Concept Note

Workshop on Climate Smart Mechanization for Transforming Agriculture in Arid and Semi-Arid Areas

28th September 2022

(14:00-16:00, Beijing time / GMT+8)

I. Background and Rationale

Drought and water scarcity have been a critical concern that threatens both food security and the global economy. Climate change is estimated to increase the drought risk in many regions all over the world. Based on estimates of the World Bank, the number of people that could be forced to migrate due to drought, water scarcity, declining crop productivity and other negative factors can reach 216 million by 2050.[1]

The COVID-19 pandemic has further exacerbated the already hard situation in fighting world hunger and malnutrition pushing millions more people on the brink of poverty. Among the farming community, smallholder farmers and vulnerable groups are the dominant part of the affected. The 2022 Global Report on Food Crises shows that the number of people experiencing acute food insecurity rose to nearly 193 million in 2021, up 40 million from the previous year[2].

The agricultural sector is vital for addressing the challenges in combating food insecurity, reducing poverty, enabling recovery from the pandemic and building resilience. Sustainable and efficient agricultural techniques that optimize land and water usage, help grow and produce more food can contribute to tackle these threats, catalyze the transformative change of agri-food systems towards greener, inclusive and sustainable development.

Sustainable agricultural mechanization is crucial in supporting recovery and building resilience of farming communities to current and future shocks. Sustainable agricultural mechanization can increase food production, minimize water usage for irrigation, reduce production costs and post-harvest losses, as well as save manpower while also contributing to reduction in carbon emissions. Innovative technologies applied in agricultural machinery such as satellite navigation and positioning, intelligent perception, automatic navigation and driving have shown great potential to transform the agricultural sector to an agent which enables effective responses to the challenges. In turn, all of these can make a great positive impact on global food

[1] Drought in Numbers 2022, UN Convention to Combat Desertification
[2] 2022 Global Report on Food Crises

supply and security, as well as contribute to enhanced resilience.

For instance, in Central Asian countries, agriculture plays a predominant role in economic development. Most areas in the region are under dry and continental climate with strong winds and sand storms during dry season. Due to severe level of drought, the agricultural sector in the sub-region has faced such hardships as livestock die-offs, shortage of water for irrigation, crop failure, large amount of food loss and farm production decrease.[3] Such drought-prone situation is also on rise in a number of countries in other regions like north and east Africa.

Leveraging agricultural technologies can help to increase agricultural productivity, output and farmers' income by improving efficiency in field operations in dry climate areas. For example, digitalized water efficient technologies can help to fight water scarcity, soil water salinization and other issues. The advantages of technological approach in dryland agriculture lies in benefits that it can bring to the farmers and contribution that it makes towards climate change adaptation and mitigation.

In analogy to the Central Asian subregion, China's Northwest region also has hot and highly dry climate circumstances. This kind of arid and semi-arid areas that account for about 47% of total land area of China face similarly harsh weather conditions and represent one of the most vulnerable agricultural systems in the context of global climate change.[4] To deal with arid land agriculture China employs a host of interventions and measures with innovative technologies such as water efficient technologies, drought-tolerant crops, mechanized soil management, drip irrigation and drainage technologies, as well as artificial intelligence and robotics. China's experiences and expertise in innovative agricultural solutions and technologies can be exchanged and shared with many other countries including Central Asian countries with proximity in climate conditions.

The 'Workshop on Climate Smart Mechanization for Transforming Agriculture in Arid and Semi-Arid Areas' will seek to enhance capacity in addressing climate challenges and food insecurity in the drought-prone areas such as Central Asia and contribute towards the objectives of the Food Systems Summit which calls for pragmatic actions for improved global food systems. The workshop will gather and deliberate on the cutting-edge and innovative mechanization technologies and solutions for arid and semi-arid areas in enabling improved and sustainable agriculture with a focus on how innovative agricultural technologies can improve

[3] FAO Water Reports 44, (2017), Drought characteristics and management in Central Asia and Turkey

[4] Dachuan Liu, Yan Li, Pengfei Wang, Huaqi Zhong, and Pu Wang, (2021), Sustainable Agriculture Development in Northwest China Under the Impacts of Global Climate Change

farmers' resilience to climate change in fight against drought attacks and support food systems transformation for developing countries with emphasis on smallholder farmers and vulnerable communities. The training workshop will be co-organized by the Centre for Sustainable Agricultural Mechanization (CSAM) and the Sub-regional Office for North and Central Asia (SONCA) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the World Food Programme China Office, Administrative Committee of Yangling Agricultural High-Tech Industry Demonstration Zone of China and the International Poverty Reduction Center of China (IPRCC). The workshop will primarily be tailored to the needs and demands of Central Asian countries, but it will also be open to other interested countries and sub-regions.

