United Nations
Convention to Combat
Desertification

G20 GLOBAL
LAND INITIATIVE

TRAINING REPORT

BIOSALINE AGRICULTURE AS AN APPROACH TO LAND RESTORATION

4-7 November 2024 / Dubai, United Arab Emirates

ICBA
AGRICULTURE FOR TOMORROW

TRAINING HIGHLIGHTS

Marginal environments are constrained by abiotic stresses such as salinity, water scarcity and heat. Climate change is exacerbating these constraints, resulting in frequent droughts and desertification, and further challenging agricultural production in such regions. Appropriate land restoration approaches can help in mitigating and adapting to climate change in marginal environments. Where there are high levels of water and soil salinity, biosaline agriculture is a potential approach for land restoration in such environments.

G20 Global Land Initiative, hosted at the United Nations Convention to Combat Desertification (UNCCD) joined forces with The International Center for Biosaline Agriculture (ICBA) to develop national capacities for land restoration.

Under this collaboration, ICBA and the G20 Global Land Initiative have recently concluded the first international training course “Biosaline Agriculture as an Approach to Land Restoration” for 25 decisionmakers, researchers, and experts from 23 countries.

The training course provided a set of comprehensive modules on land restoration in marginal environments through biosaline agriculture. The training covered site-specific techniques for land restoration and stabilization in such environments. It also provided an overview of the global climate change impacts, their effect on natural vegetation, the importance of crop biodiversity and integrated crop systems, sustainable land and water resources management measures, and other important topics related to marginal environments such as salinity management. Moreover, it presented the options of using salt-tolerant food and feed crops and agroforestry systems for soil rehabilitation and salinity mitigation as well as for saving freshwater resources.

The course was accredited by the CPD Accreditation Services, UK.

KEY OBJECTIVES OF THE TRAINING WORKSHOP

The workshop aimed to address critical topics related to the impacts of climate change on a global scale, with a particular focus on land biodiversity, utilization, and the environmental conditions of arid regions. Key areas included understanding biodiversity in marginal lands, especially under stressors like salt, drought, and heat, and exploring agricultural biodiversity benefits for land restoration. Participants were introduced to biological intervention options for land restoration, irrigation requirements and management across various crops, soil nutrient management and fertilization practices, as well as integrated land restoration and management procedures.

The workshop was specifically designed for experts, technicians, extension officers, and university students engaged in crop and natural resources management systems (CNRM), with a particular focus on biosaline agriculture. Participants were equipped with practical knowledge to disseminate alternative solutions to smallholder farmers, helping them meet their food and feed needs in the face of climate change.

EVENT STATISTICS

APPLICANTS' DATA

A total of 351 applications were received from 71 countries. The highest interest came from India with 40 applications, followed closely by Nigeria and Pakistan with 37 and 33 applications, respectively.

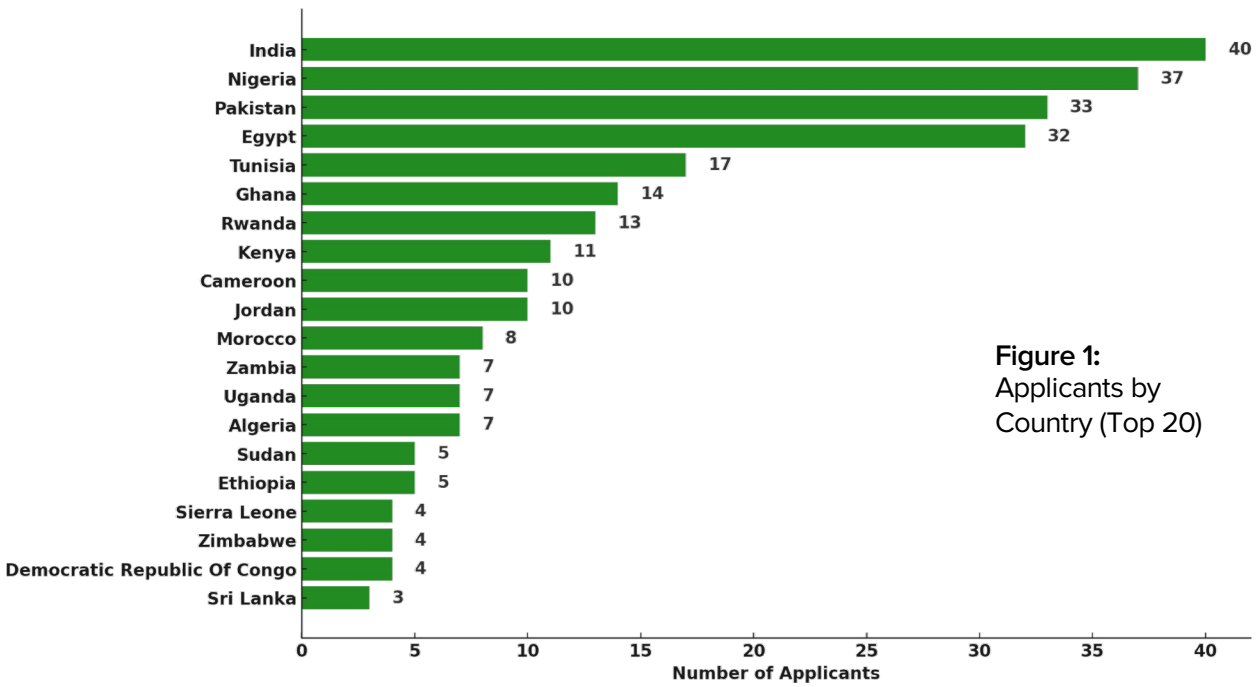
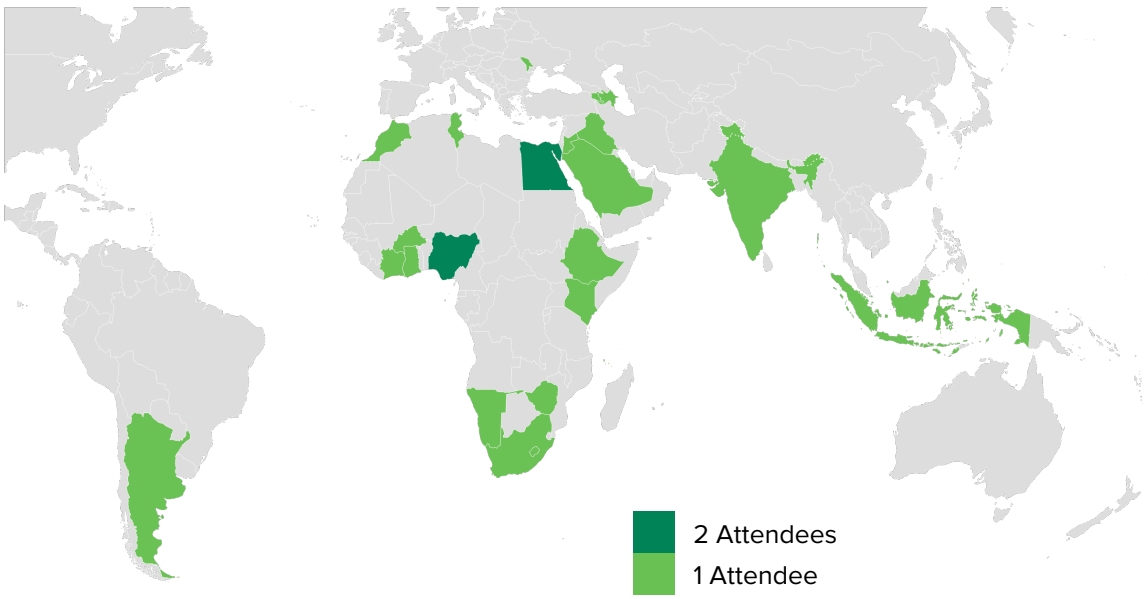


