Recommendations of
The International Conference on Water Resources Management and Sustainability: Solutions for Arid Regions

22-24 March 2022 | Dubai, UAE

The two-day International Conference had participants from 57 countries who discussed water issues, future challenges, and possible solutions to achieve water security and sustainability in arid regions. Presentations were made in both oral and poster sessions. The conference deliberations led to the following recommendations.

0. Public Engagement

0.1 Effective engagement of all stakeholders and constituencies, specially indigenous population and farmers, is key for the success of any water resources management and sustainability plans and policies. The consensus and support of the end users represents a prerequisite for the successful implementation of such plans.

0.2 Political decisions and regulatory laws should be based on public and stakeholder participation.

1. Groundwater Resources

1.1 Groundwater in arid and semi-arid regions has limited recharge and is overexploited. Its use must therefore be closely managed.

1.2 Artificial groundwater recharge is greatly needed. Appropriate techniques must therefore be developed and employed.

1.3 Seawater intrusion in coastal aquifers represents a common problem and must be contained.

2. Rainfall and Surface Water

2.1 Rainfall events in arid and semi-arid regions are often few but occur with high intensity and short duration, causing flash floods and risk to society and infrastructure. Early flood warning systems must be developed.

2.2 Flood mitigation and risk assessment are needed in urban areas.

2.3 Retention, detention, and recharge dams offer a feasible solution for surface water harvesting and groundwater recharge, in particular in urban areas, there is significant scope to utilize green spaces for both flood mitigation and harvesting.

2.4 Reassessment of measured rainfall data is called for. Non-stationary weather and extreme events need to be investigated.

3. Desalination

3.1 More efficient desalination of seawater and brackish groundwater is required. In arid regions this might be the only option for drinking water in the future.

3.2 Alternative sources of energy, such as solar, for desalination must be developed. Recent advancements in desalination technology provide a ray of hope for the development of innovative solar energy desalination systems using different nanomaterials.

3.3 Mitigation of environmental impacts of desalination is needed. Better management and/or recycling of brine waste streams from desalination is needed for future water security.

4. Wastewater

4.1 Waste represents a major renewable water resource so its fuller utilization for irrigation purposes, development of forests and green areas, groundwater recharge, industrial uses (e.g., cooling, construction, etc.), and other purposes must be emphasized.

5. Climate Change

5.1 Accurate assessment of the impact of climate change on rainfall regime, extreme events, groundwater resources, seawater level rise, water consumption, and agriculture productivity are needed.

5.2 Effective water management, governance, investments, frameworks, and people's participation are key to climate resilient water services, development of measures for mitigation of droughts and floods, groundwater depletion, and water scarcity.

5.3 Development of multidisciplinary teams is needed to address climate change challenges.

6. Data

6.1 Comprehensive monitoring systems (including real data monitoring systems) and national data bank, which can be accessed by all key stakeholders are essential.

6.2 Informed decision-making for sustainable policies to manage finite water resources at local, national, and regional scales is needed.

7. Techniques and Methods

7.1 Live monitoring, remote sensing, satellite images, and measuring techniques are essential for temporal and spatial data collection and analysis.

7.2 Combining machine learning, artificial intelligence, and Internet technology with physically based modelling should be encouraged to improve accuracy and minimize uncertainties.

7.3 Smart innovative technologies, like fog interception and cloud seeding, should be explored as contributors to the non-conventional water resources in arid and semi-arid regions.

8. General

8.1 Capacity building at all levels (e.g., community, technical, etc.) remain is key for water management and sustainability.

8.2 Empowering women is key to achieving water sustainability

8.3 Water management, efficiency (in supply, use, recycling, and reuse), and conservation in the agriculture sector are vital for water sustainability in arid and semi-arid regions.

8.4 Water problems are complex and hence require multidisciplinary and integrated approaches to develop efficient and sustainable solutions.

8.5 Water accounting/auditing is complementary to water governance, based on water modeling which entails uncertainties.

8.6 Promoting cooperation among research institutes in the region as well as those in other arid regions will contribute to addressing water management and sustainability challenges.

8.7 Strengthening collaborative structures between government, industry, research entities and education providers, both at the local and global scale, can help accelerate the translation of new research into on-the ground solutions for arid regions.