II. Objectives

The aim of the Workshop is to promote sustainable climate-smart mechanization practices and solutions including digital and intelligent technologies and innovations for agriculture in arid and semi-arid areas. The event also serves to enhance regional cooperation in tackling climate vulnerability through information exchange and knowledge management to strengthen resilience of farmers to the climate crisis and support mechanization of dryland agriculture.

The event will consist of four sessions, namely, Opening Session, International Experience, Practice and Technology Sharing, National Perspectives, Concluding and Summary. In the Opening session, senior level speakers will be invited to make an introduction and deliver opening remarks to underline the significance of the application and adoption of climate smart mechanization in building resilience to drought and enabling recovery for the agricultural sector. The International Experience, Practice and Technology Sharing session will invite technical experts and professors to share expertise, innovative technologies, and good practices pertaining to mechanization-based solutions (including digital and intelligent technologies applied to agricultural machinery), such as those for water efficient technologies for dryland agriculture and conservation agriculture, and their effectiveness in contributing to reduction of carbon emissions and adaptation. During the third session – Panel Discussion on Country Cases - speakers from Central Asian countries will present their views, experiences and perspectives on mechanization-based technologies and practices in response to drought and water scarcity in their countries. The concluding session will draw a summary on the workshop outcomes.

The workshop seeks to achieve the following objectives:

1) Disseminate the importance and advantages of climate-smart mechanization and the potential of cutting-edge technologies' in arid and semi-arid areas.
2) Expand awareness about the role of agricultural innovation in achieving food security.
3) Stimulate adoption of mechanized agricultural solutions and practices suitable for dryland agriculture.
4) Provide a knowledge and information sharing platform for the exchange of experience in the field of mechanized soil and water management systems for dryland agriculture and other technological practices between participating countries, and explore opportunities for cooperation.

III. Organization and Participation

The Workshop will take place on 28th September 2022 through virtual modality using the Zoom platform. More detailed information will be shared with the registered participants separately. While the Workshop will be oriented towards audience from Central Asian countries it will also welcome participants from other countries and sub-regions. The major target audience will be representatives at technical and policy/management levels in government agencies, research/educational institutes and civil society organizations as well as the private sector. The event is also open to other interested stakeholders. Woman participants are strongly encouraged.

The event will be conducted in Russian, English and Chinese with simultaneous interpretation in all three languages. Instructions on how to register and participate in this online event will be circulated in due course.

IV. Tentative Agenda

Workshop Agenda (14:00-16:00, Beijing Time, 28th September 2022)

Time	Agenda
14:00-14:20	**Opening Session**
	Moderator: Ms. Yutong LI, Head of ESCAP-CSAM Welcome remarks: • Mr. Siddharth Chatterjee, United Nations Resident Coordinator in China • Ms. Ling HE, Deputy Secretary of the Administrative Committee of Yangling Agricultural High-Tech Industry Demonstration Zone, China

	• Ms. Michiko Enomoto, Deputy Head, ESCAP Sub-regional Office for North and Central Asia (SONCA) (To Be Confirmed/TBC) • Mr. Sixi Qu, Representative of the World Food Programme, China • Representative of International Poverty Reduction Centre of China (TBC)
14:25-15:20	**International Experience, Practice and Technology Sharing**
	Moderator: Mr. Anshuman Varma, Deputy Head/Programme Officer, ESCAP-CSAM • Climate Smart Mechanization in Central Asia—Ms. Mina Kumari Devkota Wasti, International Center for Agricultural Research in the Dry Areas • Innovation on Climate Smart Mechanization Technologies for Dryland Farming in China—Mr. Jinghui XU, Associate Professor, Northwest Agricultural & Forestry University, China • Mechanization for Conservation Agriculture and its Significance for Carbon Neutrality—Mr. Aziz Nurbekov, Professor, Tashkent Sate Agrarian University, Uzbekistan • Digital and Intelligent Technologies in Advancing Agricultural Mechanization in Arid and Semi-arid Areas—Mr. Junfeng WANG, Professor, Dean of School of Energy and Power Engineering, Jiangsu University, China
15:20-15:45	**Panel Discussion on Country Cases**
	Moderator: Ms. Aisha Abdualiyeva, Programme Facilitator, ESCAP-CSAM Panelists from: • Kazakhstan (TBC)- • Kyrgyzstan--Mr. Zhaylobek Bularovich Mad'yarov, Leading Specialist, Department of Mechanization, Innovative Technologies and Agricultural Cooperation, Ministry of Agriculture, Kyrgyzstan. • Tajikistan (TBC) • Turkmenistan (TBC) • Uzbekistan—Ms. Kurbanova Muazzam Fazlitdinovna, Associate Professor, Director of the Information and Resource Centre, Tashkent State Agrarian University
15:45-15:55	**Q&A**
15:55-16:00	**Concluding Remarks and Summary**
	• Mr. Anshuman Varma, Deputy Head/Programme Officer, ESCAP-CSAM