogs, as well as print media for communication. These are part of a strategy for social media campaigns that includes development of infographics and social media posts, as well as a set up of a micro-blog, to create awareness regarding gene editing technology.

APCoAB is also planning to organize an international conference and webinars on gene editing. Furthermore, an online survey on public perception of gene editing is being designed. It will be conducted in selected countries of Asia where substantial investments in research on gene editing is being made, and as a result many gene-edited products are likely to be in the pipeline for release in near future. The survey results will feed into the development of a policy document to influence the gene editing regulation policies in Asia-Pacific countries for the benefits of smallholder farmers.

APAARI engages in a new partnership to strengthen research-extension linkages to improve agricultural innovation in Asia-Pacific

APAARI has recently engaged in an important partnership thanks to its active participation in the Tropical Agriculture Platform (TAP) hosted by the Food and Agriculture Organization of the United Nations (FAO). Building on its experience in promoting the Common Framework on CD for AIS under the TAP, APAARI has been included as one of the regional partners in the project "Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform (TAP) framework."

In this project, APAARI will partner for the first time with the Asia-Pacific Islands Rural Advisory Services Network (APIRAS), which implies that the two partners will bring research and science closer to extension and practice. Working at the regional level, APAARI and APIRAS will jointly conduct a joint rapid appraisal to asses and document the Asia-Pacific region's landscape for strengthening agricultural innovation processes. Both organizations have been engaged in close discussions on the methodology and planning for the assessment.

APAARI-CAAS-FAO laid foundation for a partnership in research and capacity development

The Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the Chinese Academy of Agricultural Sciences (CAAS) entered in a partnership with FAO to strengthen capacity of CAAS team of researchers to conduct an integrated assessment of AIS in China. The assessment will follow the Guidelines for Assessing AIS developed by FAO and partners of the TAP. The assessment, which includes structural, functional and enabling environment analysis of AIS in China, will first be implemented in one pilot province, providing recommendations on strategies and priorities to respective NARS and government bodies in China, to help address the challenges and gaps facing AIS.

While the planned activities have been postponed due to the outbreak and spread of coronavirus, the APAARI-CAAS teams have been working virtually to prepare a work plan and guidelines for the scoping study, plan webinars and training with the CAAS team to initiate the assessment. The outcomes of the scoping study and planned interviews with AIS stakeholders will feed into the AIS diagnosis focusing on system-level factors, such as agency-structuration (e.g. actors, institutions, interactions and infrastructure), functions (e.g. knowledge development and diffusion, resource mobilization, guidance of the search for innovations, market formation, entrepreneurial activities and experimentation, and creation of legitimacy), as well as enabling environment.

The main part of the study will identify entry points, integrate multiple system perspectives, and synthesize them into a model that can describe and predict various ways in which the AIS might react to policy change. Furthermore, an important part of the study will be assessing the contribution of agricultural innovations to development outcomes and the Sustainable Development Goals (SDGs). These strategies will account for real world complexities dealt by Chinese agriculture, and other important economic sectors of China. The findings will be validated and consulted with key stakeholders, based on which an innovation profile and other documentation is envisioned.

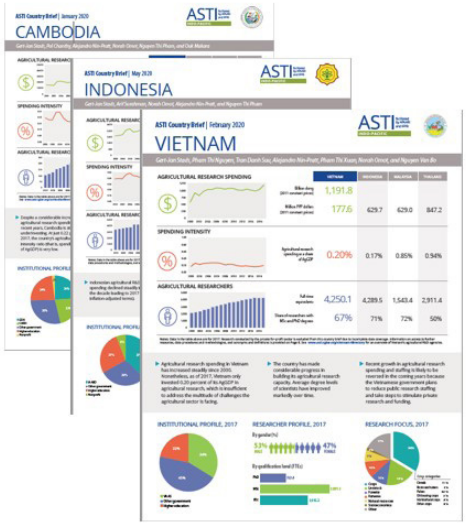
In addition to the expected outputs, the applied process for the assessment and use of FAO guidelines is extremely important to strengthen collaboration, knowledge-sharing and learning capacities for innovation of both APAARI and CAAS, and their key stakeholders. More importantly, the assessment will promote mindset shift of decision and policy

makers that is urgently required by the complex, dynamic and rapidly changing agri-food systems. Such a shift can improve the prospects for successful policy outcomes by enabling policy makers to better understand the behavior of the complex and dynamic AIS in China, and the way it contributes to the country's economic performance.

Though the assessment has been postponed due to the COVID-19 , FAO, APAARI and CAAS are involved in close communication and discussions on the planned assessment.

Progress of the Agricultural Science and Technology Indicator Project (ASTI)

Since the launch of the activities of the Agricultural Science and Technology Project (ASTI) in Southeast Asia and the Pacific in December 2017, this project funded by the Australian Centre for International Agricultural Research (ACIAR) and implemented by APAARI and the International Food Policy Research Institute (IFPRI), achieved a lot.
A well-functioning network of country focal points was established; and detailed agricultural research investment and capacity data was collected from roughly 400 individual research agencies across the region. Its analytical research agenda focusing on issues related to agricultural research investment and capacity was implemented. Key stakeholders and policy influence pathways were also mapped to ensure that the outcomes of all this work can be effectively disseminated and form an important input into policy decision making processes.



ASTI Country Briefs

All this hard work is finally beginning to pay off. Data collection and analysis in the region is now complete, and the first set of country outputs has been developed. Overall, the data reveal that Southeast Asia has made considerable progress in building and strengthening its agricultural research and development (R&D) capacity since the year 2000. All countries in the region reported a rise in the number of agricultural researchers, considerable improvements in researcher qualification levels, and increased involvement of women in agricultural R&D.

Nonetheless, important cross-country differences remain. The Malaysian and Indonesian research systems employ a substantially higher share of researchers with PhD degrees, compared to those in Cambodia, Lao People's Democratic Republic (PDR), Myanmar, and Papua New Guinea (PNG). In Indonesia and Thailand, large numbers of highly qualified researchers will retire in the next few years, while research

Myamar online country page

agencies in Cambodia, Lao PDR, Myanmar, and (to a lesser extent) Vietnam, are staffed by much younger—albeit lower qualified and less experienced—researchers. However, with well-targeted on-the-job and formal post-graduate training (and funding to match), these countries are strongly positioned to build a highly qualified pool of scientists serving a wide range of domains for decades to come.

In contrast to agricultural researcher numbers, the region's agricultural research expenditures have remained relatively stagnant over the past decade. Rapid increases in spending in Cambodia, Myanmar, and Thailand were offset by sharp declines in Indonesia. In Malaysia and Vietnam, spending levels have remained fairly stable (in inflation-adjusted terms), while Lao PDR and PNG reported significant year-to-year fluctuations, often as a result of a volatile influx of donor funding.

While regional agricultural research investment has plateaued, agricultural output has shown considerable growth over time. As a result, Southeast Asia's agricultural research intensity (that is, agricultural research spending as a percentage of agricultural GDP) has steadily declined from about 0.5 per cent in 2000 to just 0.3 per cent in 2017. Country-level ratios range from only 0.06 per cent in Myanmar to 0.94 per cent in Thailand.

These and many other findings have been published in a series of ASTI country briefs for Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, PNG, Philippines, Thailand, and Vietnam. In addition, all the underlying country-level data

can be accessed on interactive country pages, a regional benchmarking tool, and a data download tool on the ASTI website. More detailed institute-level data will be posted on the country pages soon!

APAARI and IFPRI are currently working on a regional analytical report that assesses regional trends in agricultural research investments, capacity, and outputs. It also assesses the overall performance of Southeast Asia's agricultural research systems; and future agricultural productivity growth projections based on a set of alternative R&D investment scenarios. This important report will be released in the coming weeks and will be shared with all APAARI members, partners and other stakeholders.

News Update from NARS

Agricultural Research, Education and Extension Organization (AREEO)

Research on Growth of Quinoa in Iran

Since 2014, the National Salinity Research Center (NSRC) of Iran has been evaluating the adaptation and salinity tolerance of quinoa, aiming to increase efficiency and farmer's income in salt-affected environments.

