



**Asia-Pacific Association of Agricultural Research
Institutions (APAARI), Thailand**

and

Council of Agriculture (COA), Taiwan

Collaborative Program

Progress Report

(January 1, 2020 to December 31, 2020)



**Asia-Pacific Consortium on Agricultural Biotechnology and
Bioresources (APCoAB)**

182, Larn Luang Road, Pomprab Sattrupai

Bangkok 10100, Thailand

Progress Report

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Asia-Pacific Association of Agricultural Research Institutions and Council of Agriculture (APAARI-COA) collaborative program on biotechnology has been in operation since 2008 as the Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB). Initially approved for three years (2008-2010) with a funding support of USD 35,000 per annum, the program was extended twice (2011-2013, 2014-2016) and funding raised to USD 50,000 per annum each by APAARI and COA. In view of the excellent performance of the APAARI-COA collaboration in terms of the number and range of activities conducted and benefits brought to APAARI members and other participants by way of knowledge enhancement, development of practical experience, networking and opportunities for partnership development, it was decided by both APAARI and COA to continue the APCoAB program for another term. Therefore, the program was extended for 4 years i.e. from 2017 to 2020 with a total budget of USD 560,000 is to be shared equally (USD 280,000) by COA and APAARI and other partners. The commitment of COA to continue supporting this program was conveyed during the XVIII APCoAB Steering Committee Meeting, held on October 31, 2016 at Taichung City, Taiwan. As per recommendations of Executive Committee (EC; 2/2017) of APAARI, XIX Steering Committee of APCoAB and EC 1/2018 of APAARI, activities on conservation and sustainable use of bioresources were included. The program Asia-Pacific Consortium on Agricultural Biotechnology was renamed as 'Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources' retaining the old acronym as 'APCoAB' and also the objectives of APCoAB were modified, which were approved in the meetings of XIX Steering Committee of APCoAB and EC (1/2018) of APAARI.

During XIX Steering Committee of APCoAB held on May 28, 2018 at Bangkok, COA committed to enhance the funding with effect from 2019 in view of inclusion of bioresources activities under APCoAB and suggested that a revised APAARI-COA collaborative proposal (APCoAB) should be submitted to COA. Consequently, a revised APAARI-COA proposal (2019-2022) was submitted to COA, which has been approved by COA with enhanced funding from USD 70,000 to USD 170,000 per annum for 2019-2022 with the provision of salary of a Technical Associate in APCoAB.

Revised Work Plan of APCoAB for 2020¹

Following is the Revised Work Plan of APCoAB was presented before Steering Committee of APCoAB and Executive Committee (EC) of APAARI and was endorsed:

Area	Activities
Expert Consultation/ High Level Policy Dialogue	<ul style="list-style-type: none">Regional Expert Consultation: Conservation and Utilization of Agriculturally Important microorganisms; Co-organizer: ICAR-NBAIM (October-November 2020)

¹ Original Work Plan for 2020 was revised and approved in wake of COVID-19 pandemic

Symposia/trainings/workshops	<ul style="list-style-type: none"> • Investment in agricultural biotechnology and its impact on livelihoods of farmers in Asia-Pacific region (<i>postponed to 2021 due to COVID-19 pandemic</i>); Co-organizers: PCAARRD • Biotechnological tools for conservation and sustainable utilization of fish genetic resources (training) (October-November 2020); Co-organizer: ICAR • International Conference/training on Gene Editing (September-October 2020); (<i>Cancelled by APEC/MARDI due to COVID-19 pandemic in August 2020</i>); Co-organizer: MARDI, APEC • International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling (November 2020); Co-organizer: COA and FFTC
Steering Committee of APCoAB	<ul style="list-style-type: none"> • Steering Committee Meeting of APCoAB (July 7, 2020)
Publication of proceedings/status reports/success stories	<ul style="list-style-type: none"> • Proceedings (3-4) of Expert Consultation and Workshops (January-December 2020) • One Policy Brief on GM Maize and two success stories are targeted - (Banana Tissue Culture in India, Goat and Sheep in PNG and Fiji) (January-December 2020)
APCoAB website	<ul style="list-style-type: none"> • Regular updates on agricultural biotechnology and bioresources developments, news and events of specific relevance to Asia-Pacific • Update of existing databases. Regular updates of other content and additional databases • Developing infographics and other media material for Facebook and Twitter to outreach and communication about gene editing
Additional Activities	<ul style="list-style-type: none"> • Online survey on Impact of Regional Expert Consultation on Underutilized Crops • Online survey on perception about gene editing

Accomplishments

During the period of January 1, 2020 to December 31, 2020, following activities were carried out as mentioned in following sections in chronological order:

A. Expert Consultation/Conference /Training/Online Feedback Surveys (6)

1. **Regional Expert Consultation on Agriculturally Important Microorganisms** was organized virtually in collaboration with Indian Council of Agricultural Research (ICAR) and ICAR-National Bureau of Agriculturally Important Microorganisms (ICAR-NBAIM), India, on October 28, 2020. Opening remarks were presented by Dr T Mohapatra, Director General, ICAR; Dr Ravi Khetarpal, Executive Secretary, APAARI and Dr TR Sharma, Deputy Director General, ICAR. The Expert Consultation was attended by 134 participants from 16 countries (Australia, Bangladesh, Bhutan, Fiji, Iran, Japan, Republic of Korea, Malaysia, Nepal, Philippines, Papua New Guinea, Samoa, Sri Lanka, Taiwan, Thailand, and Vietnam) including from NARS, universities, related ministries, and CG Centre. Of 134 participants, 24% were women scientists/experts. The objectives of the Expert Consultation were (i) to discuss the knowledge gaps and way forward in defining regional priorities concerning AIMs, and (ii) To formulate strategies for strengthening the institutional framework for AIMs management of AIMs, and legal and policy framework to promote conservation and sustainable use of AIMs at regional level.



Expert Consultation comprised of 3 Technical Sessions – (i) Thematic Presentations on AIMs, (ii) Strategies for Conservation and Utilization of AIMs, and (iii) Panel Discussion - Regional Priorities for AIMs for Asia-Pacific. A total 7 presentations were made by the experts related to status, regulatory policies, sub-regional linkages, public-private partnerships, role of biotechnology, and conservation strategies and sustainable use of AIMs. A panel discussion was held covering the areas of Value addition, commercialization and export; Biotechnology for enhancing utilization and IPRs; South-South Cooperation for enabling policy development and advocacy; Partnership and capacity development; Digital sequence information and sharing system; Microbial taxonomy issues and information system. The website, Common Microbial Biotechnology Platform (CMBP) Network, developed by CIAT-Bioversity Alliance, Vietnam, was also introduced to the participants

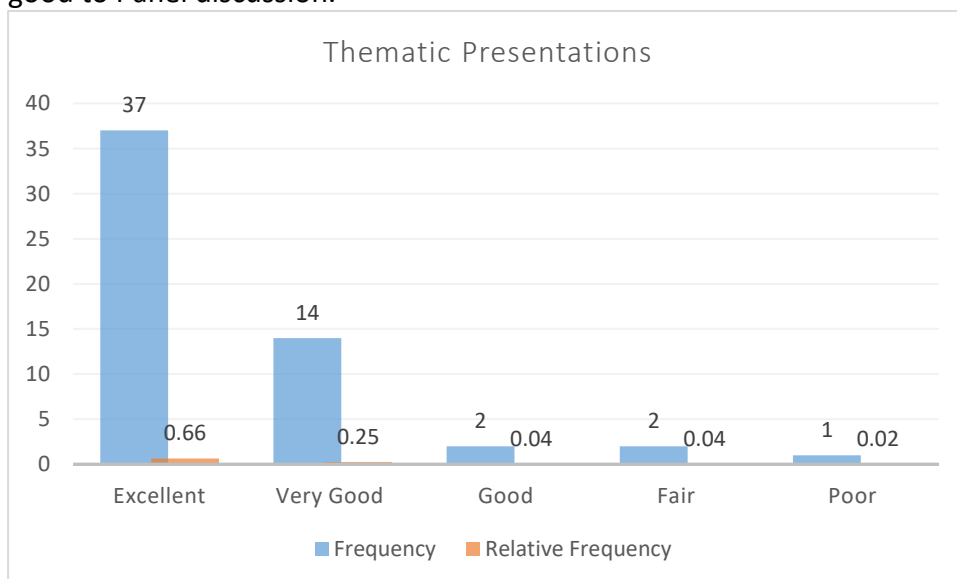
with the aim to foster collaboration and partnership in research and capacity development in AIMs at Asia-Pacific level.

