Concept Note

Regional Expert Consultation on Agriculturally Important Microorganisms

(Virtual)

Background

Sustainable Development Goals (SDGs) 2030 adopted in 2015 by the United Nations for achieving environmental, social and economic growth through green methods and cleaner production technologies. Agriculturally important microorganisms (AIMs) can play a major role to achieve these targets. The number of microorganisms currently used for food or agriculture applications is small relative to the huge number of species potentially useful, partly because of technical limitations to the culturing of many living microorganisms[1].

Majority of the biomass and biodiversity of life on the Earth are accounted by microbes, and so far about 10% of the Earth's microbial diversity has been characterized. They play a significant role in biogeochemical cycles and extend various ecosystem services. Many microorganisms are rich and serve as untapped reservoirs of metabolic products and, hence, they are potentially important for scientific, industrial and economic purposes. The uninterrupted availability of such microbes for modern scientific security and their ultimate utilization for academia and industry are of paramount importance[2]. The applications of AIMs are numerous, for example, biofertilizers and biopesticides, biostimulants, biocontrols, beneficial symbiosis and other agro-industrial processes. Despite the numerous benefits of microorganisms in agriculture, the focused approach for their characterization, conservation and sustainable utilization is lacking in the region. Climate change, habitat destruction, and several developmental and man-made activities are the major causes of loss of microbial biodiversity which calls upon the concerted and consistent efforts, and regional cooperation for long-term conservation of the valuable microbial gene pool in the repositories and in nature.

Rationale

Microbial biodiversity makes production systems and livelihoods more resilient to shocks and stresses, including to the effects of climate change. It is a key resource in efforts to increase food production

[1] http://www.fao.org/3/CA1994EN/ca1994en.pdf

[2] Sharma *et al* (2018) doi.org/10.1007/978-3-319-96971-8_1

while limiting negative impacts on the environment. It makes multiple contributions to the livelihoods of many people, often reducing the need for food and agricultural producers to rely on costly or environmentally harmful external inputs. Although, limited public- and private-sector *ex situ* conservation initiatives for targeted species of associated biodiversity have been established, with many countries, for instance, holding culture collections of microorganisms used in agriculture or in agri-food industries[3].

During the recent past, the increasing economic importance of biotechnology and the introduction of new legislation concerning the use of and access to biological resources has subjected exchanges of genetic resources to greater controls. Their access and distribution are more strictly regulated and, therefore, exchanges are becoming more and more formalized. The goal of further formalization and harmonization of institutional frameworks should, therefore, be to provide the broadest possible access to essential research materials (within the constraints set by biosecurity and quality management requirements), while maximizing the reciprocity benefits of access and exchange[4].

Many countries are actively involved in collecting and exchanging microorganisms in the global arena. The majority of big culture collections are situated in OECD countries and that is also where the majority of collection, distribution and exchange takes place. The microbial strains from non-OECD countries however, represent an important and growing subset in the overall network of culture collections. Global exchange of microbial genetic resources has proven invaluable to researchers both in developing and developed countries. Obtaining access to this diversity, spread as it is across international and continental divides, is essential for scientific research which turns on the ability to screen microbial populations for new applications or for basic understanding of the role and function of microbial diversity. The use of certified materials from the culture collections diminishes the costs from mistakes in cumulative research and decreases the search costs for finding appropriate materials. Therefore, the socio-economic benefits of the investment in culture collections are substantial[5].

Users of microorganisms are both from public and private sector entities and farmers. Global distribution and exchange of well-documented microorganisms that are publicly available for research is organized by service culture collections. Because of lack of capacity and high operating costs, the holdings of the culture collections only represent a small subset of the total holdings in the many more research collections[6]. Due to imbalanced use of chemical fertilizers and agrochemicals has a considerable negative impact on economy and environmental sustainability. To achieve the objective of sustainable agricultural practices there is a need for understanding both basic and applied aspects of agriculturally important microorganisms. Focus needs to be on transforming agricultural systems from

[3]http://www.fao.org/3/CA3229EN/CA3229EN.pdf

[4]Dedeurwaerdere (2010) doi:10.1016/j.resmic.2010.04.012

[5]http://www.fao.org/tempref/docrep/fao/meeting/017/ak566e.pdf

[6] http://www.fao.org/tempref/docrep/fao/meeting/017/ak566e.pdf

nutrient deficient to nutrient rich soil-plant system[7]. In view of the above situation, a Regional Expert Consultation on Agriculturally Important Microorganisms is being organized with defined objectives:

Objectives

1. To discuss the knowledge gaps and way forward in defining regional priorities concerning AIMs.
2. 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.

Expected outcomes

a) The Regional Expert Consultation will provide a platform for sharing experiences/knowledge about AIMs those are important for sustainable agriculture in Asia-Pacific.
b) Assessing the importance of most potential AIMs and exploring the possibilities of their commercial use and eventual benefit to smallholder farmers in Asia-Pacific.
c) Developing a Road Map to ensure efficient management including conservation and sustainable use, and commercialization of AIMs.

Organizers/Collaborators

The Virtual Regional Expert Consultation will be jointly organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI), Bangkok, Thailand, under its programme on Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB), Indian Council of Agricultural Research (ICAR), National Bureau of Agriculturally Important Microorganisms (NBAIM), India, and Council of Agriculture (COA), Taiwan.

Participation

Around 120-150 participants including senior officials, selected experts from NARS of member countries of APAARI; experts in the fields of agriculture microorganisms; representatives from local (from India) universities, ministries, research institutions who are working on AIMs including scientists, academicians and related government officers; CG Centres; donors; private sector; and NGOs.

Date

October 28, 2020

[7]Meena *et al* (2017) Agriculturally Important Microbes for Sustainable Agriculture. 10.1007/978-981-10-5343-6. Springer