In Iran, there are 28 different agro-climatic conditions. Firstly, the effect of sowing date on phenological stages and seed yield of quinoa was determined in every agro-climatic zone. Based on the phenological stages, heat unit and sensitivity of each growth stage to temperature, the best sowing date of quinoa was predicted for different climatic conditions. These results were evaluated under field conditions in different agro-climatic environments.

Additionally, the NSRC's team evaluated salinity tolerance of the accessions. The preliminary results showed that 5 out of 20 tested accessions have high salinity tolerance. These accessions were evaluated at different salinity levels from emergence up to harvest under field conditions.

The results showed that these genotypes can tolerate 4.8 up to 8 dS/m based on soil salinity (ECe) with a slop of 0.77 up to 3.53 per cent, and that at the salinity level of 25 dS/m, three genotypes could reach 80 per cent of their yield potential (research founded by Iran National Science Foundation, NO.96002543, unpublished data).

The most sensitive growth stage of quinoa to salinity is field emergence. It is very sensitive stage to salinity threshold of quinoa, which was 8 dS/m. After germination, seedling emergence decreased by 9.5 per cent with every unit of increased soil salinity (ECe). However, under laboratory condition, germination occurred up to 40 dS/m in petri dishes.

Quinoa lines with different commercial colour

A consequent experiment on adaptation of five quinoa genotypes with different flowering time and maturity showed that quinoa could be cultivated under three Iranian agro climates, namely: central Plateau with very warm summers and cool winters, where quinoa could be cultivated at the end of summer up to mid-autumn (Env.1); in the south of Iran with mild winters, where it can be cultivated as a winter crop (Env. 2); and in northern regions of Iran with mild summers it would be possible to grow quinoa as a spring crop (Env. 3).

Each climate requires different breeding objectives for quinoa. In Env. 1 and Env.3, early maturity and tolerance to drought and salinity are very important. In Env. 2, accessions with later maturity can be cultivated but in addition to abiotic stress, mildew resistance is an important breeding objective. NSRC introduced four lines with different commercial colour (red, white and black) for different agro-climatic conditions.

Quinoa plants at grain filling period

In 2019, farmers started cultivating black, white and red seed lines of quinoa. NSRC conducted another joint project entitled "Investigating Performance of Quinoa to Improve Economic Water Productivity in Salinity-affected Low Rainfall Areas of Iran" with the International Center for Agricultural Research in the Dry Areas (ICARDA), in the frame of IRAN-ICARDA Work Plan 2018-2020.

In this project, 440 accessions of quinoa were divided into four different maturity groups, and evaluated under

different environmental conditions. Since introducing a new crop needs optimization of agronomic practices, fertilizer requirement, and weed and pest management, a network was formed with different institutes under the umbrella of the Agricultural Research, Education and Extension Organization (AREEO) to identify the best management practices for quinoa.

The Ministry of Agriculture of Iran together with AREEO started farmer training on quinoa cultivation, with promising results especially for farmers operating under saline condition. In 2019, 700 ha were cultivated with quinoa, and the seed yield was 0.5-5 t ha-1 with an average of 1 t ha-1.

The aim of the ongoing programme of the Ministry is to extent quinoa cultivation to 30,000 ha of land, and increase its yield up to 2 t ha-1 in farmer's field in 2022. Three private companies have constructed quinoa processing and seed sorting machines to produce different products like cookies, bread and pasta from quinoa seeds.

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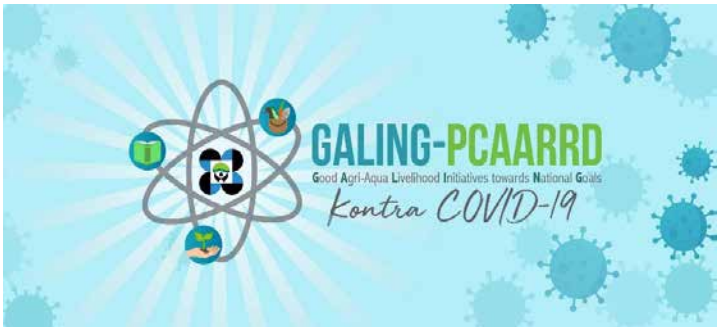
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)

Enhancing food security and livelihoods through 'Good Agri-Aqua Livelihood Initiatives towards National Goals (GALING)' programme in the Philippines

Mid-March of this year was when normal life of the Filipinos halted. Everyone was concerned about health, safety, income, and more than anything, food availability. Along with health, pressure was mostly felt in the agricultural sector, as food provision has been demanded amid the crisis brought about by the Coronavirus pandemic.



Responding to food and livelihood needs of the Filipinos, the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD) launched a programme titled 'Good Agri-Aqua Livelihood Initiatives towards National Goals Kontra COVID 19' (GALING-PCAARRD).

IEC materials on vegetable production (Source: M. A. Carlos, PCAARRD)

'GALING' is a Filipino term, which means 'healing' (from COVID-19) and 'excellence', which resonates with PCAARRD's tagline, "Excellence in AANR innovations". Pronounced with a slow accent, 'GALING' also means 'from', denoting that the programme's technology offerings come from various research and development (R&D) initiatives of PCAARRD. GALING-PCAARRD is a nationwide inter-agency collaboration among member agencies of PCAARRD's 15 Regional Consortia. The programme has three components:

1. ***Teknolohiya-Kaalaman para sa Pamayanan*** highlights technologies and information captured in PCAARRD's 'Information, Education, and Communication (IEC)' materials, as well as multi-media materials, shared through various knowledge sharing platforms.

Aiming at food security, communities need to be empowered with information on plant, animal, and fish food production technologies. In early stage of the campaign, PCAARRD provided printed and electronic copies to the Department of Agriculture-Bureau of Plant Industry (DA-BPI), as accompanying materials for its vegetable seed dispersal under the 'Plant, Plant, Plant' programme.

For wider outreach, PCAARRD utilizes its website, electronic library and social media platforms to disseminate instructional materials that the public can use for planting, animal-raising, or fish farming. It also conducts virtual pressers and webinars.

2. ***Lingkod Alalay sa Pamayanan*** is an initiative to distribute food products from PCAARRD-supported projects to frontliners and communities affected by COVID-19. These projects include: Science and Technology Community-Based Farms (STCBF); Science for the Convergence of Agriculture and Tourism (SciCAT); Agri-Technology Business Incubators (ATBIs), and 'Itik' (duck) for Life Program.

Relief operations in the context of COVID-19 led by the Office of the Vice President for Academic Affairs and ATBI, Benguet State University (Source: Ruth C. Diego, BSU)

Examples of food products given in selected provinces in different regions were: oyster mushrooms, milled rice, packs of vegetable seeds for planting in Region 1; fresh fruits and vegetables in Cordillera Region; papayas and other fruits in Cavite (Region 4A); duck eggs and other food products in Sultan Kudarat (Region 12); and duck eggs (boiled, salted, and balut) in Region 11.

A specific example is the ATBI Project in Region 3 that distributed bottled calamansi juice for the frontliners in Manila; white and brown oyster mushroom spawns in Baguio City (Cordillera Region), Pangasinan (Region 1), Bulacan, Pampanga, Tarlac (Region 3), Bukidnon (Region 10), Cebu, Bohol (Region 7), and Lanao del Norte (Caraga Region). ATBI also distributed disinfecting and cleaning materials, such as liquid handwash, dishwashing liquid, liquid detergent, and all-purpose cleaner infused with extracts from lemon peelings.

Distribution of various food and non-food products is still continuing in selected provinces in other regions for the benefit of the frontliners and affected citizens in these areas.

*3. **Pagkain at Kabuhayan sa Pamayanan*** aims to equip communities and households to be self-sufficient. Communities will have access to technology and livelihood options that will allow them to undertake urban and community/backyard vegetable gardening; village-scale meat and eggs production system, backyard tilapia farming, and other options. The three initiatives under GALING-PCAARRD will be available to the regions from June 2020.

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Read more: http://www.pcaarrd.dost.gov.ph/

News Update from Higher Education Institutes (HEIs)

CSK Himachal Pradesh Agricultural University (CSK H.P.)

