



Draft
CONCEPT NOTE

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

Background

Soil and plant ecosystems are the foundation of human life support systems. However, with our thrust to grow more food, soils have been particularly misused world-wide to an extent that these are now affecting the state of our health and well-being not only through plant and animal health but also directly affecting the environment in which we live. For sustainable crop production, it is essential to understand the soil environment in totality in which plants grow and the biotic stresses that the plants are subjected to.

Sustainable use of terrestrial ecosystems and reversing land degradation is part of Sustainable Development Goals (SDG) 15. Agriculture is the major occupation in Asia Pacific Region (APR) and activities to achieve SDG 15 will significantly contribute to the first three SDGs (eradicating poverty, hunger and enhancing healthy well-being) as well. Carbon sequestration addresses “Zero Hunger”, “Climate Action” and “Life on Land”, three of the 17 SDGs. Realizing the significant role that *soils* play in food and environmental security and in abating climate change, the United Nations declared 2015 as the year of soils. Similar to this the International Union of Soil Science (IUSS) has declared 2015-2024 as International Decade of Soils. Similarly plant health is the key to the sustainable intensification of agriculture to feed the growing global population by 2050. Global efforts are being made to save colossal crop losses from the ravages of pests and diseases but the approach towards this endeavor has to be pragmatic as environmental concerns are to be kept in mind. The FAO Conference in July 2017 approved a resolution requesting the General Assembly of the United Nations to consider declaring 2020 as the International Year of Plant Health. A number of SDGs that can be addressed by ensuring sound plant health such as that of Poverty (SDG 1), Zero hunger (SDG 2), Good Health and Well-being (SDG (3), Climate action (SDG 13) and Partnership for the goals (SDG 17). FAO has initiated a number of global and regional programs to ensure soil and plant health. This has to catalyze the national programs and priorities in the region.

Defining the Problem

Soil Health

Soil health being an attribute of physical, chemical and biological processes is constantly declining and is often cited as one of the reasons for stagnating or declining crop yields and low input use efficiency. The physical deterioration of soil health is through waterlogging, submergence, flooding, soil compaction, crusting, poor infiltrability and impedance to root penetration. Chemical degradation of soil health is due to salinization/ alkalization, acidification, soil toxification and contamination. Humus, soil organic matter, primarily nitrogen, oxygen levels, pH, temperatures and soil moisture levels are adversely affected due to modern agricultural practices deteriorating biological activity in soil. The physical, chemical and biological degradation of soil health along with

inadequate and imbalanced nutrient use and neglect of organic manures is the cause of multi-nutrient deficiencies (secondary, macro and micro-nutrients). This coupled with poor field water management is the major cause of low crop productivity and reduced nutrient and water use efficiency. The biodiversity of the organisms in the soil perform vital ecosystem services that include nutrient cycling, aiding in soil formation and regulation of atmospheric composition and climate, improving water quantity and quality, as well as maintaining soil productivity.

Plant Health

In a recent study by International Plant Protection Convention, it was found that the most important issues in Asia and the Pacific are the need for strengthened phytosanitary capacity, emerging pests and changing environment. Further, annual potential costs globally due to spread of pests and pathogens is estimated at USD 540 billion. Emerging pests in general and the environment are also important concerns for APR. The main phytosanitary capacity needs of Asia are pest surveillance, inspection, pest reporting, diagnostics and use of phytosanitary treatments. The introduced pests and disease of concern to Asia are brown planthopper, Golden snail and Khapra beetle and the Pierce's disease. The main concern for the Pacific region is plant diseases, particularly Anthracnose fungus, Brown eye leaf spot, Fruit rot and Citrus canker. The main phytosanitary capacity needs of the South West Pacific are pest surveillance, use of phytosanitary treatments and the ability to raise national phytosanitary awareness. Among the insect pests, Coconut Rhinoceros Beetle is of concern. Range of direct crop yield losses due to pests and diseases is between 20 and 40% without reflecting true costs to consumers, public health, societies, economic fabrics and farmers. More than twenty pests and several diseases contribute to these crop yield losses in addition to post harvest losses.

