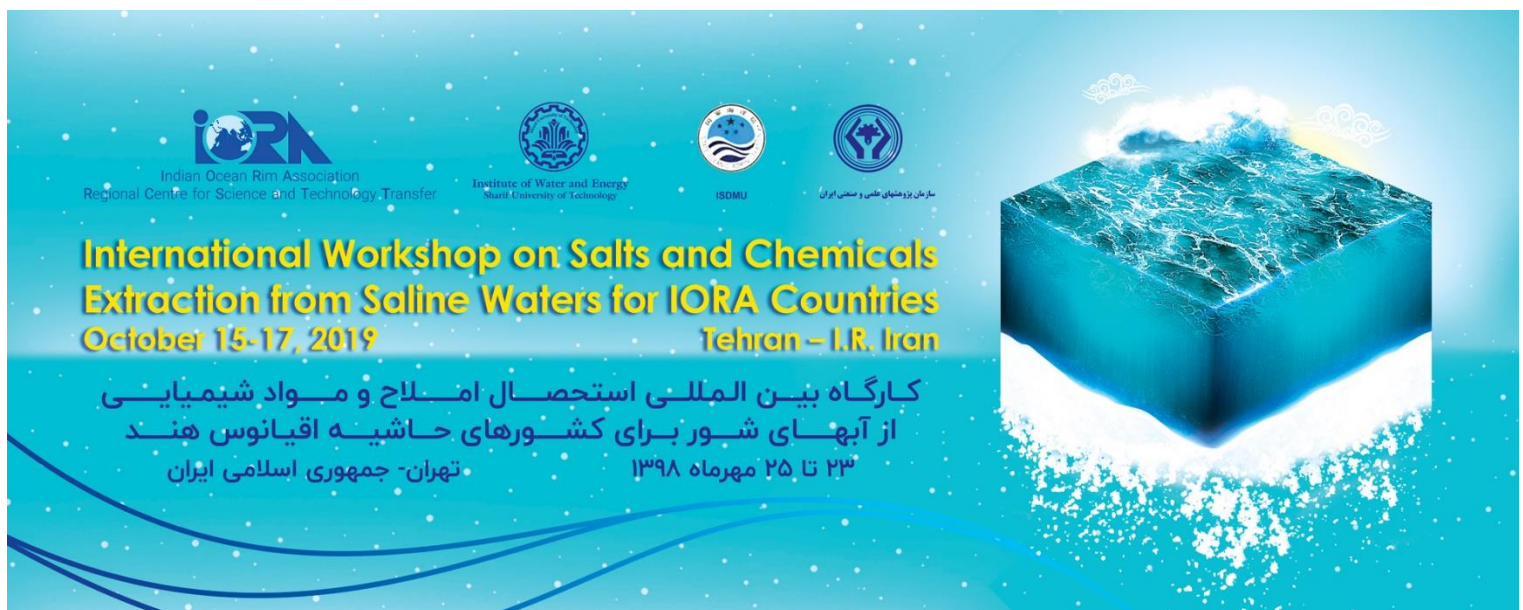


Report of Workshop on “Salts and chemicals extraction from saline waters for IORA countries”

October 15-17, 2019



The banner features a blue background with a 3D cube of water and salt crystals on the right. It includes logos for IORA, Institute of Water and Energy Sharif University of Technology, ISDMU, and the Iranian Research Institute for Science and Technology. The text is in both English and Persian.

International Workshop on Salts and Chemicals
Extraction from Saline Waters for IORA Countries
October 15-17, 2019
Tehran – I.R. Iran

کارگاه بین المللی استحصال املاح و مواد شیمیایی
از آبهای شور برای کشورهای حاشیه اقیانوس هند
تهران- جمهوری اسلامی ایران
۲۳ تا ۲۵ مهرماه ۱۳۹۸

Institute of Water and Energy
Sharif University of Technology
Tehran – I.R. Iran

❖ Introduction

Seawater and unconventional water sources (such as brine discharge from operational desalination plants, wastewater, produced, mine, and hypersaline waters) contain large quantities of valuable salts, minerals, and chemical elements. On the other hand, the severity of potential environmental impacts of the unconventional sources is one of the critical issues, in recent years.

The goal of this workshop was to introduce commercialized, developed and state-of-the-art technologies, environmental impacts and marketing of salts and chemicals extraction from the above-mentioned unconventional water sources, with the aim of reducing the environmental impacts, producing and utilization of salts and chemicals as by-products, and exploring marketing activities and international trade.