CSK H.P. Agriculture University in India doubled its wheat breeder seed production

"The efforts of CSK H.P. Agriculture University situated at Palampur in Indian state of Himachal Pradesh (H.P.) to make the state self-sufficient in wheat seed production have achieved a major breakthrough" said in a press conference Professor Ashok Kumar Sarial, the university Vice-Chancellor. He told that the university planning of the last three years have yielded positive results. During the current rabi season, the university is expecting to harvest 30,000 kg breeder seed of improved wheat varieties from its Seed Production Farm at the main campus, which is double compared to 2016.

University Vice-Chancellor and scientists visiting the seed production farm of CSK H. P.

The Department of Seed Science and Technology of the university is producing breeder seed of five wheat varieties: HPW 236, HPW 249, HPW 349, HPW 360 (Him PalamGehun 1) and HPW 368 (Him PalamGehun2). These varieties are recommended for cultivation on the 350,000 hectares of total wheat area in the state. The productivity of these high yielding varieties ranges from 4.0-4.5 thousand kg/ha in irrigated and 2.5-2.8 thousand kg/ha in rainfed areas, besides possessing good quality and resistance to yellow rust. An estimated seed yield of 30,000 kg/ha is likely to be produced from the main campus this year, and a total of 60,000 kg of breeder seed from its out-station research farms.

According to Professor Sarial, the breeder seed is high in quality but low in quantity. Thus, the seed is further multiplied to foundation seed by the state Department of Agriculture on its farms, under the supervision of scientists and technocrats. In the next rabi season, the university in collaboration with the state Department of Agriculture will grow 60,000 kg breeder seed to produce approximately 1.8 million kg of foundation seed. The foundation seed is further multiplied to produce certified seed in third and last stage of multiplication on farmer's fields under the supervision of the

State Seed and Organic Produce Certification Agency. With an average production of 30,000 kg/ha, it is likely to produce 54 million kg certified seed. This is much more than the requirement of a total of 14 million kg at 40 per cent seed replacement rate for 350,000 ha area of the state under wheat.

Professor Sarial foresees the seed produced by the university as having the potential to meet requirements of the certified seed of the State, as well as generating a surplus to be supplied to other states to generate revenue. The farmers of H.P. are also likely to benefit from seed production as the seed crop fetches higher price than the grain crops, which is evident from the procurement price of INR 19.25/kg (USD 0.26/kg) for grain crop, whereas purchase price of foundation and certified seed is INR 26/kg and INR 25/kg (USD 0.34 and USD 0.33 respectively) fixed by the State Government. Thus, common farmers have opportunity to fetch premium about INR 6-7/kg (USD 0.079-0.093) by growing seed crop of wheat in H.P. that can help in enhancing their income.

Furthermore, the Japan International Cooperation Agency (JICA) is funding a INR 10 million (USD 132,440) scheme for Himachal Pradesh, which is likely to be implemented next year on vegetable crops at the university level. With the scheme, the quality of seed production on 75 hectares of land will improve and the university will be able to produce sufficient seeds of vegetables to meet the requirements of the state.

Mitigation of the effects of COVID-19

COVID-19 and related lockdown have posed a challenge on young people due to uncertainty over their academic schedules and job prospects. The university made efforts to provide an online platform to prepare students to complete their course work of the current academic year and motivate them for tomorrow's knowledge-intensive and technology-driven work environment.

However, the university has continued its Rural Agricultural Work Experience Programme (RAWE) in villages and internship in Veterinary Hospitals of the final year for agriculture and veterinary students to enable them to complete their degree programmes in time. It also released admission notification and acceptance of online applications for ensuing academic session as per the schedules of the University Grants Commission (UGC) and Indian Council of Agricultural Research (ICAR).

In addition, the university has kept in touch with its farming community through print, electronic and social media tools to advise them on harvesting of rabi season (November-April) crops, with all COVID-19 preventive measures. The Vice-Chancellor himself took initiatives to prepare detailed crop advisory and also recorded a video messages for them. The farmers were also given timely advice on field preparation and sowing of kharif crops. On top of that, the university has also submitted research projects worth INR 11.5 million (USD 152,337) to funding agencies to set up a COVID-19 testing facility.

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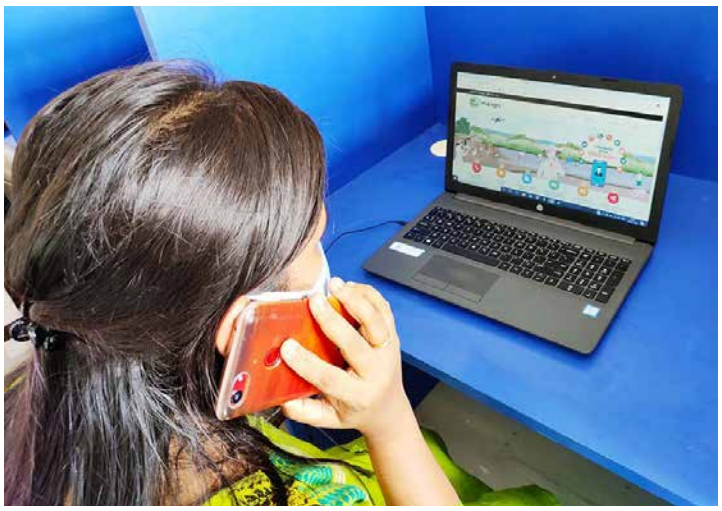
Central Agricultural University, Imphal (CAU)

Matsya Varta: An innovation towards advisory services to fish farmers of Tripura, India during COVID-19

The north-eastern state of Tripura in India, with its vast in-land fishery resources, offers tremendous scope for developing the fisheries sector. The state is having abundant fisheries resources as water bodies consisting of lakes, rivers, tanks, ponds, and reservoirs. However, the production is still low with respect to the demand for fish as the per capita fish consumption in state is the highest in India. The lack of intensive extension activities and fast dissemination of farm information restrict the optimum exploitation of production potential of the state fisheries. The availability of and access to mobile phone by fish farmers in the state provides an opportunity to develop a fishery-based mobile agro-advisory module. Hence, the project entitled 'Mobile Based Agro-Advisory System in Tripura (Matsya Varta)' was initiated in collaboration with the College of Fisheries, Central Agricultural University (CAU Imphal), Lembucherra, Tripura and Digital India Corporation (DIC), New Delhi, with financial assistance from the Ministry of Electronics and Information Technology (MeitY), Government of India.



Dissemination of advisory by an expert from the Agro-Advisory Laboratory

The broad project objective is to empower fish farmers by providing right information at the right time through a mobile-based agro-advisory system. The project aims to provide pull- and push-based agro-advisory services to fish farmers in selected districts and to customize the

Project farmer receiving advice on his mobile phone

mobile-based agro-advisory system for fisheries in hilly region by using a platform called 'Interactive Information Dissemination System (IIDS)' developed by DIC, New Delhi.

The region's fish farmers started the preparatory activities for in-land fish farming in April 2020, and begun with the onset of monsoon during May 2020. The fish farmers have been struggling to gather necessary farm information and advisory services this year due to COVID-19 and subsequent lockdown. It has made mobile-based agro-advisory services more pertinent as conventional approaches of agro-advisory services and extension activities cannot be continued in full swing. During the pandemic period, 2,742 farmers from the project districts have been registered in an interactive voice response system (IVRS) through telephonic call in toll-free number, and 769 advisories have been provided to the farmers in their mobile phone by the experts. Outbound calls have been made during the period for awareness and sensitization of the farmers about the project and as precautionary measures against COVID-19.

Moreover, farm advisories in the form of text and voice messages, and awareness messages for installation of *Aarogya Setu* App, developed by the Government of India to fight against pandemic, have also been made available. The COVID-19 advisory issued by the Government of India and State Government of Tripura for farmers and farming sector during the lockdown period and other farm advisories recommended by CAU, Imphal, have been included in Google Drive as online resource materials. A link has been shared as a push message for several times to the registered farmers.

Matsya Varta is an innovative approach that has been helping fish farmers in accessing necessary farm information to mitigate the recent crisis.