The Major Recommendations arising from the Expert Consultation were related to research priorities, policy advocacy, regional priorities related to value addition, commercialization and export; biotechnology for enhancing utilization and IPRs; South-South Cooperation for enabling policy development and advocacy; partnership and capacity development; digital sequence information and sharing system; microbial taxonomy issues and information system. The Proceedings and Recommendations are being finalized for further distribution among the various stakeholders in the Asia-Pacific region.

Feedback from the Participants of Regional Expert Consultation on AIMs:

An online feedback form was developed composing simple questionnaire to collect their feedback about their organizations, objectives, rating of the different sessions, most valued and least valued sessions, how they will use gained knowledge in their research work, possible areas of collaboration, relevance of the deliberations to the contemporary issues in AIMs. The summary of the feedback is presented below:

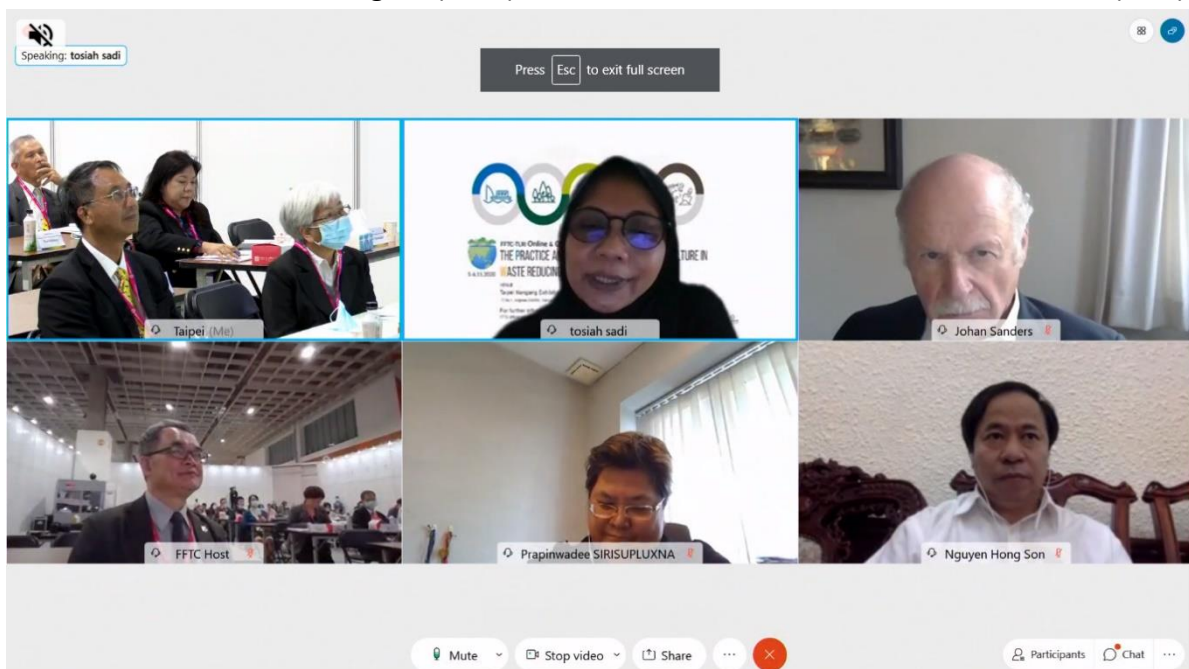
- (i) Of 134 participants, 42% (56) responded to and submitted their feedback; 56% participants belonged to National Agricultural Research System followed by 39% from academia/universities from 16 countries of Asia-Pacific.
- (ii) Some 43% participants attended the Expert Consultation either to develop networking or exchanging the knowledge about AIMs; 48% attended for acquiring more knowledge or updating their knowledge in subject areas of actinomycetes, conservation policies, commercialization, to explore possibilities of collaboration in areas of biofertilizer and biopesticides research and to learn about linkages in various fields of AIMs.
- (iii) About 91% rated the thematic presentation and strategies for conservation and utilization as excellent or very good; whereas 82% mentioned as excellent or very good to Panel discussion.



- (iv) A total of 95% participants felt that the Expert consultation was highly informative and useful in one or the other related to following major areas:
 - a. Networking and potential collaboration (11%)
 - b. Conservation and utilization (24%)

- c. To understand global/regional status (18%)
- d. Microbial biotechnology, policy discussion, South-South cooperation (13%)
- (v) However, up to 5% participants mentioned that they did not get any additional knowledge or difficult to understand the topics or not understand the values of AIMS in general from this expert consultation.
- (vi) About 82% participants agreed that they will integrate/take forward the information/knowledge received during Expert Consultation:
 - a. To develop collaboration and networks in different research areas with experts through South-South collaboration (27%)
 - b. Sharing gained knowledge/information with their networks/collaborators on various aspects of AIMS (49%)
 - c. Policy issues related to conservation, documentation, exchange of knowledge and genetic resources (ABS), capacity building, quality control (9%)
- (vii) Some 81% of the participants identified the experts/countries for future collaboration - (a) 21% with India, (b) 16% with Australia, (c) 13% with Taiwan, 7% with Japan.
- (viii) About 96% mentioned that the Expert consultation was relevant to contemporary issues related to AIMS.
- (ix) Following major suggestions were made by the participants:
 - a. Online meeting should be of two days to facilitate the participants of the Pacific region due to time difference.
 - b. Time duration of the speakers should be effectively monitored by Chairs.
 - c. Video recording of the presentations should be provided to the participants.
 - d. Future consultation may include – regulations on exchange of AIMS in different countries; Microbial red-data bank; Functional microbial diversity; Microbial Biodiversity Heritage Sites; quality control on microbial inoculants.
 - e. Funding opportunities for collaborative research projects

2. International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling was organized jointly by the Food and Fertilizer Technology Center for the Asian and Pacific Region (FFTC) and the Taiwan Livestock Research Institute (TLRI),

