

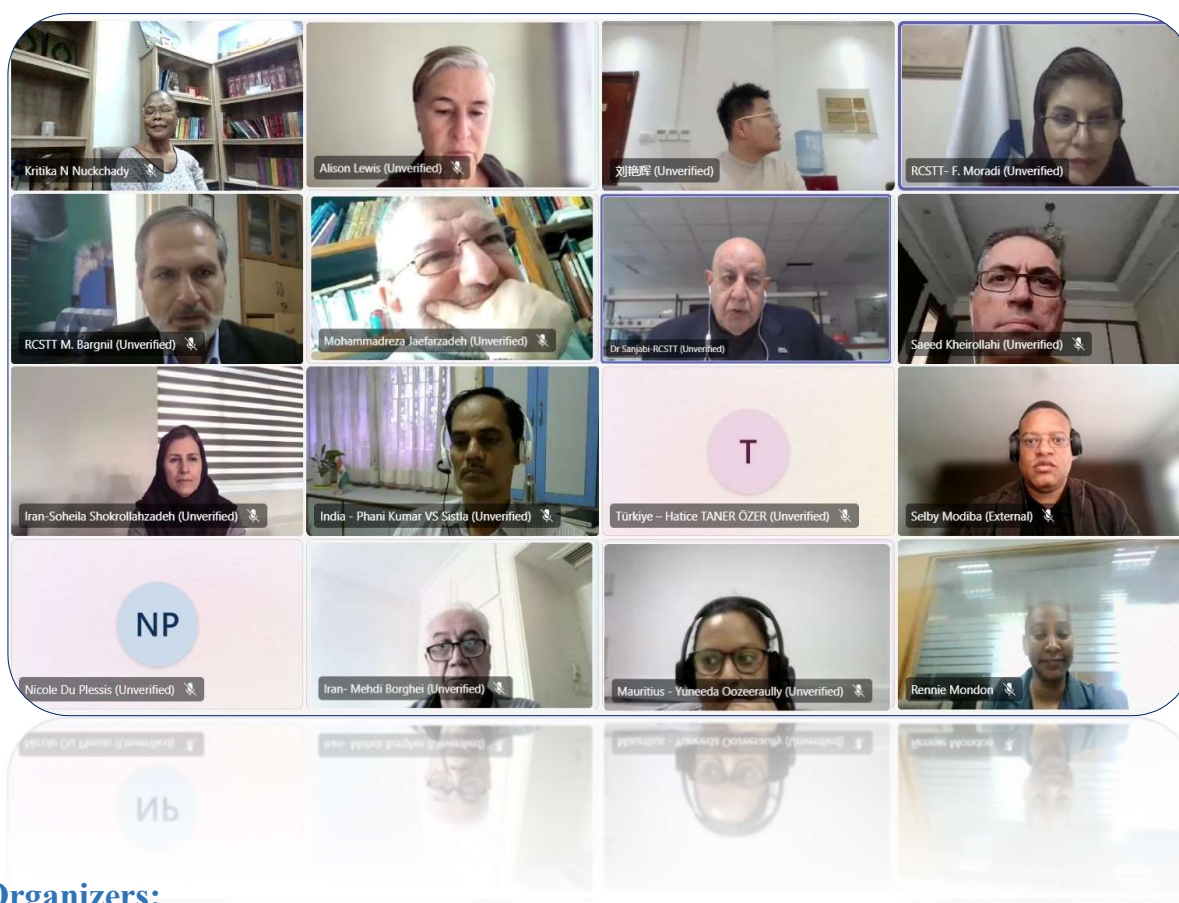
Report of the RCSTT–ISDMU Webinar on Seawater Desalination and Multipurpose Utilization

Date: 26 November 2025

Time: 11:00–14:00 (GMT+4)

Platform: Microsoft Teams (technically hosted by ISDMU, China)

Moderator: Mrs. Fereshteh Moradi, Chief Coordinator of IORA RCSTT



Organizers:

- IORA Regional Centre for Science and Technology Transfer (RCSTT)
- Institute of Seawater Desalination and Multipurpose Utilization (ISDMU), Ministry of Natural Resources, China
- In cooperation with: IORA Secretariat, IORA Working Group on Science, Technology and Innovation (WGSI)

Introduction

The Regional Centre for Science and Technology Transfer (RCSTT), in collaboration with the Institute of Seawater Desalination and Multipurpose Utilization (ISDMU), Ministry of Natural Resources, China, organized the IORA RCSTT-ISDMU Webinar on “Seawater Desalination and Multipurpose Utilization in the Indian Ocean Region.”

The event aimed to facilitate knowledge exchange, highlight recent scientific and technological advances, and strengthen regional cooperation among IORA Member States on sustainable desalination solutions and the utilization of saline resources.