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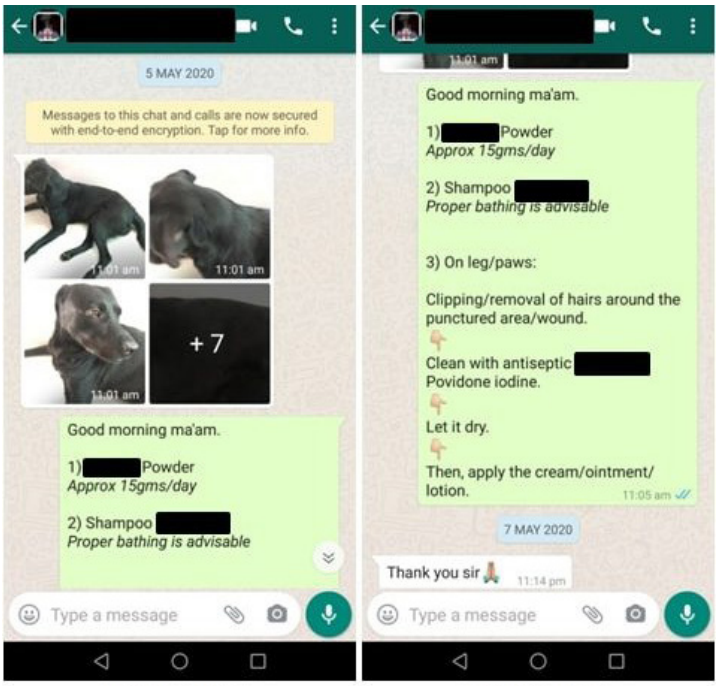
Kamdhenu University (KU)

Use of telemedicine by staff of Veterinary Hospital, Kamdhenu University, Gujarat, for veterinary services during COVID-19 lockdown

Animal husbandry is emerging as a separate economic sector considering its contribution to the Indian economy. However, the economic aspects of animal husbandry depend on animal health and production where veterinarians play a crucial role. Veterinarians are essential service providers and are working tirelessly at veterinary polyclinics, hospitals and mobile veterinary units governed by State Animal Husbandry departments; private clinics and also in veterinary hospitals of educational institutes under veterinary and agricultural universities. One important aspect associated with this



05/05/2020 (Date of First Communication) **07/05/2020 (Response after 2 days)**

Teleguidance for a case of coat shedding, superficial pyoderma and minor wound on leg/paw in a Labrador Retriever

service is propinquity of veterinarians to different animals, which can lead to accidental transmission of zoonotic infections. Therefore, utmost care needs to be taken while treating cases of all animal species. Despite such risk factors, veterinarians continue to serve the society during COVID-19 pandemic. The COVID-19 appears to leave variable impacts on the veterinary profession and veterinary professionals, including those involved in private veterinary practice,

veterinary hospitals, dairies and teaching veterinary hospitals of veterinary educational institutes. Medicinal treatment or surgical management of cases brought and/or referred to veterinary hospital is a common practice. However, the COVID-19 pandemic has also created an opportunity to practice 'Telemedicine'.

'Telemedicine' is the use of telecommunication media for remote diagnostics and therapeutics in veterinary patients. The use of telemedicine results in effective outcomes especially for mild cases (e.g. alopecia/coat shedding in dogs, and minor injuries). This practice also encourages 'teleguidance' by veterinary practitioners and academicians by communicating with: (i) distant professional colleagues regarding veterinary care in clinical cases at their respective place of work (e.g., veterinary academicians can provide guidance to junior veterinarians regarding treatment of sick wild animals in protected areas and zoos); (ii) para-veterinary professionals for primary veterinary care (e.g. guidance to livestock inspectors or veterinary assistants for treatment of minor injuries in stray animals); and (iii) students and their parents regarding education in veterinary science (e.g. admission to veterinary colleges and para-veterinary teaching institutes).

The Veterinary Hospital under the Postgraduate Institute of Veterinary Education & Research (PGIVER), Kamdhenu University, is located at Rajpur (Nava) of Himmatnagar, Gujarat and is providing free services to animal owners from urban and rural areas (for all mammalian, avian and reptilian species) since its inception in April 2018. Noticeably, the nation-wide lockdown measures were implemented in India after 23 March 2020 due to the COVID-19 pandemic. Hence, the frequency of case registration at the hospital was expected to decrease due to strict implementation of lockdown in nearby villages, restricted movement of people and cooperation of villagers with government authorities to prevent transmission of COVID-19.

Besides management of emergency cases at the hospital by staff on requirement-basis, an emphasis was also placed on the use of telemedicine for veterinary services. Common social media platforms (such as Whatsapp and Facebook), as well as other modes of telecommunication (e.g. phone calls) were used more than 135 times for telemedicine under different categories of veterinary services between 23 March and 28 May 2020.

For example, a case of coat shedding, superficial pyoderma and minor wound on leg/paw in a Labrador Retriever dog was provided with teleguidance on the use of medicines and antiseptic dressing of wound through Social Media, which showed clinical improvement within two days of teleguidance as reported by the owner.

It is noteworthy that the use of telemedicine in veterinary practice during the time of COVID-19 resulted in benefits, such as improvement of clinical status in mild cases without patient's visit the hospital, reducing contact between animal owners and veterinarians or staff of hospital, and prevention of economic loss associated with travelling to veterinary hospital for mild cases. This experience showed that the use of telemedicine should be encouraged as a routine practice at veterinary hospitals.

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Further reading: www.aaha.org

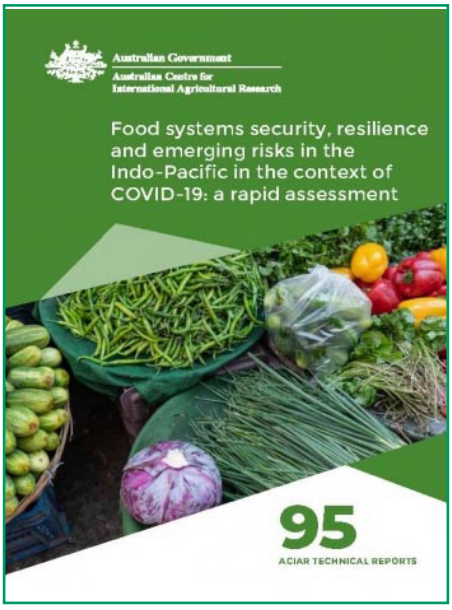
News from International Agricultural Research Centers

Australian Centre for International Agricultural Research (ACIAR)

Food systems security, resilience and emerging risks in the Indo-Pacific in the context of COVID-19: a rapid assessment

The Australian Centre for International Agricultural Research (ACIAR) has conducted Stage 1 of a three-stage assessment process on the impacts of COVID-19 pandemic on food systems security, resilience, and emerging risks on smallholder farmers in the Indo-Pacific region. The report covers a period between 20 April – 8 May 2020 by a team of authors consulted, ACIAR staff, and ten country offices in the aforesaid region, together with experts on Policy Advisory Council, project leaders, and International Agricultural Research organizations. The report can be downloaded here:

Rapid Assessment Report ACIAR



International Centre for Integrated Mountain Development (ICIMOD)

Will a hunger pandemic follow in the mountains?

In mid-March, as governments scrambled to contain the spread of the COVID-19 pandemic, banning flights, halting surface transport, and announcing nationwide lockdowns, millions of daily wage earners and migrant workers suddenly found themselves stranded, jobless, without income, food, and shelter. A large number of them are migrant workers from the mountains. With transportation suspended, they could neither return home nor remit funds to their families. Many poor mountain households suddenly found themselves food insecure, with no remittances and little or no access to food supplies and markets.

With remittances drying up and disruptions in supply chains as a result of the COVID-19 lockdowns, mountain communities fear a slide back into poverty. (Photo: Jitendra Bajracharya/ICIMOD)

Food security in the mountains has been a matter of concern with agricultural productivity in steady decline over several years. This is one of the major reasons for high outmigration and many households have depended on remittances to lift them out of poverty and food insecurity. With remittances drying up and disruptions in supply chains as a result of the lockdowns, food security has come back to haunt mountain households.

Many also fear a slide back into poverty. With access to essential food items seriously compromised, the present situation highlights the inadequacy of existing food access and distribution mechanisms and raises questions about the preparedness for ensuring food and nutritional security for mountain communities in the aftermath of the pandemic.