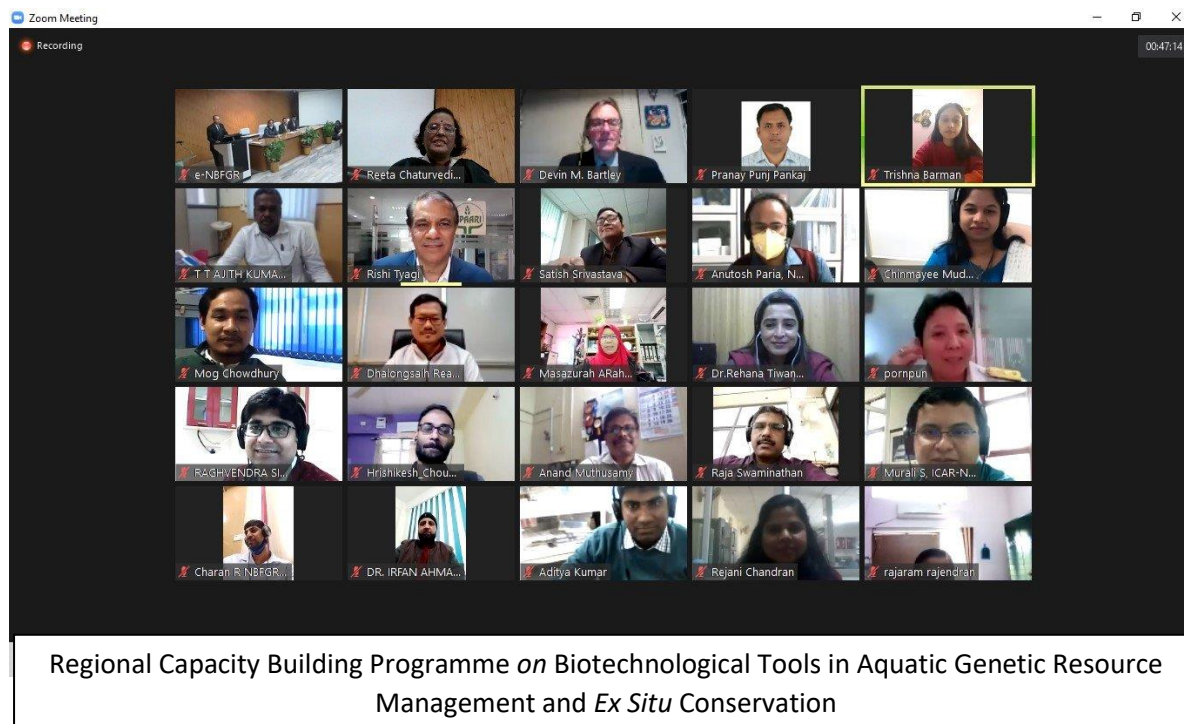


Council of Agriculture on November 5-6, 2020 in Taipei, Taiwan. In light of the COVID-19 pandemic, the symposium was held both onsite and online. In addition to the keynote session, the symposium had four sessions on the following themes: 1) New Challenges and Opportunities to Minimize Agricultural and Food Wastes and Residuals; 2) Modern Technologies of Agricultural Waste and Residual Recycling and “Low External Input Farming”; 3) New Aspects on “Optimization of the Use of All Resources and Value-adding”; and 4) Small Farmers’ Material Matching, Basic Education and Policy Promotion. The 2-day Symposium attracted more than 200 participants (off-site and on-site), with many speakers from Taiwan, the Netherlands, Denmark, South Korea, Japan, Indonesia, and Vietnam with focus on Circular Agriculture. APAARI as co-organizer, under its programme APCoAB, facilitated the participation from its member-countries in Asia-Pacific region. A total of 40 participants were sponsored from 7 APAARI-member countries (Fiji, India, Iran, Malaysia, Nepal, Thailand and Vietnam). Of 40 participants, 44% were the women scientists/researchers. Policy makers, scientists, researchers, students, agriculturists, members of the private sector participated in the symposium. Experts from the Dutch Ministry of Agriculture, Nature and Food security, Wageningen University & Research and Lely emphasized that the key to the success of circular agriculture lies in the responsibility of all sectors in the value chain and the consumers. Also, it was emphasized that companies should sell and produce products that are beneficial to a sustainable environment. Examples of possible solutions on livestock circular agriculture, and technology such as big data and sensors application was also brought to the audience.

Following were the major recommendations emerged out from the symposium

1. Minimize food loss and wastes and efficiently utilize all resources under the food systems by harnessing innovative technologies. These are particularly important to feed the growing world population which is projected to be 9 billion people in 2050.
2. Link and involve the private sectors, policymakers, enterprises, and farmers, with good policy, to successfully transform linear agriculture to circular agriculture. The great potential of future circular agriculture market will be opened by the rapid technological innovation and expanding connections.
3. Reduce food loss and wastes in the Asian and Pacific region to generate multiple dividends: such as creating economic values and new jobs, avoiding lots of greenhouse gas emissions, reducing waste of freshwater use, and recovering meals for food security.
4. “Internationalize” science investments to maximize efficiencies and facilitate collaboration.
5. Emphasize co-benefits for sustainable development to achieve buy-in and remove barriers to the action of achieving the goal of circular agriculture.
6. Scale-up investments in both public and private sectors to retain human capability and research infrastructure.
7. Establish regional industrial symbiosis parks as an important model for industrialized utilization.
8. Make value-added final products to maximize circular agriculture.

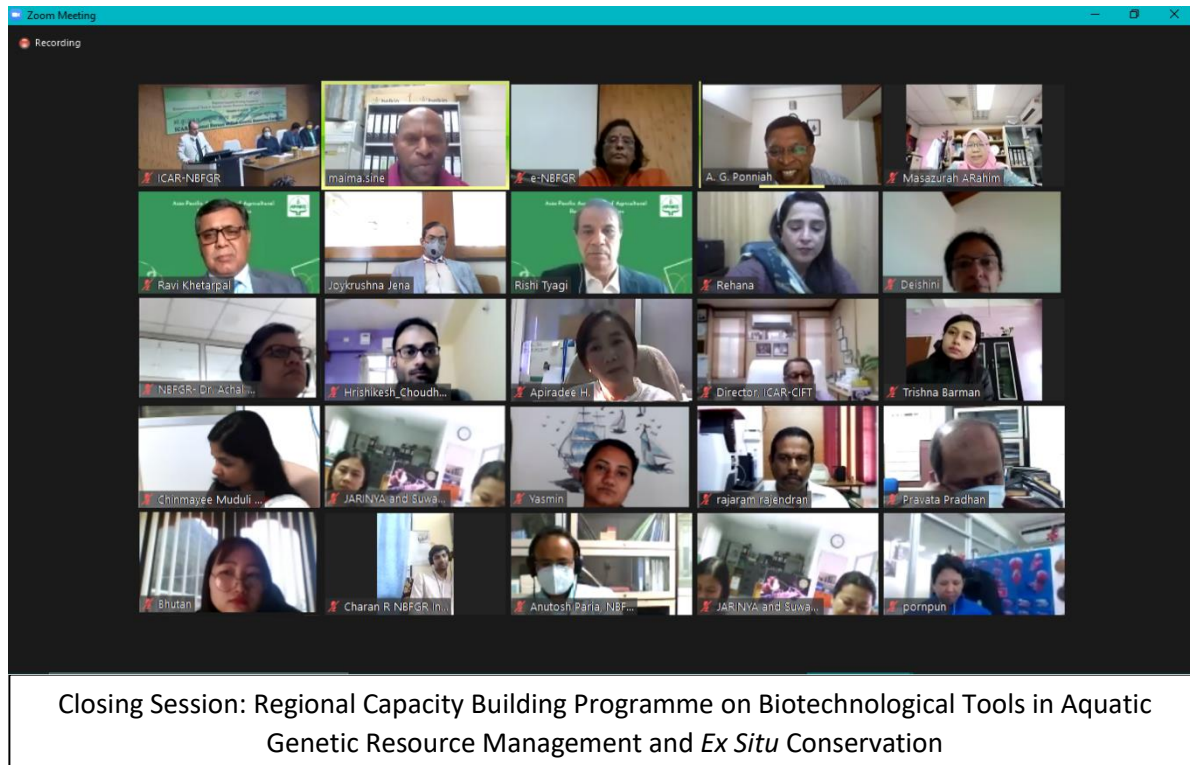
3. **Regional Capacity Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and *Ex Situ* Conservation** was jointly organized in virtual mode



with ICAR, on December 7-18, 2020, at ICAR-National Bureau of Plant Genetic Resources (NBFG), India - one of the best institutes for aquaculture resources in the Asia with experts and technologies which are in vogue for characterization and ex situ conservation of fish genetic resources. A total of 35 scientists/researchers attend the course from 14 countries (Bangladesh, Bhutan, Fiji, Iran, Malaysia, Nepal, Philippines, Pakistan, Papua New Guinea, Samoa, Sri Lanka, Taiwan, Thailand, and Vietnam of Asia-Pacific region). All the 35 participants were mid-career active researchers; and 72% of those were women scientists/researchers. In addition from ICAR institutes, the faculty was also drawn from USA, FAO, NACA, SPC, and WorldFish Centre.