The webinar brought together government officials, researchers, engineers, and experts from several IORA Member States including **Bangladesh, Iran, India, Malaysia, Mauritius, Sri Lanka, South Africa, Tanzania, and Thailand**, as well as IORA Dialogue Partners: **China, Egypt and Turkey**. Their active engagement contributed to a rich exchange of knowledge and experience.

Opening Remarks

Opening statements were delivered by:

- **Representative of the IORA Secretariat**
- **Deputy Chair of the IORA WGSTI**
- **Vice Director of ISDMU, China**
- **Director of IORA RCSTT**

The Opening Remarks underscored the urgent and shared challenge of water scarcity across the Indian Ocean Region, where climate change, population growth, and increasing economic demands continue to strain freshwater resources. Ms. Zelda Vrolik, the Director of IORA Secretariat further contextualized this challenge within global trends, noting that freshwater demand may exceed supply by 40% by 2030, and reaffirmed IORA’s commitment to advancing regional cooperation in Water Science and Technology. She also underscored the role of STI diplomacy and recent collaborative initiatives—including its long-standing partnership with RCSTT and ISDMU—in promoting innovative desalination solutions. In continuation, Mr. Selby Modiba, the Deputy Chair of the IORA Working Group on Science, Technology and Innovation, highlighted desalination as a strategic pillar of its national water security agenda, emphasizing the need for technologies that are energy-efficient, environmentally sustainable, and financially viable.

Then, Dr. Zhang Qiufeng, the Vice Director of ISDMU, speaking on behalf of the Director of ISDMU, stated that China has accumulated extensive technologies and experience in seawater desalination, and that ISDMU is willing to serve as a bridge to strengthen cooperation with all countries in this field.

Dr. Zhang also noted that this workshop represents an important starting point, providing a platform for joint exploration, technological complementarity, shared achievements, regional demonstration, and pathways toward sustainable development.

And finally, as the last speaker of the opening session, Dr. M. Sanjabi, the Director of IORA RCSTT emphasized desalination's broader potential beyond freshwater production, including renewable-energy integration, brine management, and salt and mineral recovery, while reiterating its mandate to strengthen scientific collaboration, capacity-building, and knowledge-sharing among the IORA Member States. Collectively, the Opening Remarks highlighted a unified vision: leveraging science, technology, and regional partnerships to develop sustainable, multipurpose desalination systems that can enhance resilience and support long-term water security across the Indian Ocean Region.

Keynote Presentations

❖ Solar Desalination Technologies: From Concept to Sustainable Practice

Speaker: Prof. S. Shokrollahzadeh, the Project Manager of the “Comprehensive Study on Dual Purpose Desalination” (IROST, Iran)

The presentation introduced advancements in solar-powered desalination systems, emphasizing sustainability, energy efficiency, and the relevance of such technologies for arid coastal regions of the Indian Ocean.

❖ Valuable Product Recovery from Seawater Desalination Brine

Speaker: Prof. Alison Lewis, Director, Crystallization and Precipitation Research Unit, University of Cape Town, South Africa