This is the very definition of precarity – the lack of predictability, livelihood security, and social safety nets that ensure material and psychological welfare. Workers driven by circumstance to leave their mountain homes in search of economic and food security have been forced to return to, as many of them describe, the relative security of their "insecure" villages.

Hunger and malnutrition in the HKH

The majority of mountain farmers are engaged in subsistence agriculture and dependence on the plains for food supplies ranges between 30% and 60% in the Hindu Kush Himalaya (HKH). This reliance has increased over time and is driven to a large extent by changing dietary habits and preferences for processed foods and other staples. On the other hand, mountain communities are increasingly giving up on cultivation of traditional crops that are highly nutritious and are much sought after in the plains. The result is a very high incidence of food and nutrition insecurity across the HKH. The Hindu Kush Himalaya Assessment report revealed that around one-third of the population in the HKH is food insecure and roughly half suffer from some form of malnutrition with severe impacts on children and women.

In mountain regions, the risk of disruption to food supplies and distribution is high even in normal times given the seasonality and increasingly frequent climate-related hazards. However, disruptions resulting from measures to contain the COVID-19 pandemic have created new risks and uncertainties, far reaching in their impacts, and a source of additional vulnerabilities for mountain communities. With the lockdown, mountain households dependent on remittances, small businesses, and daily wages find their flow of funds drying up and their purchasing power severely eroded. Mountain farmers – predominantly smallholders – find markets unreachable and are faced with the option of distress sales or outright dumping of their produce, effectively eroding the hope of returns and any cash earnings during this season. The pandemic has also hit tourism hard in mountains, leaving dependent

In remote, hard-to-reach villages, the decline in dietary diversity as a result of limited or no access to foodgrain and pulses is likely to result in increased malnutrition. (Photo: Jitendra Bajracharya/ ICIMOD)

households impoverished and food insecure and facing an uncertain future. In remote, hard-to-reach villages, the decline in dietary diversity as a result of limited or no access to foodgrain and pulses is likely to result in increased malnutrition with severe impacts on children and women. Studies by ICIMOD show that for a majority of poor rural households, foodgrain security from their own production lasts, at best, for around six months. For

many such households, mid-March to June is a lean period when food insecurity is common. Without support from public distribution systems or the means to purchase food from the market, food insecurity is a very real threat for a large section of the mountain population. Further, rural communities' access to health services in nearby urban centres is also disrupted, which can compound the impacts on their general health.

Addressing immediate needs

Upland farmers, particularly smallholders, need to start preparations for the next sowing season, and although restrictions for farming activities have been eased, farmers face labour shortages and difficulties in sourcing inputs. Land preparation, sowing, and irrigation need to start immediately, but with disruptions in transport and communication, most upland farmers expect the coming weeks to be challenging. Livestock farmers face an uphill task in arranging fodder and forage for their animals without extension services from line agencies. Any delays in the agricultural calendar will have implications for the next season's productivity and by extension, the food security of upland households in the coming year. The impact of the pandemic on food security, therefore, is not only immediate but has implications for the coming year and possibly beyond.

While direct cash transfers and food aid – the immediate response of governments – may address current food requirements of mountain communities, a stable food supply over the next year will need to take into account the added requirements from a large number of returnee migrant workers. This will require a drastic increase in procurement and augmenting existing distribution networks. This is an area where governments can mobilize the large network of community-managed institutions, self-help groups, cooperatives, and their federations, and traditional organizations in the HKH as strategic collaborators. Some have suggested setting up village-level "food granaries", managed by such groups, to decentralize public distribution and ensure access to food during such crises. This becomes critical as an urgent need – and one rapidly snowballing into a crisis – has emerged for better targeting of financial and food aid towards the returnees, wage earners, and the destitute.

Strengthening local food systems

The present crisis offers opportunities for bringing about transformative changes that promote resilience building and foster long-term sustainability of mountain farming systems. Given their painful experience with disrupted supply chains of agro-inputs, mountain farmers could be receptive to switch back to diversified cropping systems and the revival of native livestock and neglected and underutilized mountain crops (NUMCs) that require minimal external inputs and are therefore less susceptible to these disruptions. Increased R&D investment by government along

With more shocks disrupting modern supply chains, mountain farmers could switch back to diversified cropping systems, neglected and underutilized mountain crops, and native livestock, which are more resilient. (Photo: Jitendra Bajracharya/ICIMOD)

with appropriate public–private partnerships for large-scale technology deployment focused on native livestock and NUMCs will strengthen local food systems in the mountains and reduce the external food dependence in coming years, enhancing self-reliance and thereby increasing resilience of farming systems and the communities. It will also address the issues of micronutrient deficiency and overall malnutrition in the mountains. Initiatives such as that taken up by the Government of Sikkim offer a good template for promoting organic farming. A similar programme should also be encouraged across the region for promoting "safe and healthy" food from the mountains – particularly mountain niche crops – and strengthen the branding of mountain products that will help deepen markets and encourage mountain entrepreneurs.

Innovation and regional cooperation

To strengthen input support, community-led mechanisms – lead farmers, local community resource persons, and farmer field schools – need to be linked with formal extension agencies. In the mountain context, where government extension services are limited, involving local entrepreneurs in input sourcing, food storage, distribution, and extension service provisioning can further augment the sector. This is an important area that requires immediate government attention. International returnee migrants, given their proven risk-taking ability and the exposure to external economic systems and technology, will be smart enough to take advantage of enabling policies by the government and can be significant contributors to the post-COVID 19 recovery process. The financial remittances and skills of returnee migrants can be a gamechanger in this context and steps should be taken to harness this potential. Agencies should also look at IT and fintech to facilitate the linkage of farmer producer groups to urban markets. Internet penetration in the mountains is pervasive in most HKH countries and there is great potential for fintech startups and incubation centres to contribute to product development, e-commerce, online banking, and insurance.

Finally, regional cooperation among the HKH countries is key

to enhancing overall food security and insulating mountain communities from future shocks. In the immediate aftermath, governments are expected to introduce export bans on essential food items to manage their own post-pandemic food security. Concessions for neighbouring countries, especially those that are economically weak and have large vulnerable populations, will be crucial to address regional food security concerns at this time. Achieving long-term security will require relaxation of trade barriers to promote regional value chains and intra-regional trade. Similarly, research collaboration focusing on productivity enhancement in rainfed mountain agriculture, development and exchange of germplasm – a recent example being the exchange of breeding yak bulls between Bhutan, India, and Nepal – can go a long way in addressing long-term food and livelihood insecurity in mountain communities.

Authors: *Abid Hussain, Dhrupad Choudhury, Arabinda Mishra*

World Vegetable Center (WorldVeg)

Asia-Pacific seed trade reeling from COVID-19 lockdown

Severe restrictions on the movements of people and goods imposed in recent weeks are having widespread negative effects on the seed industry in the Asia-Pacific region with international seed trade particularly affected, a survey of seed companies finds.

The seed trade is highly international with large volumes of seed shipped across borders to meet farmers' demand across the Asia and Pacific region. In 2018, more than US$4.1 billion worth of sowing seed was traded in the region, constituting about 14 per cent of the global seed trade. This trade is essential for the region's food and nutrition security and economic prosperity. Yet shipments are affected by lockdowns imposed by governments across the region to stem the Covid-19 pandemic. Although many governments have since recognized seeds and other agricultural inputs as "essential items" – effectively exempting them from lockdown restrictions – seed companies have been reporting a number of supply-chain challenges.

To better understand these challenges, APSA's Special Interest Group for Vegetables and Ornamentals joined with the World Vegetable Center (WorldVeg) to conduct a survey among seed companies operating in the Asia-Pacific region. The online survey sent to seed company managers recorded their opinions on how the crisis has affected their business and identified emerging bottlenecks in the seed supply chain. Sixty-eight managers responded to the survey representing at least 48 seed companies.