This 10-day training covered comprehensive course content on AqGR and its management comprising the state of the world's aquatic genetic resources for food and agriculture; Aquatic food systems: Integrating biodiversity and ensuring sustainability; Ornamental marine genetic resources, conservation and livelihood promotion; Utilizing genetic diversity through selective breeding for genetic improvement; taxonomy, radiography, morphometry; shape morphometric analyses; chromosome preparation and karyotyping; Strategies and sampling procedures for genetic diversity studies; Basic molecular biology, Demo: Designing of PCR primers; DNA to Genomics; DNA sequencing procedures, sequence quality check and processing for application; Analysis and application in genetic diversity; species delineation, intra-specific diversity; Intraspecific genetic divergence using codominant markers; Microsatellite markers: isolation, development, genotyping (PAGE), automated genotyping; Genotype data analysis and

interpretation; Gene expression: RNA isolation, quality check; Quantitative PCR, gene-expression procedure and analysis and interpretation; Surveillance, disease diagnosis and cell culture; Aquaculture certification and standards; *Ex situ* conservation: sperm cryopreservation, procedure and quality; *Ex situ* conservation of fish genetic resources; Biological traits and intra-specific diversity, parameters and tools. Fish scale data, age and growth analysis; Repository of Fish Cell lines and FisOmic Portal.



The training was concluded by distributing the Certificates of Successful Completion to the participants. Dr T Mohapatra, Director General, ICAR; Dr Ravi Khetarpal, Executive Secretary, APAARI; and Dr JK Jena, Deputy Director General, ICAR delivered addresses and encourage the trainees to use the gained knowledge on AqGR management in their research work and develop new partnerships with other countries. Trainees also gave their feedback in person and also online through feedback form, which is being analysed. The training ended on a high note, with appreciation by the participants and opened up newer avenues for collaboration with institutes in various other countries working on similar lines or setting up their research facilities in the area of management of AqGR. The training provided the opportunities for South-South Cooperation and collaboration in capacity development in the area of biotechnology for conservation of AqGR.

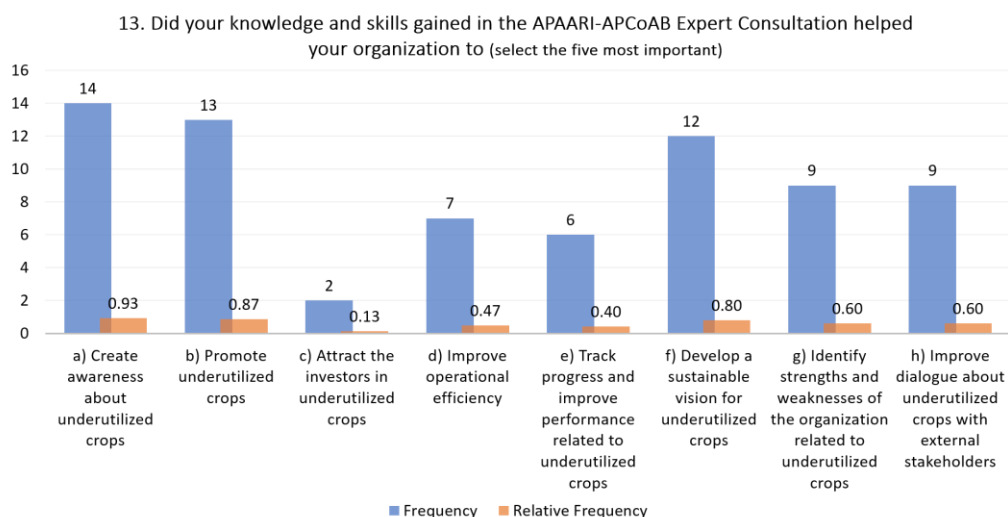
4. Online Survey on Impact of Regional Expert Consultation on Underutilized Crops

A multi-stakeholder "Regional Expert Consultation on Underutilized Crops for Food and Nutrition Security in Asia and the Pacific" was organized with other partners – COA, CFF, ICRISAT, ICARDA, and Bioversity International during November 13-15, 2017 at Bangkok,

Thailand. An online survey was conducted after about 3 years to analyze its impact. A simple questionnaire was designed to have feedback from the participants of the above Expert Consultation to analyze the impact on individual participant and their organizations. Questionnaire comprised 20 questions broadly related to general information about individual and respective organization; existing knowledge of about the underutilized crops (UUC); improvement in participants' knowledge and skills; how this expert consultation impacted their research programmes and recognitions to individual or organization; and UUC-related expectations from APAARI in future.

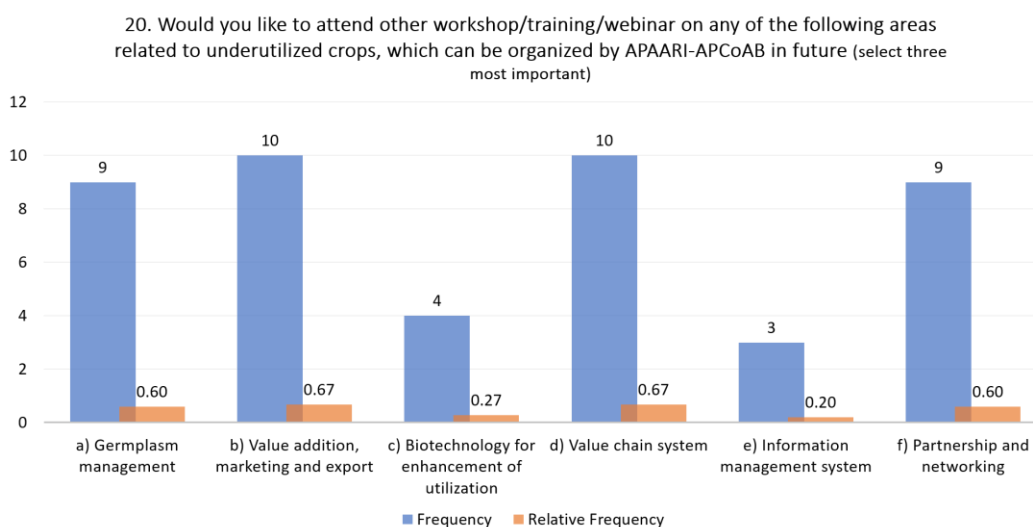
The questionnaire link was created and shared with all the participants (40) by email and polite reminders were also sent twice. Due to change in email IDs or transfer to other organizations 10 emails bounced back meaning thereby that only 30 participants received the emails. A total of 18 participants (60%) responded online and some questions were answered by 15 participants only. The responses have been analyzed on the basis of responses of 18 or 15 participants. and a summary is presented:

- (i) Some 67% of participants work in organizations of the federal governments; 72% working in organizations with ≥ 100 employees.
- (ii) About 44% of respondents work as the researchers/scientists, followed by 39% as the research managers and 17% as policy makers. Most of the researchers work in areas of crop improvement or germplasm management. Currently only 67% of participants work in the same organization in area of underutilized crops other either transferred or changed the crops.
- (iii) Some 60% of participants have provided consultancy on underutilized crops to the public sector of organization and 13% to either private sector or NGOs.
- (iv) About 47% of participants felt major improvement of knowledge about underutilized crops and 40% mentioned minor improvement after participating the Expert Consultation. A total of 74% mentioned that they have implemented the gained knowledge and observed major or minor improvement in their ongoing programmes after participation.
- (v) Between 60-93% of participants mentioned that their knowledge and skills gained during the Expert Consultation helped their organization to (i) create awareness about underutilized crops; (ii) to promote underutilized crops; to develop a sustainable vision for underutilized crops; (iii) to improve dialogue about underutilized crops with external stakeholders.