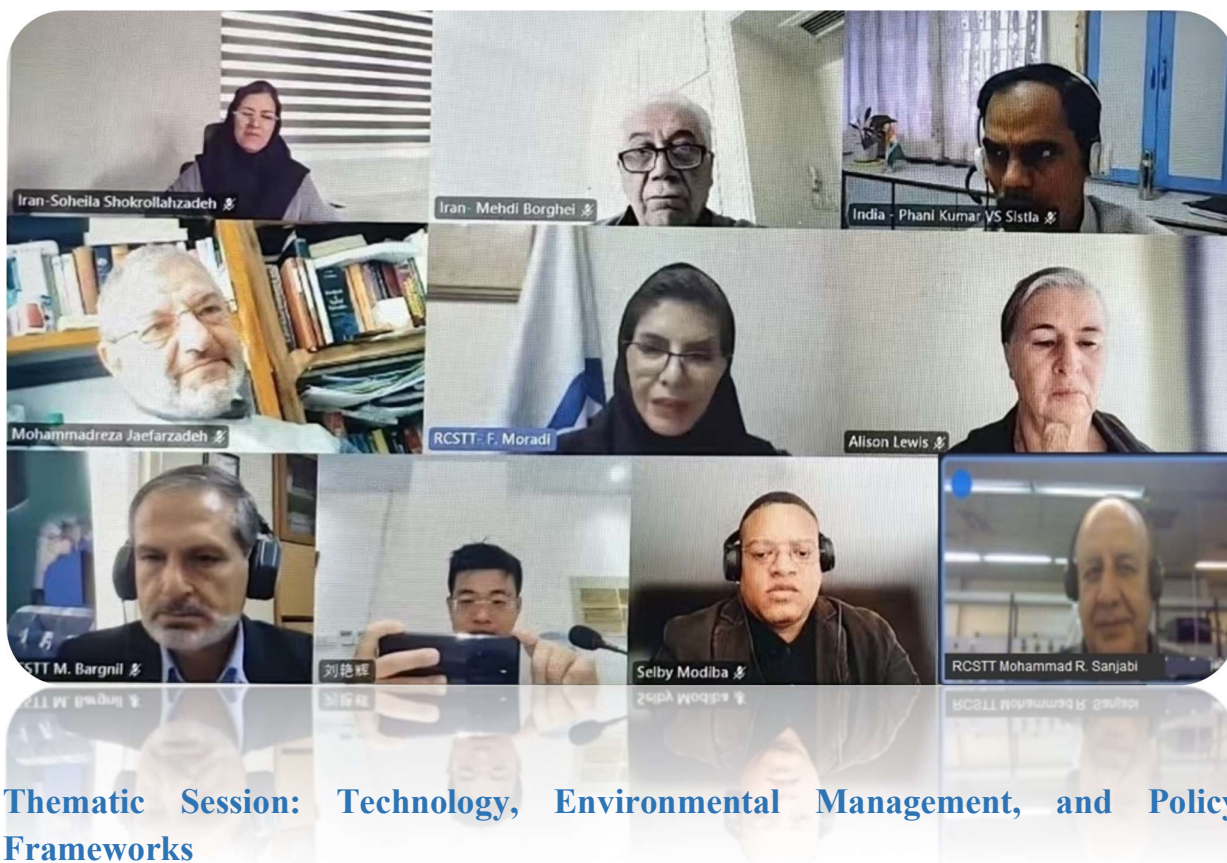
Prof. Lewis discussed modern methods for extracting valuable minerals and chemicals from desalination brine, presenting brine mining as a promising approach for added economic value and reduced environmental impact.

❖ Technical Progress in Coupling Ocean Energy with Seawater Desalination

Speaker: Dr. Xie Chungang, Vice Director, Desalination Technology Research Department, ISDMU

Dr. Xie reviewed global desalination trends and highlighted ISDMU's major technological achievements in the field. It emphasized the role of ocean energy in reducing CO₂ emissions from desalination processes and showcased innovative models that integrate ocean energy with seawater desalination to enhance sustainability and efficiency.

He provided an overview of innovative systems that integrate ocean energy with desalination technologies, highlighting efficiency improvements and future prospects.



This session included diverse technical presentations from India, China (ISDMU), and Iran:

❖ **India: MoES-NIOT Efforts on Sea Water Desalination in Lakshadweep Islands**

By: Dr. S V S Phani Kumar, Group Director, Water and Climate Change, Scientist G, National Institute of Ocean Technology, Chennai, India

MoES–NIOT has successfully implemented Low Temperature Thermal Desalination (LTTD) in the Lakshadweep Islands, using natural ocean temperature gradients to provide sustainable freshwater for remote communities. With plants operating reliably for up to 20 years and expansion underway, these environmentally friendly systems—along with SWRO units—offer practical solutions for isolated island regions.

❖ **ISDMU, China:**

1-The Multi-length Scale Structure of Polyamide TFC RO Membranes

Dr. Wang Jian, ISDMU, Ministry of Natural Resources, China

Dr. Wang from ISDMU presented recent advances in understanding the multi-length scale structure of polyamide thin-film composite RO membranes, which are responsible for over 80% of the world's new desalination capacity.

He highlighted how structural limitations still constrain membrane performance and demonstrated how X-ray and neutron scattering offer powerful tools to analyze PA formation, guide membrane optimization, and quantify structure–performance relationships. The presentation emphasized future prospects for improving durability, efficiency, and overall membrane design through deeper structural insights.

2-Global trends of seawater desalination research: An AI-assisted bibliometric analysis during 2019–2024 AI-assisted bibliometric analysis of global desalination trends (2019–2024)

Dr. Song Hanwen, ISDMU, Ministry of Natural Resources, China

Dr. Song in his presentation provided an AI-assisted bibliometric analysis of global seawater desalination research from 2019–2024, revealing rapid growth in renewable-energy-based desalination and chemical extraction from brine. It highlighted China’s leading position in both publications and patents—though with moderate publication impact—and showed differing patent ownership patterns, with universities dominating in China while enterprises lead in the Middle East and the United States. The study demonstrated that AI-enhanced bibliometric tools significantly improve the depth and accuracy of research trend analysis.