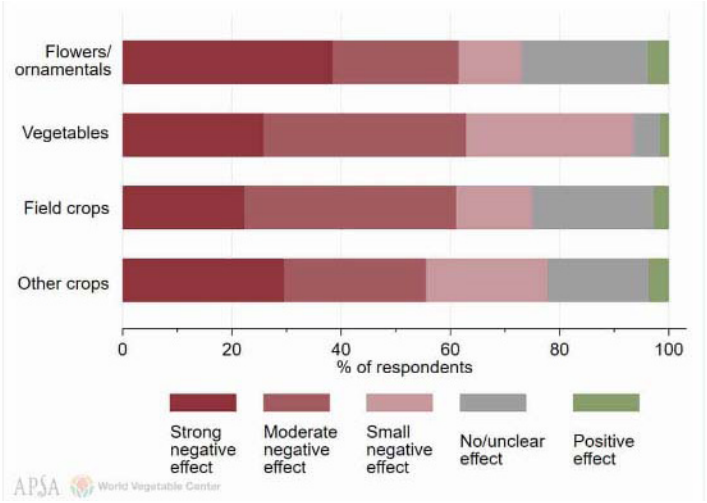


Chart 1 How has COVID-19 affected seed demand sales

How has COVID-19 affected seed demand/sales?

Of the 62 respondents involved in the vegetable seed trade, 58 (93 per cent) reported a negative effect on the demand for vegetable seed, of which 26 per cent reported a strong negative effect (see the graph below). Fewer respondents were active in flowers and field crops, and about 75 per cent of them reported a negative effect on seed demand with 38% reporting a strong negative effect on the demand for flower seed.

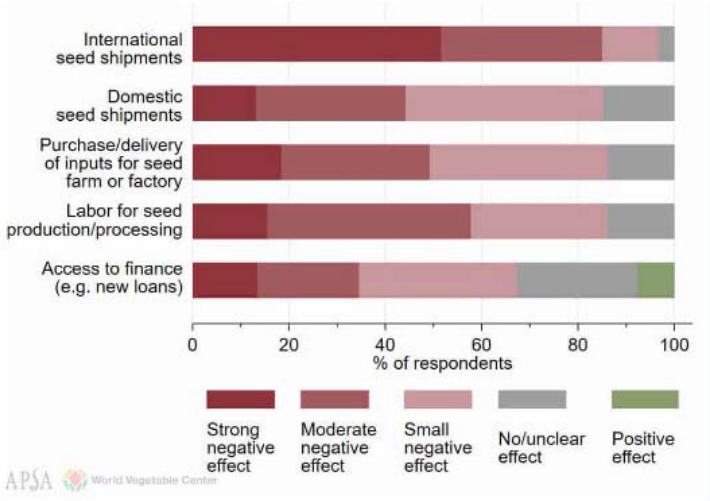


Chart 2 What aspects of your business have been affected by COVID-19

What aspects of your business have been affected by COVID-19?

The second graph shows that nearly all aspects of the seed business are negatively affected with more than 85 per cent of respondents reporting negative effects on international and domestic seed shipments, difficulties in getting inputs, and difficulties getting labor for seed production and processing. Reduced access to finance was also reported by 64% of the respondents. Yet, international seed shipments clearly appear as the most severely affected aspect of the seed industry with 52 per cent of the respondents reporting a strong negative effect.

Strong effects on the international seed trade

Zooming in on the aspect of international trade, the third graph identifies bottlenecks that have occurred in international seed shipments. The graph shows that a wide range of problems have already occurred in many aspects of the seed trade with key bottlenecks including difficulties finding freight solutions (reported by 54 per cent of respondents), reductions in new export orders (42 per cent of respondents), and difficulties distributing seed in the destination countries (42 per cent). Many respondents also reported problems getting export and import permits, phytosanitary certificates, and customs clearance. Many companies not yet affected expect that these issues will become a problem as the crisis continues. This is a concerning trend considering that most countries in the region are highly dependent on seed imports for some of their cultivated crops to ensure their food and nutrition security. The largest seed importers in the region are China, Malaysia, Pakistan, Australia, Japan and South Korea. Only Thailand, India, Israel, New Zealand and Indonesia had net surplus in their seed trade in 2018 according to international trade data analyzed by APSA (see report on page 8-9 of Asian Seed Magazine here)

Coping Strategies

Respondents emphasized the importance of continuous monitoring of the market situation and maintaining communications with customers. In addition to seeking new routes for seed shipments, some respondents recommended making advance bookings for space on vessels or flights and to negotiate transportation costs, which were reported on the rise.

Another key point emphasized was the need to seek support from concerned government agencies regarding rules and procedures for so-called "green lanes" to expedite the movement of food, seeds and other vital agricultural inputs.

Companies are increasing their use of digital platforms to facilitate the sales of seeds and related products online,

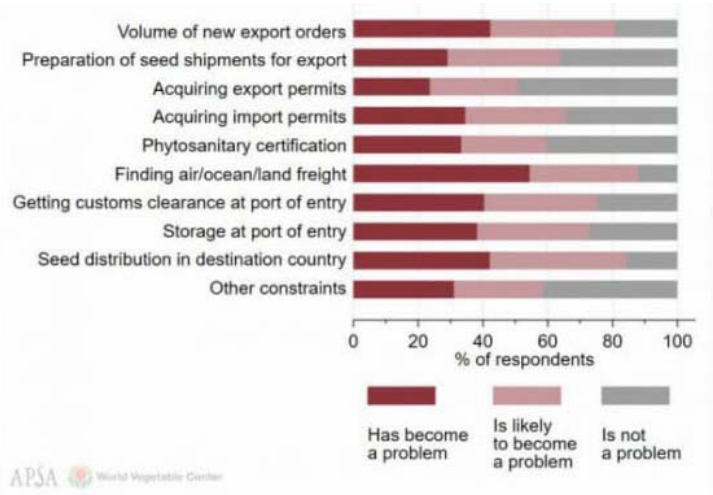


Chart 3 Strong effects on the international seed trade

while also devising promotions and incentives to stimulate sales.

Looking Ahead

As the effects of Covid-19, associated lockdowns and economic downturn are still playing out, it is too early to draw concrete conclusions from this survey. Yet, a reduction in seed demand and international seed shipments will have consequences for the region's food and nutrition security and the income of smallholder farmers. Governments can try to ease bottlenecks in the seed supply chain by exempting seed production, distribution and trade from lockdown restrictions and ensuring timely processing of import/export permits and phytosanitary certificates. It is important that bottlenecks are addressed before the upcoming seed production season and that the local situation is monitored closely.

About the Survey Sample

Responses were collected over a week-long period, from 8-14 April 2020, with a total of 68 respondents completing the survey. Full survey results and summarized responses, including country-specific comments and recommendations, can be downloaded here.

Authors: *Pepijn Schreinemachers (pepijn.schreinemachers@worldveg.org), WorldVeg; Kanokwan Chodchoey (may@apsaseed.org), Steven Layne (steven@apsaseed.org) and Weeranuch Mhadlhoo (weeranuch@apsaseed.org) Asia & Pacific Seed Association, APSA*

Young Professionals for Agricultural Development (YPARD)

COVID-19 and agriculture in Nepal

Farming in Nepal has been severely affected by the COVID-19 transmission, enforced lockdown and mandatory physical distancing. Farmers feel devastated as they are unable to harvest and market their products, which have led to a movement to dump milk, vegetables, fruits, chickens, and egg on the road.

The Ministry of Agriculture and Livestock Development of Nepal has established a digital market and declared a 25 per cent subsidy on transport of agricultural products, considering the COVID 2019 crisis. Similarly, an initiative of the "agriculture ambulance" brought in by Province-5 of Nepal for transportation and marketing of agricultural products can prove to be a real life-saver in this pandemic situation. Furthermore, the Government of Nepal has envisioned the preparedness and response plans to COVID-19 for the Fiscal Year 2020/2021.
Recently, the Agriculture and Forestry University (AFU),

On-going work during the lockdown in a seed processing unit at AFU, Nepal, Photo: Ram Hari Timilsina

Chitwan, Nepal, has prepared guidelines for online teaching and declared to adopt such practices. It may be challenging in the Nepalese context, but students, faculties, and staff have expressed their commitment to continue teaching and learning amidst the obstacles.

Moreover, to prevent COVID-19 from spreading, AFU has been producing Mugwort (Artemisia vulgaris) based hand sanitizer and distributed it to farmers and traders of university neighboring villages. To meet the challenge of short supply during the lockdown period, the AFU Farm Directorate, with the support of the Delivering Genetic Gain in Wheat Project funded by the Gates Foundation, is collecting improved seed of wheat and paddy, and selling them at a reasonable price to seed entrepreneurs.

