

Session Outcome Document

(2 pages max)

Monitoring and controlling sand movement in urban areas, agricultural lands and roads using artificial intelligence for a sustainable environmental future

[King Faisal University - WSIS+20]

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[\[https://www.itu.int/net4/wsis/forum/2025/Agenda/Session/298\]](https://www.itu.int/net4/wsis/forum/2025/Agenda/Session/298)

Key Issues discussed Looking Beyond 2025:

The session's topic was placed within the general framework of the Sustainable Development Goals (SDGs: 13-17) in addressing environmental issues and their economic and social challenges in arid regions, especially since some communities depend on agricultural and pastoral activities for their economies. Linking the problem of sand encroachment to climate change makes it important for regional partnerships to address it, given its environmental, economic and social importance, to mitigate its risks and develop technologies to stabilize it.

- The project addresses the issue of sand movement (sand creep and sand drift) in Al-Ahsa Governorate, located in the Eastern Region of the Kingdom of Saudi Arabia. This region is among the most affected by sand creep due to its geographical location, which contributes to desertification.
- The project involves monitoring and observing this phenomenon and predicting its behaviour to mitigate its environmental, economic, and social impacts. This will be achieved through the use of artificial intelligence (AI), remote sensing techniques, and geographic information systems (GIS).
- The ability to identify the geographical distribution of sand dunes, map sand movement trends and annual rates, analyse the factors influencing sand movement activity, identify its sources, and predict its dynamics using modern technology applications in the environment of geographic information systems, remote sensing, and geospatial artificial intelligence.
- Proposing effective techniques for stabilizing sand dunes.
- Providing decision-makers with a comprehensive spatial database to support the planning of development projects in the region.

Tangible Outcomes of the session:

1. To be able to monitor and control the movement of sand dunes in the study area, which is directly linked to environmental issues associated with climate change. This will be achieved through the



application of geographic information systems (GIS), remote sensing, and artificial intelligence algorithms to identify and map the geographical distribution of moving sand dunes and their encroachment paths.

2. To enhance environmental sustainability by understanding the extent of sand movement and its impact on the environment. This includes mitigating its impact on agricultural lands, urban areas, and infrastructure, and implementing measures to stabilize sand dunes.

3. The Eastern Province is a vital agricultural centre in the Kingdom of Saudi Arabia, and sand encroachment threatens food security. The project will focus on enhancing food security by protecting agricultural lands from the negative effects of sand encroachment.

4. To collaborate with neighbouring countries to develop partnerships to address the problem of sand encroachment and achieve the Sustainable Development Goals (SDGs) in this area (Goal 17). These countries, such as Bahrain, Qatar, the United Arab Emirates, Kuwait, Oman, and Iraq, are part of this research. The project proposes the establishment of a regional early warning centre to monitor and control sand movement, and to enhance cooperation and exchange of data and strategies for desertification management.

5- We expect agreements and commitments from donors, UN funds, and sponsors of the forum, noting that the National Center for Giftedness and Creativity Research and the Deanship of Scientific Research at King Faisal University in the Kingdom of Saudi Arabia have signed an agreement to fund the project in its initial studies under contract number (KFU-Creativity-13), especially since the project's applied scientific benefits include all GCC countries, and its results can also be used in similar regions in dry areas around the world, as the project achieves the expected achievements of the sustainable development goals related to climate change and the importance of international partnerships in addressing environmental issues through the sustainable development goals by utilizing modern information technologies.

Key Recommendations and Forward-Looking Action Plan for the WSIS+20 Review and Beyond:

- The importance of using modern technology indicators and leveraging information technologies to study the nature of sand movement over successive time periods and measure its environmental, economic, and social impacts on communities in fragile environments to mitigate the impact of climate change. This supports decision-makers in taking the necessary measures to mitigate its effects.
- Activating regional partnerships and United Nations donor funds to conclude agreements to implement projects that contribute to addressing the environmental issues resulting from sand movement in urban and agricultural areas and roads, in order to achieve environmental sustainability, within the framework of the efforts of the United Nations and the vision of the World Summit on the Information Society after 2025.