Figure 1: Applicants by Country (Top 20)

ATTENDEES' DATA

Participants were selected based on their sector, experience and potential for advocacy on the learning outcomes from the training. 25 participants were selected from 23 countries, consisting of 14 men and 11 women.

Figure 2: Attendees by Country



KEY LEARNINGS

- **Climate Impact on Ecosystems:** Participants understood how climate change, driven by human activities, affects ecosystems, particularly agriculture, livestock, and forestry, and learned about key mitigation and adaptation strategies.
- **Land Biodiversity in Arid Regions:** They gained insights into global land biodiversity and its utilization, focusing on arid regions that are highly susceptible to climate impacts.
- **Crop Biodiversity and Biosaline Agriculture:** The training highlighted the role of climate-resilient, nutrient-rich crops and the potential of biosaline agriculture for sustainable food production in saline-affected lands.
- **Biological Interventions for Restoration:** Participants explored biodiversity-driven approaches for land restoration, targeting resilience to salt, drought, and heat stresses.
- **Crop and Irrigation Management:** Emphasis was placed on crop management under arid conditions and the importance of efficient irrigation and saline water management.
- **Soil and Nutrient Management:** They learned essential practices in soil nutrient management, fertilization, and soil analysis for effective land restoration.

ANNEXURE

DAY / DATE	MORNING SESSION *09.30 AM - 12.00 PM*	AFTERNOON SESSION *01.00 PM - 03.30 PM*
DAY 1 *(4 Nov 2024)*	➢ Registration ➢ Inaugural Session ➢ Session 1 - Module 1.1: Global climate change impact, Mr. Rashyd Zaboul, Modeler - Climate Change	➢ Session 2 - Module 1.2: Climatic and environmental conditions in arid regions, Dr. Khalil Ammar, Program Leader, Sustainable Natural Resources Management, Principal Scientist – Hydrology/Hydrogeology ➢ Discussion on the day sessions
DAY 2 *(5 Nov 2024)*	➢ Session 3 - Module 2.1: Crop diversity, Dr. Mohammed Shahid, Geneticist ➢ Session 4 - Module 2.2: Benefits of agricultural biodiversity, Dr. Rakesh Kumar Singh, Section Head, Program Leader on Crop Diversification and Genetics, Principal Scientist – Plant Breeding)	➢ Session 5 - Module 2.3: Biosaline agriculture for highly deteriorated lands, Dr. Zied Hammami, Agronomist ➢ Discussion on the day sessions
DAY 3 *(6 Nov 2024)*	➢ Session 6 - Module 3.1: Irrigation management and salinity control, Dr. Asad Sarwar Qureshi, Senior Scientist – Water and Irrigation Management ➢ Session 7 - Module 3.2: Plant nutrition and fertilization, Dr. Henda Mahmoudi, Plant Physiologist	➢ Session 8 - Module 3.3: Soil sampling and analysis techniques for the evaluation of soil fertility, Dr. Ahmed H. El-Nagger, Soil Management Scientist ➢ Discussion on the day sessions
DAY 4 *(7 Nov 2024*	➢ Session 9 - Module 3.4: Rehabilitation and Management of Degraded Soils, Dr. Ahmed H. El-Nagger, Soil Management Scientist ➢ Session 10: The way forward: Discussions with the trainers over a field and facilities tour	➢ Post-course knowledge test ➢ Evaluation of the training ➢ Distribution of certificates and closing