The youth' perspective

An assessment of the impact of COVID-19 on farming is urgently needed in Nepal to explain potential food crisis, and propose solutions. Furthermore, the government should promote the use of local and improved seeds. If provinces can ensure marketing by investing in farmers' seed production, the current seed dependency on imports would be reduced.

Today, millions of Nepalese, including a large number of young people, who used to work in India and elsewhere, are returning to Nepal. This implies further increase in the demand for food and work. Loan packages at subsidized rates could spur youth and returnee migrants to be agri-entrepreneurs, which would eventually boost up the local economy and sustain food supply. Food scarcity can be minimized by the promotion and consumption of indigenous and local underutilized crops, which are abundant in Nepal.

It is vital to urgently help set up micro-enterprises, which would prioritize post-harvest technology, such as production of dry meat, frozen meat, cheese, ghee, and jam jelly to prevent wastage of surplus. The extension advisory system of both university and government need to bring farmers and agriculture experts together in a virtual platform to adopt local agricultural innovations.

Every nation should have its sustained food supply system at the local level to be resilient to any pandemic. Self-reliant and sustainable agriculture that contributes to food and nutrition security is the present need because if the farming is interrupted, there will be consequences more disastrous than the virus itself.

Authors: *Ram Hari Timilsina, Assistant Professor, Agriculture and Forestry University, Nepal; rhtimilsina@afu.edu.np and Dinesh Panday, Communications officer, YPARD Asia and Pacific; Email: asia@ypard.ne*

New Member Profile

Agricultural Biotechnology Research Center (ABRC), Academia Sinica, Taiwan

Brief History

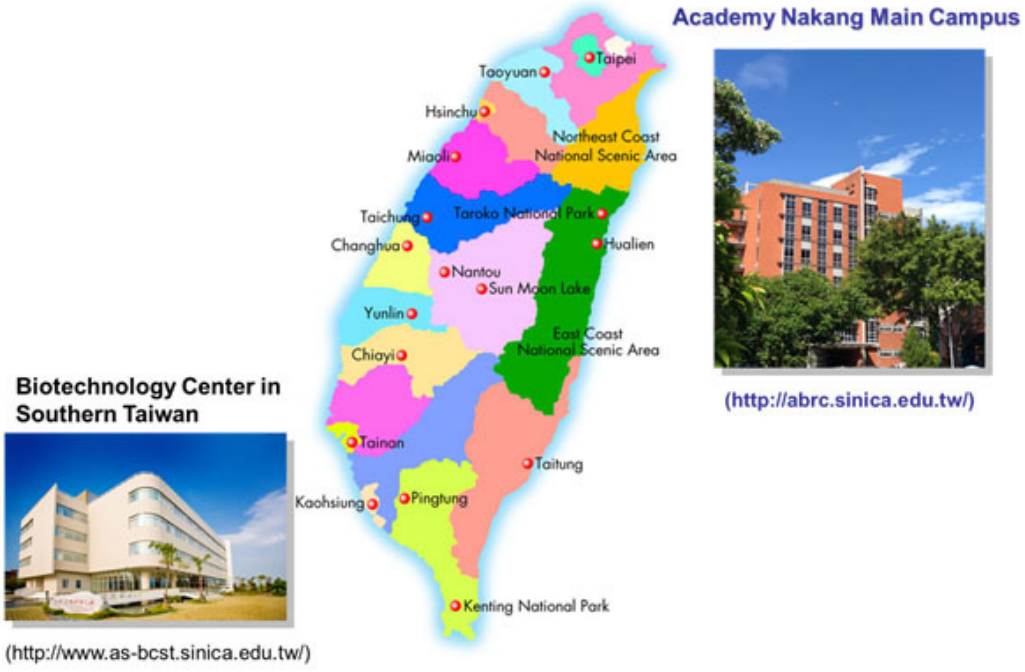
The Agricultural Biotechnology Research Center (ABRC) of Academia Sinica, Taiwan, formerly known as the Institute of BioAgricultural Sciences (IBS), was founded in 1998. Its objective is to conduct mission-oriented basic and applied research towards solving agricultural problems and develop agricultural biotechnology industry within the country. The ABRC, one of 31 institutions within Academia Sinica, has a total of twenty two principal investigators and six research specialists, along with 300 graduate students, post-doctorates, research assistants and supporting staff working either at the Nankang main campus of Academia Sinica in Taipei City or at the Biotechnology Center in Tainan City.

Mission and Research Programmes

ABRC pursues a multi-disciplinary approach, bringing constant innovation to the development of a biotechnology industry building on unique Taiwanese features that can compete with the best of the world. The core research themes include: Integrative Plant Stress Biology (iPSB), Herbal Medicine Research (HMR), Molecular Vaccine Technology, and Enzyme Biotechnology. These thematic programmes are strengthening the organization and function of the ABRC, and enabling large-scale project collaboration with local and international institutions.

Key findings and achievements

ABRC maintains several state-of-the-art and shared-use core facilities, including next generation sequencing, metabolomics, proteomics, microarray, plant technology, animal laboratory, and confocal microscopy. With efficient utilization of the core facilities and other platforms, such as cell/tissue culture and transformation or transgenic technology for both plants and animals, ABRC is



actively engaged in innovative research in agricultural biotechnologies and food security related to sustainable agriculture.

The Center also generates useful and platform-based patents, innovative products, and publishes high-impact scientific and technical papers to address important agricultural problems. Some key findings include data on screening, characterization and use of drought-, chill-, heat-, heavy metal- or pathogen-tolerant genes, using DNA microarray, bio-informatics, functional analysis and genetic engineering approaches. The Center identified important genes implicated in abiotic and biotic stress in crop plants and orchid and followed by their application.

Furthermore, it conducted studies of dendritic cell and T-cell related to immune modulatory bioactivities in response to phytocompounds/botanical substances extracted from Crassocephalum, Wedelia, Bidens, Dioscorea, and Echinacea plants. Systems biology approaches, such as functional genomic, proteomic and metabolomics experiments have yielded significant and interesting results, generating scientific publications and patent applications. Secondary metabolite profiles (metabolomics) in medicinal herbal plants and key phytochemicals responsible for the observed bio-pharmacological activities in animal models or human cell systems are being characterized. Herbal supplements and botanical medicines for human health and animal health have been developed as well. Besides, phytogenics, enzymes, vaccines, and vaccine adjuvants for animal health have been successfully developed and licensed to the bio-industry. ABRC's achievements have been globally acknowledged, as the Center received over 48 awards for its scientific programmes at national and international levels.

Read more:

Institute of Biotechnology (IOB), National Taiwan University

Molecular and Biological Agricultural Sciences (MBAS) of Taiwan International Graduate Program (TIGP)

Scholar Exchange Program for postdocs and visiting researchers

New Appointments

Dr. S. M. Bokhtiar, Executive Chairman, Bangladesh Agricultural Research Council (BARC)

Dr. S. M. Bokhtiar joined BARC on 31 December 2019 as Executive Chairman. Earlier, Dr. Bokhtiar served as Member Director (Planning and Evaluation) in the same organization, and Director of the SAARC Agriculture Centre (SAC). Dr. Bokhtiar earned his PhD from the United Graduate School of Agricultural Science, Ehime University, Japan, in 2006. He also worked as post-doctoral research fellow at the Guangxi Academy of Agricultural Sciences, Guangxi, China, for two years where his research work was on silicon nutrition of sugarcane crop.

During his career beginning at the Bangladesh Sugarcrop Research Institute (BSRI) in 1989, he served in different important capacities and contributed towards many R&D activities in Bangladesh. As a soil scientist, Dr. Bokhtiar published around 60 scientific publications with total citations of 485 (according to Google Scholar).

Dr Jacqueline d'Arros Hughes, Director General, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Dr. Jacqueline d'Arros Hughes, is currently the Director General of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India. A virologist by training, she has worked in the United Kingdom and Ghana, before moving to the International Institute of Tropical Agriculture (IITA) in Nigeria, followed by the World Vegetable Center in Taiwan, and the International Rice Research Institute (IRRI), before moving to ICRISAT. She has an extensive publications record and strong interests in plant health, epidemiology, gender equity, nutrition, and remote sensing/digital agriculture.