Soil and Plant Health Interaction

Deteriorating soil health, emerging pests and development of nutritional disorders and other factors causing ecological imbalances cannot be dealt in isolation. Environmental concerns include overuse of chemicals for pest management, climate change and poor soil conditions through natural causes or mismanagement. Studies on interaction of soil and plant health and their interdependence in the context of climate change are rather limited. More bio-diverse soil environments have more kinds of predators that reduce the chance of some species to dominate, which in turn reduces the risks of diseases in plants and humans, and control growth of pests. High soil biodiversity is also high in natural pest control potential, as it enables a higher probability of hosting a natural enemy of the pests. Pests serve ecosystems in regulating biodiversity itself. Soil-borne pathogens and herbivores control plant abundance, which enhances plant diversity. Agrochemical inputs adversely affect soils with high biodiversity. Most soil quality evaluation has been done in North America and Europe though soil degradation is more severe in the subtropics and tropics. Land degradation issues are further complicated by the chronic poverty, political and social instability, and high rates of weathering that occur throughout APR. However, important insights into management and economic approaches to improve soil quality are still awaited in the APR.

Objectives of Regional Conference

The Regional Conference will deliberate on soil and plant health scenario in APR involving diverse experts from research, development, extension, policy makers, private sectors, professional societies, Civil Society Organizations and donor organizations. It will be a platform to share region specific long-term experiences on the neglect of soil and plant health, soil biodiversity, emerging crop pests and diseases through ecosystem approach in the context of climate change and variability; and suggest location-specific and region-specific measures and provide a platform to identify

regional priorities and also to catalyze the global initiative through new collaborations, regional networks and projects.

Setting the Regional Priorities

Soil and plant health related issues being highly location, specific, the deliberations will contribute in setting the regional priorities on research, development, extension and policy in the Asia Pacific involving various stakeholders.

Priorities for soil health may include development and harmonization of baseline data on soil resource status and emerging plant health issues, sharing of innovations and success stories of restoring soil resource to enhance agricultural productivity, addressing soils reclamation aspects in soil health management program, encouraging conservation agriculture as an alternative to residue burning, organic carbon content monitoring and incentivizing the farmers through payment of ecosystem services and bringing the issue of soil carbon sequestration on the political agenda. Besides, attention of civil society organizations to be drawn towards soil and plant health in the safe disposal of municipal wastes and industrial effluents to prevent contamination of soils and water.

For plant health specifically some of the approaches that need emphasis include plant health diagnosis and management of pests and diseases through plant clinics and use of drones, disease resistance through marker assisted breeding, ecological or bio-intensive management (use of bio-fertilizers), epidemiology and forecasting models that consider weather and soil data dynamically, remote sensing for pest detection and management, Integrated Pest/ Disease/ Crop Management systems, decision support systems, dynamic interactive agro-advisories, bioinformatics, adaptation strategies under changing climate, application of proteomics and transcriptomics for understanding disease and applications for management, use of nano particles for efficient, effective and environmentally safe chemicals, post-harvest pathology, quarantine and health and trade restrictive issues, etc.

Extension policies, capacity development and knowledge sharing mechanism needs to be highlighted for achieving the targets. Creating awareness amongst the stakeholders/masses on the significance of soil and plant health should form a part of knowledge management and knowledge sharing program.

Some Expected Outcomes

- A regional knowledge platform is developed to access new technologies within and outside the region to enhance soil and plant health
- New networks are emerged to protect and sustainable use of soil and develop baseline information on soil and plant health
- National priorities are revisited, outlined and documented to help in developing roadmap to sustainably use soil resources and effectively deal with emerging plant health concerns
- Preparedness for need based capacity development and policy interventions that are addressed for each sub region or a country for dealing with soil and plant health

Participants: Experts from APAARI member countries and regional and global organizations, members of professional societies, donor organizations etc.