

JORDAN

Cooperative Activities under the SPS Programme



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Jordan has been involved in NATO science activities since 1998. In total, scientists and experts from Jordan have had leading roles in 25 activities, and more have joined various cooperative activities as key speakers and participants.

Today, NATO science activities enable close collaboration on the two key priorities of **defence against terrorism** and **countering other threats to security** and are managed under the Science for Peace and Security (SPS) Programme. SPS activities contribute to NATO's strategic objective of partnership, helping to connect scientists and experts from NATO

countries with their counterparts from Partner and Mediterranean Dialogue countries through workshops, training courses, team collaborations and multi-year projects.

All activities supported by the SPS Programme are approved by NATO nations on the basis of consensus.....

Examples of Activities

In a recently approved project, scientists from Jordan are cooperating with Canadian experts on the “**Monitoring of Desertification Using Remote Sensing and Bioindicators**”. The project is designed to contribute to a National Strategy and Action Plan to combat desertification. The investigators will identify the most appropriate indicators in the soil and water that can be examined locally or sensed remotely. These indicators will then be integrated with other sources of data to assess the status of desertification and the severity of drought. All data and results will be incorporated in a Geographical Information System to form a vital component of the Desertification Information System and will be used to identify areas where remedial action is most urgently needed. The principal end-user will be the Nature Protection Directorate of the Ministry of Environment of Jordan, which is

the responsible body for implementing the National Action Plan. [ref: 982863]

Jordanian scientists and their collaborators from Israel and the United States are working on a method for “**High-Recovery Desalination Process for Brackish Groundwater**”. The major innovation in the project is a proposed method to prevent the precipitation of sparingly soluble salts on the surface of the polymeric membrane—called “scaling”—a major barrier to efficient desalination during the reverse osmosis (RO) process. The participants will build demonstration desalination pilot plants in Jordan and Israel, which will be set up to extract 90-95% of brackish groundwater and generate around 50 m³ of product water per day. By exploiting brackish groundwater to such a high degree and reducing brine volumes, these demonstration plants will

encourage development of additional marginal water sources in Jordan and Israel. Relieving pressure on existing water sources and therefore reducing water scarcity, this is expected to contribute to the security of the region. [ref 982481]

Beginning in January 2007, scientists from Jordan, Israel and the United States have cooperated in a project to assess the impact of **“Natural and Anthropogenic Aerosol Pollution in the Gulf of Aqaba”**. They have estimated the discharge of nutrients, trace metals and other pollutants into the Gulf, in order to determine the impact they have on marine ecosystems. This effort has involved the integration of field surveys, laboratory analyses, modelling and remote sensing data. Results acquired to date have been made available to the Special Economic Zone Authority in Aqaba, Jordan, and the Ministry of the Environment in Haifa, Israel. In addition, work has begun on a conceptual ecosystem model, which will constitute the final product for end-users. [ref 982161]

As part of another project focused on the fragile ecosystem of the Gulf of Aqaba, **“Real-Time Surface Current Measurements to Protect the Gulf of Aqaba”**, researchers from Jordan, Israel and the United States have worked to protect the Gulf of Aqaba against the discharge of oil and other toxic substances. An important part of the study is the validation of measurements made by high-frequency radar using drifter trajectories and Acoustic Doppler Current Profiling. The collaborators aim to chart common surface circulation patterns and to investigate the physical forces driving this water circulation.

The project end-users include the Aqaba Special Economic Zone Authority and the Marine Pollution Prevention Station in Eilat. [ref 982220]

Investigators from Jordan, Israel and France have been working to develop a new approach for the **“Prediction of Sinkhole Hazards Related to the Drop of the Dead Sea Level and Human Activity”**. They have studied variations in subsurface physical parameters using non-invasive ‘quasi’ 3-D mapping of resistivity and water content. A methodology was also to be developed for the detection of dissolution caves filled with water or mud buried within the salt layer at



Photo: Project Co-Directors.

Dredger, excavator plunged in a sink hole

depths of 20–50m. Using the Magnetic Resonance Sounding (MRS) method, the scientists have collected data that indicate that sinkhole sites are characterized by the presence of free water, whereas in surrounding areas, free water is absent. Several entities, including the Jordan Valley authority have expressed interest in the results of the work. [ref 981128]