Dr. Johan Swinnen, Director General, International Food Policy Research Institute (IFPRI)

Dr. Johan Swinnen became Director General of IFPRI in January 2020. Prior to joining IFPRI, Dr. Swinnen was professor of economics and director of the LICOS Centre for Institutions and Economic Performance at the University of Leuven (Belgium), and senior research fellow at the Centre for European Policy Studies in Brussels. Between 2003-2004, he was a lead economist at the World Bank, and from 1998 to 2001 economic adviser to the European Commission. Over the course of his career, Dr. Swinnen has been a visiting professor at various universities, including the Stanford University's Center on Food Security and the Environment, and a frequent adviser to institutions, such as the World Bank, the European Bank for Reconstruction and Development, the Organization for Economic Co-operation and Development, and the Food and Agriculture Organization of the United Nations.

Dr. Swinnen earned his PhD from Cornell University (USA) and holds honorary doctorates from the University of Göttingen (Germany) and the Slovak University of Agriculture in Nitra (Slovakia). He is a fellow of the Agricultural and Applied Economics Association and the European Association of Agricultural Economists, and he served as President of the International Association of Agricultural Economists from 2012 to 2015.

Dr. Swinnen has published extensively on agricultural and food policies, international development, political economy, institutional reforms, trade, and global value chains, and his body of work has been widely cited. His books include: The Political Economy of Agricultural and Food Policies (Palgrave Macmillan, 2018); Quality Standards, Value Chains and International Development (Cambridge University Press, 2015); Political Power and Economic Policy: Theory and Empirical Applications (Cambridge University Press, 2011); and From Marx and Mao to the Market: The Economics and Politics of Agricultural Transition (Oxford University Press, 2006).

Dr. Deepak Bhandari, Acting Executive Director, Nepal Agricultural Research Council (NARC)

Before serving various senior positions at NARC, Nepal, Dr. Deepak Bhandari is now its Acting Executive Director. NARC is an apex research organization of the Government of Nepal with networks of agricultural research centers throughout Nepal and supporting the development of agriculture policies of the Government. He has earned PhD in Philosophy from the Asian Institute of Technology, Thailand. He has published over 50 research papers in peer reviewed journals.
Dr. Bhandari also earned an international award titled "International Gene Stewardship Award" from Borlaug Global Rust Initiative (BGRI), USA in 2012. Furthermore, he has also earned a national award of one of the highest cash prizes from the Government of Nepal. He has widespread expertise in wheat pathology and biological control of plant pathogens.

New APAARI Staff

Ms. Sasireka Rajendran, Knowledge Management Intern

Sasireka Rajendran has recently joined APAARI during pursuing her Ph.D. in Processing and Food Engineering at the Tamil Nadu Agricultural University (TNAU), Coimbatore, India. She has currently completed her work as research personnel for the Scheme for Promotion of Academic and Research Collaborations (SPARC) between TNAU and the University of Minnesota, USA, where she worked for six months as a part of the SPARC project. Sasireka is supporting the KM Team of APAARI particularly in

the thematic areas of pesticide mitigation, agroecology, safe food systems and ASTI.

Ms. Sokharath Samnang, Communication and Outreach Intern for Value Chains

Sokharath Samnang has recently joined APAARI during her Master studies in Agri-Business Management at the Asian Institute of Technology Thailand. She is passionate about learning about the valorization of agri-products, understanding agricultural issues in developing countries, particularly those related to malnutrition, agribusiness, and value chains. Sokharath has successfully completed a Bachelor's degree at the Rajamangala University of Technology Thanyaburi, Thailand, graduating with a Bachelor of International Marketing. In 2018, she was an intern with Sanwa East Asia Trading co. ltd., in Chengdu, China. This enabled her to acquire several communication skills required in international business dealings and customer support. The experience gained in China was on the implementation of online marketing activities and assistance in the management of the department's internal management.

Upcoming Events

- APCoAB Steering Committee Meeting 2020 (Online), 7 July 2020, APAARI
- APAARI Executive Committee Meeting 2020 (Online), 8-10 July 2020, APAARI
- A series of ASTI Webinars: Lao PDR, Malaysia, PNG and Vietnam, July 2020; Myanmar, Thailand and the Philippines, August 2020; Cambodia and Indonesia, September 2020
- A perspective on Capacity Building in Knowledge Management Development in Agricultural Sector of Iran: The First International Webinar in the Cooperation between Agricultural Research, Education and Extension Organization (AREEO) and APAARI, 27 July 2020
- A series of thematic webinars indicated through the APAARI Stakeholder Survey 2020, to support innovation in agriculture, food security and nutrition, August-December 2020
- Horti Asia Conference, 14-16 October 2020, Bangkok, Thailand, Department of Agriculture (DOA) Thailand, Department of Agricultural Extension (DOAE) Thailand, Horticulture Science Society of Thailand, International Society for Horticultural Science (ISHS)
- Regional Expert Consultation on Conservation and Utilization of Agriculturally Important Microorganisms, November 2020; Indian Council of Agricultural Research (ICAR), India
- International Training on Biotechnological tools for conservation and sustainable utilization of fish genetic resources, October-November 2020; Indian Council of Agricultural Research (ICAR), India
- International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling, November 2020; Council of Agriculture (COA), Food and Fertilizer Technology Center (FFTC), Taiwan

NEW APAARI Members

Affiliate Member:

- Centre de coopération internationale en recherche agronomique pour le développement (CIRAD)

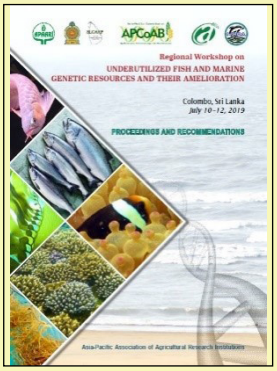
New Publications

Regional Expert Consultation on Gene Editing and its Regulation – Proceedings and Recommendations

DOWNLOAD

Proceedings and Recommendations of the Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration

DOWNLOAD



Regional Conference on Role of Soil and Plant Health Towards Achieving Sustainable Development Goals in Asia-Pacific – Summaries & Recommendations

DOWNLOAD

Agricultural Policy and Program Framework-Priority Areas for Research & Development in South Asia

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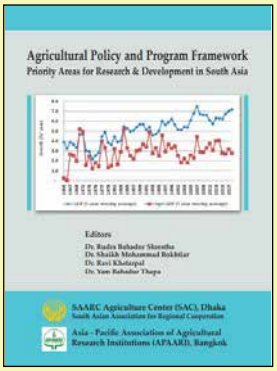
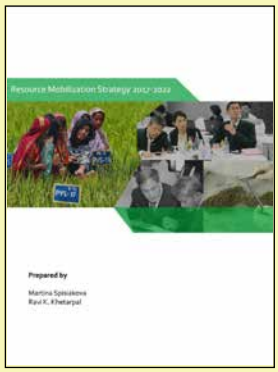


APAARI Knowledge Management and Communication Strategy 2017-2022

APAARI Membership Strategy 2017-2022



APAARI Resource Mobilization Strategy 2017-2022

Executive Committee 2019-2020

Chair	**Dr Peter Horne** *ACIAR, Australia*
Vice Chair	**Dr. Trilochan Mohapatra** *ICAR, India*
Members	**Dr Chung-hsiu Hung** *COA, Taiwan*
	Dr. Mohamad Roff Bin Mohd Noor *MARDI, Malaysia*
	Dr Muhammad Azeem Khan *PARC, Pakistan*
	Dr Surmsuk Salakpet *DOA, Thailand*
	Mr Ritesh Dass *MAF, Fiji*
	Dr Jacqueline Hughes *ICRISAT, India*
	Dr Marco Wopereis *World Vegetable Center, Taiwan*
	Dr B.S. Dhillon *IAUA, India*
Member Secretary	**Dr. Ravi Khetarpal** *Executive Secretary*

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

THANKS

All queries relating to APAARI Newsletter be addressed to:

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