(vi) Some 33% of respondents mentioned that their organizations gain some formal recognition for research work on underutilized crops whereas 40% mentioned that they have been awarded individually also while working on underutilized crops.

(vii) About 53-60% of participants expected advanced sector-specific workshop/training in future to enhance their knowledge and skill about promoting underutilized crops.



(viii) Some 60-67% of participants expressed their views to attend other workshop/training/webinar on value addition, marketing and export; value chain system; germplasm management; and partnership and networking related to underutilized crops.

5. Online Survey on Impact of Regional Expert Consultation on Agricultural Biotechnology - Scoping Partnerships to Improve Livelihoods of Farmers in Asia and The Pacific

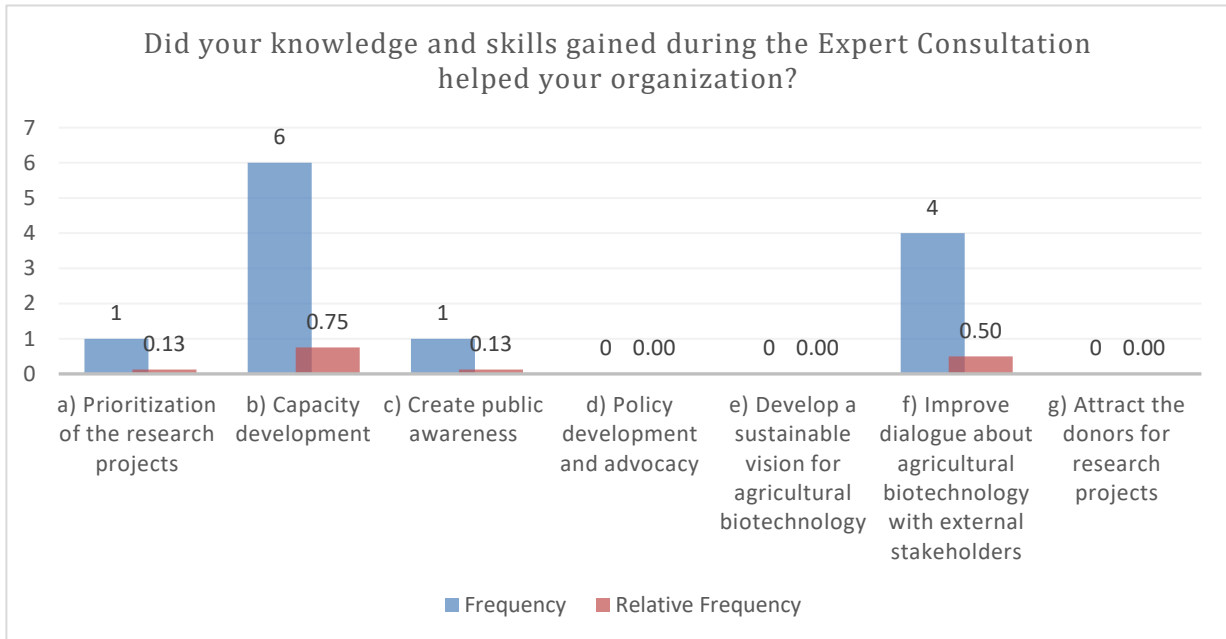
A Regional Expert Consultation on Agricultural Biotechnology - Scoping Partnerships to Improve Livelihoods of Farmers in Asia and The Pacific was held on May 29-31, 2018 at

Bangkok, Thailand. The meeting was in partnership with Council of Agriculture (COA), Taiwan, Australian Centre for International Agricultural Research (ACIAR), Australia and CGIAR Research Programme on Grain Legumes and Dryland Cereals (CRP-GLDC), Hyderabad, India. Other collaborators were the Department of Agriculture (DOA), Thailand and Biotech Consortium of India Limited (BCIL), Delhi, India. An online survey was conducted after about two and half years to analyze its impact. A simple questionnaire was designed to have feedback from the participants of the above Expert Consultation to analyze the impact on individual participant and their organizations. Questionnaire comprised 20 questions broadly related to general information about individual and respective organization; existing knowledge of about the agri-biotechnology; improvement in participants' knowledge and skills; how this expert consultation impacted their research programmes and recognitions to individual or organization; and agribiotech-related expectations from APAARI in future.

The questionnaire link was created for online use and shared with the participants (45) by email and polite reminders were also sent thrice. Due to change in email IDs or transfer to other organizations 7 emails bounced back meaning thereby that only 38 participants received the emails. In spite of three reminders, the response was very poor. It is observed that most of the speakers chose not to respond. Only 8 participants (21%) responded online. The responses have been analyzed on the basis of responses received from 8 participants, and a summary is presented below:

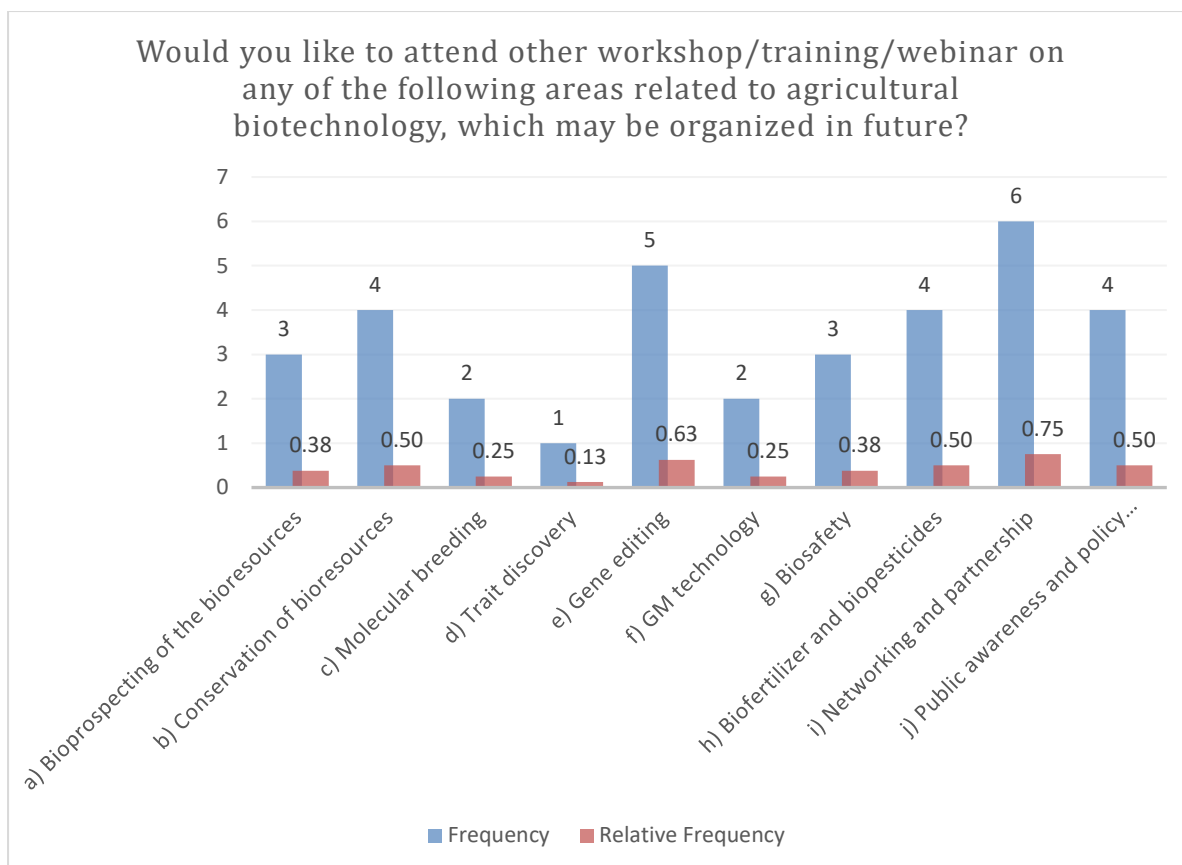
- (i) Of the total respondents, 38% belonged to or the federal government organizations, other either CG or private organizations; organizations of 50% participants had ≥ 100 employees; 63% of respondents working as the researchers/scientists, followed by 25% as the Policy makers, and 13% as research managers.
- (ii) Most of the respondents (63%) were working in Plant Biotechnology and 75% currently working in same organization from where they were deputed to participate in the Expert Consultation; 63% have provided consultancy on agricultural biotechnology for the public sector of organization.
- (iii) Some 75-100% of the respondents felt there were major improvement of knowledge of the agricultural biotechnology within their organization and individually after participating in Expert Consultation, particularly through strategic case studies and country status reports.
- (iv) Some 88% of respondents felt there were major improvement of knowledge/skills of how to develop partnerships at national/regional level in areas of agricultural biotechnology after participating the Expert Consultation. However, additional support about networking to exchange experience and ideas among other participants would have been required much more in future.
- (v) About 75% of respondents have implemented/practiced or planning to use improved knowledge and skills they gained, to directly or indirectly to prioritize their research projects and to contribute to promote agricultural biotechnology

for improving livelihoods of smallholder farmers and incomes at high level; 50% of respondents mentioned that their knowledge and skills gained helped them in terms of improving dialogue about agricultural biotechnology with external (vi) stakeholders. However, 63% of respondents mentioned that of all the related stakeholders, policy makers are most difficult to communicate about the benefits of agricultural biotechnology.



(vii) About 63% of respondents mentioned that the individual as well as their organizations gain formal recognition/award for research work on agricultural biotechnology.

(viii) Some 75% of respondents expected to attend other workshop/training/webinar on networking and partnership related to agricultural biotechnology; 63% of respondents would like to attend other workshop/training/webinar on gene editing related to agriculture; 50% of respondents would like to attend other workshop/training/webinar on conservation of bioresources related to agriculture; 50% of respondents would like to attend other workshop/training/webinar on trait discovery; 50% of respondents would like to attend other workshop/training/webinar on biofertilizer and biopesticides; 50% of respondents would like to attend other workshop/training/webinar on public awareness and policy development related to agricultural biotechnology.



6. Online Survey on the Perception of Gene Editing for Food and Agriculture

Gene editing has great potential and evidently has very special role in agriculture to increase the qualitative and quantitative agricultural production and productivity. The success and potential of this technique to contribute towards developing new varieties/breeds will depend on the prevailing regulation for gene editing and public acceptance of the products derived from the gene editing technology in a given country. While many Asian countries are investing a lot of resources in research for development using gene editing and are at different stages of developing the regulatory guidelines for gene edited products in their respective countries. Whereas usage of new technologies, generally, bring some issues about its adoption and scaling up. Equally important is acceptance of the public about products developed using gene editing. An online survey on the Perception of Gene Editing for Food and Agriculture was conducted to get the feedback from the different stakeholders about the acceptance of gene editing technologies.

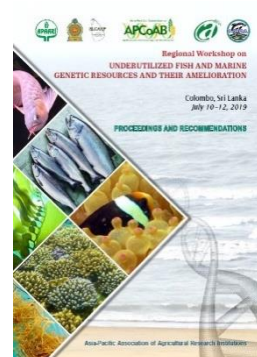
The email IDs to prepare the contact lists of various stakeholders - researchers (1304), academicians (411), industry (335), policy makers (58), journalists (14) from India and researchers (99), academicians (351), industry (211), policy makers (165) from Philippines, were collected from the websites of different organizations related to agricultural biotechnology in respective countries. All the above stakeholders were contacted through emails to respond a simple online questionnaire and a polite

reminder is also sent. Many of the emails bounced back, due to either server errors or the person has changed the organization or the email ID. However, responses are being received gradually.

All the responses from stakeholders will be analyzed which may be useful for developing the resource document on gene editing. The document will be shared with the researchers and policy makers involved in agricultural biotechnology in Asia-Pacific countries to facilitate the formulation of the regulatory guidelines of gene editing on the basis of the public opinion to benefit the society.

B. Publications and e-Training Manual (6+5*)

- (i) **Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration - Proceedings and Recommendations**, held at Colombo, Sri Lanka, Thailand, held on July 10-12, 2019, has been published (ISBN: 978-616-7961-37-8). This publication contains the proceedings and recommendations on Conservation, Improvement and Use of FMGR Resources with respect to value addition, marketing and export, biotechnology for enhancing utilization, partnership and capacity building and on need for Regional Information Sharing System and Focal Point.



The publication can be accessed on:

<http://www.apaari.org/web/wp-content/uploads/downloads/2020/Proceedings%20and%20Recommendations%20FINAL-%20HR%202019.pdf>

Rishi K. Tyagi, D.H.N. Munasinghe, K.H.M. Ashoka Deepananda, Frank Niranjana and Ravi K. Khetarpal (2020) Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration – Proceedings and Recommendations. Asia-Pacific Association for Agricultural Research Institutions (APAARI), Bangkok, Thailand, xii+53 p.

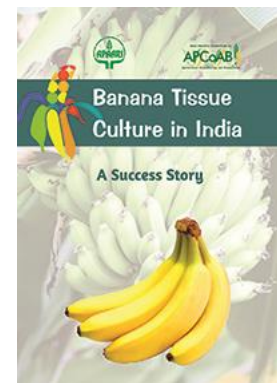
- (ii) **Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration – Country Status Reports** (ISBN: 978-616-7961-40-8). The present document specifically focuses on Country Status Reports belonging to 12 countries ((Bhutan, Fiji, India, Iran, Lao PDR, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Taiwan) of Asia-Pacific region. The publication can be accessed on: <http://www.apaari.org/web/wp->

[content/uploads/downloads/2020/CountryStatus Reports-on FMGR\(Final\) 7-8-2020 High Resolution.pdf](http://www.apaari.org/web/wp-content/uploads/downloads/2020/CountryStatus_Reports-on_FMGR(Final)_7-8-2020_High_Resolution.pdf)

Rishi K. Tyagi, D.H.N. Munasinghe, K.H.M. Ashoka Deepananda, Frank Niranjana and Ravi K. Khetarpal (2020) Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration – Country Status Reports. Asia-Pacific Association for Agricultural Research Institutions (APAARI), Bangkok, Thailand, xiv+129 p.