The initial idea of holding this workshop was discussed between Ali Asghar Alamolhoda, director of Institute of Water and Energy (IWE), Sharif University of Technology (SUT) and Prof. Li Lin mei, director of Institute of Seawater Desalination and Multipurpose Utilization (ISDMU) in China during visiting Tianjin in ۲۰۱۷ on holding seawater desalination workshop in Iran.

To plan and organize this workshop, two committees: scientific and executive were formed at IWE. The details of the committees and secretariat participants are annexed in enclosure-I. Since the start of the year, the scientific committee began to review articles, reports, scientific research activities, theses, etc. Based on library searches and review published articles on this subject has taken this following steps:

- Review published articles
- Three subjects were chosen to be discussed in three panels
- Select scientists and experts on this subject
- Send request to about 80 scientists and experts for participation

The workshop on "Salts and chemicals extraction from saline waters for IORA countries" in order to create an atmosphere of cooperation and interaction among experts and scientists from Indian Ocean Rim Association (IORA) countries was held on October 15-17, 2019 by IWE and Regional Centre for Science and Technology Transfer (RCSTT) at the Sharif Energy Research Institute (SERI) with the participation of prominent scientists and researchers from different countries including South Africa, Italy, Bangladesh, Tanzania, Thailand, China, Sri Lanka, Oman, India and as well as Iranian scientists and researchers specializing in different aspects. Finally, we thank IORA for support and SUT for holding this workshop.

Day 1: October 15, 2019

❖ Opening ceremony

The opening ceremony was attended by Sharif university of technology officials, Sri Lanka's ambassador, scientific counselor at the French embassy, representatives of the embassy of India and Thailand, representative of Mitsui company in Iran, representatives of the first vice president office, parliament, Iran water resources management company, department of environment, foreign participants, private sector companies, professors and academic researchers, etc.

Initially, the following lectures were given at the ceremony.

١. Dr. Tahereh Miremadi, Director of RCSTT-IORA
Presented subjects: Welcome speech
٢. Dr. Mohammad Reza Movahedi, Deputy of research and technology, (SUT)
Presented subjects: SUT programs in the field of water, energy and desalination
٣. Eng. Ali Reza Daemi, Former deputy minister of energy in international affairs
Title: “water resources management in Iran”
Presented subjects:
 - Water resources potentials and related issues
 - Development procedure of water sector
 - Major challenges and trends in Iranian water resources management
٤. Dr. Majid Abbaspour, Chief of the Iranian association of environmental specialists
Title: “Freshwater production from marine water resources”
Presented subjects:
 - Desalination plants in the Persian Gulf
 - Desalination technologies
 - Environmental impacts of seawater desalination
٥. Dr. Ali Asghar Alamolhoda, Secretariat of desalination committee, Ministry of science and technology
Presented subject: Workshop planning and scientific committee report

Furthermore, the South African ambassador along with officials from department of international relations and cooperation, MFA South Africa attended a meeting on the sidelines of the ceremony.



❖ Introductory



In this part, panel moderators with a member of each panel -from left to right: Dr. Soheila Shokrollahzadeh, Dr. Majid Abbaspour, Dr. Ahmed Al-Busaidi, Prof Alison Lewis, Prof. Ugo Bardi- introduced themselves and briefly expressed their opinion about their respected panel topics.

Also, three presentations from Bangladesh, India and Iran were presented by:

- ١- Mr. Md. Mostaque Hassan: Control of Iodine Deficiency Disorders (CIDD) through universal salt iodization project -Bangladesh Small & Cottage Industries Corporation (BSCIC) ministry of industries

Presented subjects:

- Iodine Deficiency Disorders (CIDD) activities in Bangladesh
- Achievements of CIDD activities in Bangladesh
- Salt production and demand

- ٢- Dr. Arvind Kumar: Water treatment technologies and recovery of salt and marine chemicals from brines -Central Salt & Marine Chemicals Research Institute (CSIR)- India

Presented subjects:

- Water treatment technology
- Recovery of salt and marine chemicals from brines/saline system
- Oceanic salt system and salt manufacturing process

- ٣- Dr. Abdulreza Hormati: Salt production from Persian Gulf- Dolphin sea salt factory - Iran

Presented subjects:

- Introduction of Dolphin sea salt factory
- Dolphin sea salt products
- Sea salt production process at Dolphin factory

❖ Sessions

The workshop included three sessions. We received many requests to attend to 1, 2 or all 3 sessions from local experts. Scientific committee reviewed requests and their backgrounds and select up to 40 persons for each panel. Overall 65 people attended to the sessions.