3-Brine Mining Technologies and Typical Cases

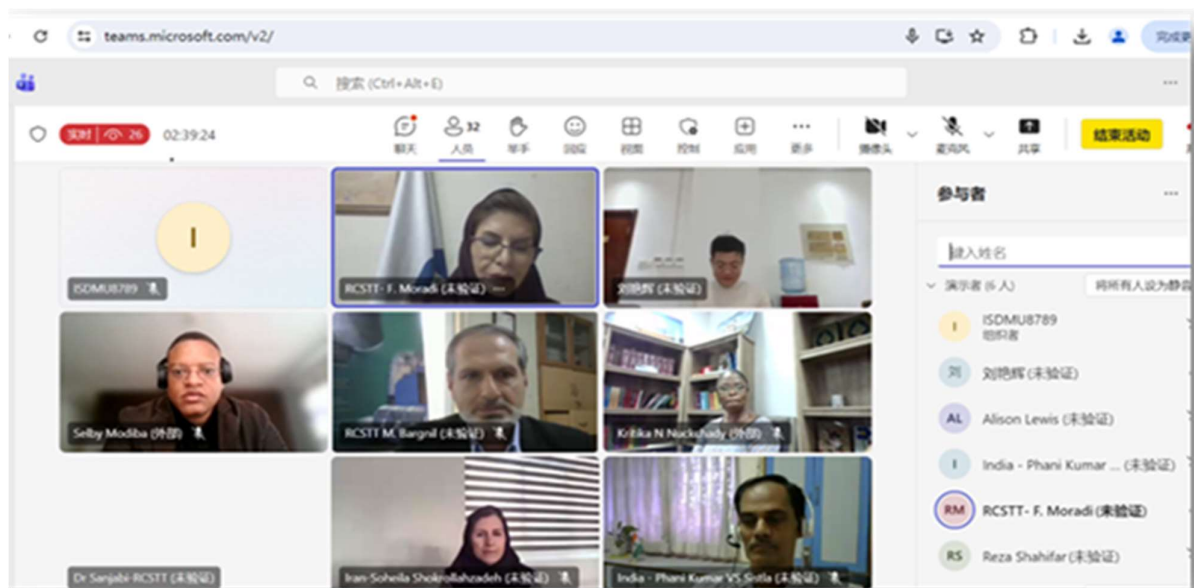
Dr. Luo Bijun, ISDMU, Ministry of Natural Resources, China

Dr. Luo introduced ISDMU’s key projects, achievements, and collaborations, focusing on brine-mining technologies and practical case studies such as large-scale seawater and brine utilization projects, including the upgrade of the Changlu Hangu Saltern. He highlighted advanced research on extracting strategic elements (like lithium, rubidium, and cesium), developing high-value chemical products from bromide, magnesium, and boron resources, and improving key technical equipment. The presentation concluded with future goals to reduce operational costs, enhance extraction efficiency from low-grade resources, and promote sustainable, high-value utilization of seawater chemical resources.

❖ Iran: Survey on the Possible Impacts of Seawater Desalination on Salinity Changes in the Persian Gulf (Asia Water Development Engineering Company)

By: Dr. Reza Shahifar, HSE Manager of Asia Water Development Engineering Company, Iran

Dr. Shahifar’s presentation reviews the natural water exchange processes of the Persian Gulf and evaluates the impact of desalination brine, concluding that even with significant increases in desalination production, the resulting salinity rise—estimated at about 1 g/L—would remain within environmentally acceptable limits due to the Gulf’s continuous water circulation with the Sea of Oman.



Conclusion and Recommendations:

This session provided a multidisciplinary view of evolving technologies, environmental concerns, and emerging policy needs.

The RCSTT–ISDMU webinar successfully advanced regional dialogue on desalination technologies and multipurpose saline resource utilization. The event reinforced IORA’s commitment to scientific cooperation, innovation, and sustainable development. The organizers emphasized continued collaboration and follow-up actions below to turn discussions into concrete regional initiatives.

1. Strengthen Collaborative Research and Knowledge Exchange

Promote joint research programs, expert exchanges, and coordinated studies, particularly on low-energy and renewable-based desalination technologies.

2. Enhance Capacity Building and Technical Training

Organize specialized trainings, workshops, and technical sessions to upskill scientists, engineers, and policymakers in IORA Member States.

3. Support PPPs and Innovation

Encourage public–private partnerships and private-sector engagement to accelerate the adoption of efficient and cost-effective desalination technologies.

4. Develop an IORA Knowledge Platform on Water Technologies

Establish an online regional hub dedicated to desalination and water-related technologies to facilitate continuous data sharing and collaboration.

5. Implement Regional Pilot Projects

Launch pilot-scale demonstration projects on multipurpose desalination tailored to different national contexts within the Indian Ocean Region.

The webinar concluded with the above set of practical and forward-looking recommendations, which will be further reviewed by the speakers and participants to refine, revise, and finalize them for future actions.