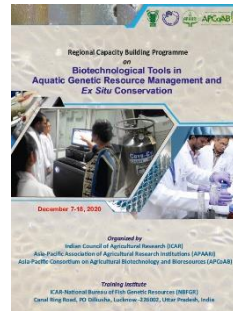
- (iii) **Banana Tissue Culture in India - A Success Story** was published and printed. This document provides detailed information on banana, its different varieties grown across India, cultivation practices, various constraints faced in the conventional propagation of banana and how these can be overcome by the use of banana TC plants. Production of TC plants viz., mother plant selection, initiation, multiplication and hardening are briefly described. Protocols used for virus indexing and genetic fidelity testing for successful implementation of certification system has been provided in detail. The molecular and serological based methods standardized under NCS-TCP for virus indexing of the four major viruses infecting banana have been described. The various challenges encountered during certification procedure of banana TC plants have been discussed with reference to emergence of new diseases, particularly the occurrence of Fusarium wilt caused by the soilborne fungus *Fusarium oxysporum* in G9 cultivar, the production and distribution of plantlets, technology transfer for TC production and adoption of the technology by the farmers. This document is available to all APAARI members and other stakeholders which can be accessed on: [http://www.apaari.org/web/wp-content/uploads/downloads/2019/Banana Tissue Culture-Success Story 29-11-2019 For Circulation.pdf](http://www.apaari.org/web/wp-content/uploads/downloads/2019/Banana_Tissue_Culture-Success_Story_29-11-2019_For_Circulation.pdf)



- (iv) **Revised Brochure of Asia-Pacific Consortium of Agricultural Biotechnology and Bioresources (APCoAB) with updated information** was published. Brochure contains the concise information on mission, genesis, revised objectives, organization structure and steering committee, recent activities and publications and supporters and facilitators of APCoAB. The brochure was distributed to all concerned stakeholders and can be accessed on: <http://www.apaari.org/web/wp-content/uploads/2018/08/2018-APCoAB-Brochure.pdf>



- (v) **Regional Capacity Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ Conservation – Brochure (7 pages).** The brochure contains the needs for aquatic genetic resources (AqGR) management; genesis and purpose of the training; objectives; principal components of the training; and application form to invite the trainees from APAARI-member countries (14).



(vi) **e-Material for Demonstration for AqGR Management**

The demonstration video capsules were developed for virtually organized Regional Capacity Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ Conservation for participants during December 7-18, 2020. A training manual will also be prepared for the benefits of the participants. The above training material will be available in open access to be used by any country in Asia-Pacific and beyond.

***Publications in under preparation (5)**

- (i) Success Story on Sheep and Goats in Fiji and PNG
- (ii) Success Story on Induced Systemic Resistance: A New Hope for Malaysian Papaya Industry
- (iii) Policy Paper on GM Maize in Emerging Economies
- (iv) Regional Expert Consultation on Agriculturally Important Microorganisms
- (v) Success Story of Tissue Culture Raised Apple Root Stock in India

C. APCoAB Website


(i) Content update of databases

- (a) Institutional database: 54 new institutions from 14 countries (total: 302 institutions)
- (b) Educational Institutions: 81 new institutions from 15 countries (total 209 institutions)
- (c) Experts database: 258 new contacts from 20 different countries (total 404 experts)

(ii) Regular update

News (96), events, announcements, infographics (255), uploading of publications, event proceedings updates, etc. Distribution of resource material (proceedings, country status reports, PowerPoint presentations etc. of workshops/Expert Consultations to the participants and different stakeholders.



(iii)  Tweets: 785 with 352.9 K impressions were posted relating to the application and benefits of agricultural biotechnology, and conservation and use of bioresources.

Major Inputs provided

- (i) Inputs for Horti-Asia Conference: developed structure for panel discussion on gene editing and genebank.
- (ii) Inputs for ACIAR for Stage 1 of ACIAR Assessment of Food System Security, Resilience and Emerging Risks in the Indo-Pacific.
- (iii) Inputs for APAARI Progress Report and Work Plan of APCoAB for ECM, July 8-10, 2020.
- (iv) Article on gene editing for APAARI Newsletter (Jan-Jul 2020)
- (v) Joint preparation of Concept Note with AFSI (USA) and BCIL (India) for developing comprehensive policy document on gene editing in Asia.
- (vi) Coordination, networking and preparatory meetings (total 13) with partners from FARA, FANRPAN (Africa), NAFRI (Laos), ICIMOD (Nepal) for developing a Concept Note of Technical and Financial Proposal (for 10 years) on Agrobiodiversity-based food and nutrition security through market-led strategies for SDC.
- (vii) Detailed information about ICAR research institutes provided to AREEO, Iran
- (viii) Proposal for Collective Action on 'Mapping of Landraces and Varieties of Forgotten Crops for Food, Nutrition and Health Security in Selected Asian Countries', to GFAR.
- (ix) Inputs for Concept Note for Regional Consultation on Forgotten Food in Asia-Pacific, for GFAR.
- (x) Write-up related to APCoAB activities for APAARI Newsletter (July-Dec. 2020).

D. Participation in Webinars/Meetings Organized by Other Organizations (16)

- (i) Webinar on Future Digital Currencies and Crypto-Currencies: Policy Choices and Way Forward, May 8, 2020, RIS, India
- (ii) Webinar on Next Generation Genomics and Integrated Breeding for Crop Improvement (VII-NGGIBCI) on Genomics for Food, Health and Nutrition, May 14, 2022, ICRISAT, India
- (iii) Webinar on Digital Dialogue on Defining Medium to Long-Term Improvements for Resilient Food Systems, World Food Prize Foundation, May 14, 2020.
- (iv) Webinar on Experiential Learning in Agriculture Education. American Univ. of Beirut and APAARI, June 2, 2020.
- (v) Webinar on World Food Safety Day Joint FAO/OIE/WFP/WHO Webinar in Asia and the Pacific Food safety in the "new normal", FAO-RAP, Bangkok, June 3, 2020.

- (vi) Webinar on Perspectives on the New USDA Regulation on GM crops. Cornell University, USA, June 5, 2020.
- (vii) Webinar on Genome Editing: Healthcare and Industrial Applications and Regulation, ISAAA, June 19, 2020.
- (viii) Webinar on release of book on “Socio-Economic Impact Assessment of Genetically Modified Crops: Global Implications”, July 6, 2020, organized by RIS, India.
- (ix) AREEO-APAARI Webinar on Knowledge Management, August 17, 2020.
- (x) Participated as Panelist in webinar on Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS), July 27, 2020.
- (xi) Webinar on Nutri-garden: Bridge between Agriculture and Nutrition, IIT Mumbai, Sep. 5, 2020.
- (xii) One CGIAR Global webinar series on “Genome Editing in Agriculture: Innovations for Sustainable Production and Food Systems”, ICRISAT, Sep. 6 and 13, 2020.
- (xiii) One CGIAR Global webinar series on “Genome Editing in Agriculture: Innovations for Sustainable Production and Food Systems”, ICRISAT, Oct. 6 and 20, 2020.
- (xiv) Invited lecture on Strengthening Regulatory Cooperation for Innovative Biotechnology Products, to during virtual APEC-HLPDAB, Malaysia, October 8, 2020.
- (xv) Participated in ICGEB Board of Governors Meeting, ICGEB, Italy, on November 18-19, 2020.
- (xvi) Keynote Lecture on Regulatory Cooperation for Promoting Innovative Biotechnology Products, National Conference on Precision Biotechnology in Agriculture, MARDI, Malaysia, December 8-10, 2020.