Session 1:

The first session on environmental aspects was held in the afternoon of the first day with the participation of 43 professors and experts.

Topic: Environmental impacts of brine discharge

Moderator: Dr. Majid Abbaspour

Presentations:

1-South African brines and current and potential treatment processes

By: Prof. Alison Lewis

Presented subjects:

- Industries that generate brines in South Africa
- South Africa's brine disposal strategy
- Emerging brine treatment technologies
- Eutectic Freeze Crystallization for waste water treatment

2- Environmental impacts of desalination plants in Iran

By: Prof. Parvin Farshchi

Presented subjects:

- Environmental impacts of desalination plants
- Characteristics and important habitats of the Persian Gulf and sea of Oman
- Major environmental challenges
- Transition to a green desalination industry

3-Metal accumulation in soils and plants irrigated with saline and treated waste waters

By: Prof. Ahmed Al-Busaidi

Presented subjects:

- Soil salinity problem in Oman
- "Management of salt-affected soils and water for sustainable agriculture" research project in Oman
- Treated wastewater application
- Use of desalination process for agriculture



Day 2: October 16, 2019

Session 2:

The second day of the workshop was started with session 2 on dual purpose desalination with the participation of 38 professors and experts.

Topic: Dual-purpose desalination plant

Moderator: Dr. Soheila Shokrollahzadeh

Presentations:

1-Producing salts and chemicals from desalination plant brine: Possibilities and Challenge

By: Prof. Al-Haddabi

Presented subjects:

- Produced water: A new source
- Disposal of produced water in Oman
- Objectives of produced water treatment
- Produced water reuse case examples
- Produced water reuse potential

2-Technological and industrial developments of salts and chemicals extraction from saline waters in China

By: Prof. Liu Luofeng

Presented subjects:

- Chemical resources in saline waters
- Technological situations and development trends
- Comprehensive utilization of saline waters and typical project cases
- Activities and achievements of the Institute of Seawater Desalination and Multipurpose Utilization (ISDMU) in saline waters utilization
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3-Dual purpose desalination (water and salt) plants

By: Dr. Ali Jafarian and Dr. Jahanbakhsh Asgari

Presented subjects:

- 1- Zero Liquid Discharge (ZLD) process
- 2- A feasibility study on dual purpose desalination plant for mining process by-product

Session 3:

In the afternoon session on mineral extraction 41 scientists and expert were participated.

Topic: Valuable and trace elements

Moderator: Dr. Ali Asghar Alamolhoda

Presentations:

1-Extraction of trace elements from seawater: a biophysical perspective

By: Prof. Ugo Bardi

Presented subjects:

- Mineral extraction from seawater
- Recovery of uranium from seawater
- Lithium extraction from seawater

2-Extraction of edible salt from high TDS brine

By: Mr. Fereydon Ekhteraei

Presented subjects:

- Introducing desalination and waste water treatment methods
- Brine management methods
- Economical comparison of brine treatment methods
- Introducing ZLD system
- Mineral recovery options from brine
- Description of producing edible salt from high TDS Brine

۳- Brine evolution and mineral extraction of Urmia Lake in wet and dry season

By: Dr. Razyeh Lak

Presented subjects:

- Features of Urmia Lake
- Hydrogeochemistry and brine evolution of Urmia Lake shallow and deep water
- Urmia, Iran SOP Project



❖ Closing Ceremony

At the closing ceremony Mr. Jean Christoph Bonté, Scientific counselor at the French embassy and Dr. Tahereh Miremadi, Director of RCSTT-IORA joined the existing scientists and experts from IORA countries were already present at the third session. The attendees of the workshop discussed and gave their comments and suggestions and they value and appreciate the organization of the program.

A draft copy of declaration prepared by members of scientific committee has been read and comments of participants discussed in order to reach an agreement for final text of the workshop declaration. Also, decided to IWE and RCSTT-IORA finalize this file and the workshop secretariat at IWE will follow up objective and decisions. The final declaration is attached.



Day 3: October 17, 2019

Third day of the workshop was devoted for Tehran sightseeing for International guests. they visited historical places of the city. The purpose of the visit was to share our cultural heritage.