



Project Description for ARASIA TC Programme

TC Cycle 2018-2019

Project Number: RAS7032

Project Title: Assessing Water Resources Pollution by Using Chemical and Environmental Isotope Techniques.

Overall Objective: To enhance the regional capacity towards sustainable water resources management.

Project Duration: (2018 – 2019)

Project Description: Water resources in different Arab countries are subjected to different kinds of pollution, which affects water quality. This contamination relates to salinity intrusion; infiltration of waste water; overabstraction; industrial wastes; fertilizers; and natural contamination of shallow aquifers and other surface water bodies. Different study areas in the region suffer from deterioration by different kinds of pollutants, which could raise highly dissolved solids. In some specific aquifers, such as in the Amman Zarka basin, the phosphate layer led to high radioactivity content where radon gas ranged from 200-2500 pci per litre, and radium-226 from 2 to 15 pci per litre. Some unconfined aquifers facilitate the infiltration of pollutants into wells. Highly polluted surface water may cause the infiltration of the present pollutants to the groundwater basins. The implementation of chemical and environmental isotope analyses will be effective in determining the degree of contamination of groundwater and surface water. Quantifying the pollution indicators (salinity, electrical conductivity (EC), nitrate, phosphate, total dissolved solids (TDS), among others), their spatial distributions, potential seasonal variations, and stable isotopes will be useful to determine the recharge of groundwater by rainfall or infiltration and specify the origin of pollution. This project will be helpful in monitoring the water quality and solving the problems at hand. It strengthens regional capabilities in the field and enhances expertise to identify sources of pollution and recommend suitable remediation actions through the utilization of chemical and environmental isotope techniques.

Problem to be addressed: Arab countries mainly depend on groundwater resources and surface water as a supply for drinking water and irrigation. These sources are facing illegal practices regarding over-abstraction and are subjected to contamination by salinity intrusion, infiltration of wastewater into aquifers, anthropogenic and industrial activities. In some cases, natural contamination (natural radioactivity) will affect the water quality. Investigation and identifying the sources of pollution will be helpful to limit the degree of deterioration of water resources and adopt methodologies that limit the degree of contamination. Using chemical and environmental isotope techniques will be an efficient way to determine and monitor the levels and behaviour of pollutants in different aquifers



among Arab countries. This will also facilitate the identification of the pollution origin and recharge of groundwater. The project is linked to Target 6.5 of Sustainable Development Goal (SDG) No. 6, “Implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate”.

This project is proposed as a regional activity for the following reason(s): Water resources in Arab countries are facing similar pollution problems regarding groundwater and surface water.

Stakeholders: Stakeholders will include (1) governmental institutes, mainly Ministries of Water; Ministries of Health; Ministries of Energy; Ministries of Environment; (2) farmers and various involved national/Emirates institutes will be in charge of collecting samples and carrying out physical and chemical analysis before completing the rest of the analysis by outsourcing, using adequate laboratories.

Partnerships: Partnerships will be established with universities, scientific institutions, and donors.

Role of nuclear technology: Environmental isotopes have been widely used as a tool by many countries in order to manage water resources in a sustainable way. Isotope techniques may play an important role in defining groundwater origin, recharge rates and interaction between surface water and ground water. Understanding the mechanisms that control the presence of pollutants in surface and ground water systems can often provide information that conventional hydro-(geo)logical techniques cannot offer. The role of the IAEA will be through (1) advice on and support of the development of an action plan; (2) support capacity building through regional trainings on isotope hydrology and water quality related techniques; (3) procurement of minor items and standards required for water sampling and analysis; (4) technical support for sampling and analysing samples for chemical and isotopes parameters; (5) evaluation and interpretation of data; (6) support transfer of knowledge and experience through mutual scientific visits between the concerned parties of the project.