E. Networking and Partnerships

- (i) With ICAR, India to co-organize (i) Virtual Regional Expert Consultation on Agriculturally Important Microorganisms and (ii) Virtual Regional Capacity Building Programme on Biotechnological Tools in Aquatic Genetic Resource Management and Ex Situ Conservation.
- (ii) With MARDI, Malaysia, to organize International Conference on Precision Biotechnology (due to COVID-19, conference was converted into national conference).
- (iii) With PCAARRD, Philippines to organize Investment in agricultural biotechnology and its impact on livelihoods of farmers in Asia-Pacific region (due to COVID-19, the event is postponed to 2021).
- (iv) With ISAAA, Philippines and BCIL, India, to develop a project on “Enabling coordination among selected APAC countries for alignment of regulatory policy for gene edited crops”.
- (v) With FARA, FANRPAN, ICIMOD to develop a project on “Agrobiodiversity-based Food and Nutrition Security through Market-led Strategies”.
- (vi) With CLA, Singapore and FSII, India, to develop a project on “Outreach and communication strategy for gene editing acceptance in India”.
- (vii) With FFTC and TLRI, Taiwan, to co-organize International Symposium on the Practice and Benefits of Circular Agriculture in Waste Reducing and Recycling.
- (viii) With MARDI, Malaysia; BCIL, India; University of Goroka, PNG, for documenting the Success Stories.

Memorandum of Understanding (MoU)

- (i) MoU signed among CLA-APAARI-FSII for implementation of the project “Outreach and Communication Strategy for Gene Editing Acceptance in India”.
- (ii) MoU for collaboration between APAARI and ICAR was signed, to collaborate for capacity building and knowledge management in areas of agricultural biotechnology and other agriculture sectors.

F. Governance

(i) Steering Committee Meeting of APCoAB

The XXI Steering Committee Meeting (SCM) of the Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB) was held on July 7, 2020 virtually under the chairmanship of Dr Peter Horne, ACIAR, Australia. Mr Vincent LIN, COA, Taiwan, was Co-chair. The SCM was attended by 21 participants, comprising the Chairman, Vice Chairman, Members of the SC, Special Invitee and observers including APAARI Secretariat Staff. Dr Ravi Khetarpal, welcomed all the participants. Dr Peter Horne presented the opening remarks as chair. Mr Vincent LIN Vice-Chair also made his remarks. After that following agenda items were presented by Dr Rishi Tyagi, Coordinator, APCoAB for discussion/approval in SCM:

Final Approval of Minutes of XX SC Meeting; 2. APCoAB Program – Background, Status, Action Taken Report and Progress Report (June 1, 2019-May 31, 2020); 3. APCoAB Work Plan (January-December 2020); 4. Administrative Matters (Recruitment of Technical Associate, Intern, Extension of Coordinator, APCoAB); 5. Re-constitution of Steering Committee for year 2020-2021; 6. Financial Statement (January-December 2019); 7. General Discussion and Any Other Matters.



The Progress Report (June 1, 2019 to June 30, 2020) and Revised Work Plan (January 1, 2020 to December 31, 2020) was presented and approved by the Steering Committee.

The meeting was concluded by the remarks of Chair and vote of thanks were proposed by Dr Rishi Tyagi, Coordinator, APCoAB. The draft Proceedings were prepared and submitted to the Chair for his approval.

(ii) Executive Committee Meeting (1/2020)

Executive Committee Meeting (1/2020) was held virtually on July 8-10, 2020. The Progress Report (October 1, 2019 to June 30, 2020) and Revised Work Plan (January 1, 2020 to December 31, 2020) was presented and endorsed by the Executive Committee.

G. Project Proposal Approved/Submitted

Approved

- (i) Outreach and communication strategy for gene editing acceptance in India (USD 59,000)

Submitted but not approved

- (ii) Enabling coordination among selected APAC countries for alignment of regulatory policy for gene edited crops (in partnership with ISAAA, BCIL) (USD 3 million)
- (iii) Agrobiodiversity-based Food and Nutrition Security through Market-led Strategies (in partnerships with FARA, FANRPAN) (CHF 2,400,000)

H. Tentative Work Plan of APCoAB for 2021

Area	Activities
Expert Consultation/ High Level Policy Dialogue	<ul style="list-style-type: none"> • High-Level Policy Dialogue on Gene Editing in Asia-Pacific (July-August 2021) Co-organizers: CLA/KBSH
Symposia/trainings/workshops/online surveys/feedback analyses	<ul style="list-style-type: none"> • Webinar Series (3-4) on Gene Editing (January- April 2021) Co-Organizers: BCIL/AFSI/KBSCH • Implementation of Nagoya Protocol in Asia-Pacific region (May-June 2021) Co-organizers: ICAR/Bioversity-CIAT • Investment in agricultural biotechnology and its impact on livelihoods of farmers in Asia-Pacific region (August-September 2021); Co-organizers: PCAARRD • Biotechnological tools for conservation of animal or fish genetic resources (October-November 2021) Co-organizer: ICAR/ MARDI • Online Survey on Perception of Gene Editing and data analyses of survey and Feedbacks of Events
Steering Committee of APCoAB	<ul style="list-style-type: none"> • Steering Committee Meeting of APCoAB (June-July, 2021)
Publication of proceedings/status reports/success stories	<ul style="list-style-type: none"> • Proceedings of Expert Consultations and Workshops (January-December 2021) • Preparation of a Resource Document on Applications of Gene Editing in Sustainable Agriculture and Food Security in Asia Pacific Region (August-December 2021) • One Policy Paper on GM Maize and two success stories - (Success Story on Induced Systemic Resistance: A New Hope for Malaysian Papaya Industry; Tissue Culture Raised Apple Root Stock in India) (January-December 2021)
APCoAB website	<ul style="list-style-type: none"> • Regular updates on agricultural biotechnology and bioresources developments, news and events of specific relevance to Asia-Pacific • Update of existing databases; Regular updates of other content and additional databases
One activity as suggested by COA	<ul style="list-style-type: none"> • To be decided by COA (November-December 2021) Co-organizer: COA

I. Table 1: Summary of Account Statement of APCoAB (January 1, 2020-December 31, 2020)

	(in USD)	(In Kind)	
Receipts		Name of Partners	Amount in USD
COA, Taiwan	170,000.00	NBFG-ICAR	6,785.00
APAARI and Partner Contribution	70,000.00		
Sponsorship	0.00		
Total	240,000.00		
Payments			
Salary costs	109,748.00		
Other Direct Costs			
Staff Time for Online Meetings/Trainings/Workshop	32,202.14		
Consultancy	8,000.00		
Telephone	324.25		
General communication	182.04		
Computer Hardware and Software	3,634.67		
Sponsorship	0.00		
Courier	553.00		
Hospitality	42.97		
Publications	4,362.77		
Miscellaneous Charges	1,771.21		
Facilities from Secretariat	25,708.50		
Total Expenditure	186,529.55		
Previous year loss adjusted	8,072.00		
Grand Total of Expenditure	194,651.55		
Balance	45,348.00		

* One third of the KM Cost is Charged for conducting online webinars/meetings/survey and other online activity as required due to COVID-19 Pandemic

Table 2. Summary of Expected Income and Expected Expenditure for the APCoAB activities during January 1, 2021-December 31, 2021

	USD
Receipts	
COA, Taiwan	170,000.00
APAARI and Partner Contribution	70,000.00
Balance Brought forward	45,348.00
Total	285,348.00
Payments	
Salary costs	112,768.00
Other direct costs	
Meetings/Trainings/Workshop	87,848.00
Publications/printing etc.	15,000.00
Consultancy	10,000.00
Telephone and other communication	2,000.00
Travel	20,000.00
Computer hardware and software - Laptop	2,000.00
Facilities from Secretariat	26,500.00
Miscellaneous	9,000.00
Total	285,116.00
Balance	232.00