

## THE CONCEPT OF DESSAK: DEVELOPMENT OF ENVIRONMENTAL DECISION SUPPORT FOR RADIOECOLOGICALLY SENSITIVE AREAS IN KUWAIT

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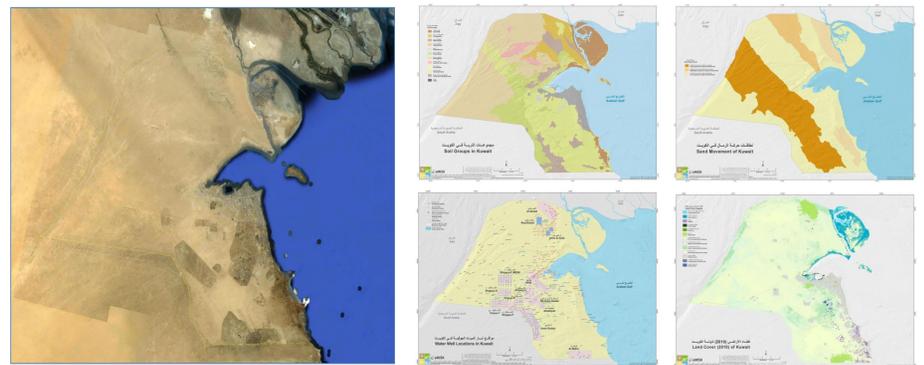
### ABSTRACT

Utilization of nuclear energy and applications of nuclear technologies are becoming the cornerstone in the socio-economic development of many countries and even regions in the world. Kuwait recognizes the potential benefits to be gained from this development and is gradually implementing nuclear methods and techniques in the petrochemical industry, medicine and research. Kuwait also recognizes the risk associated with embracing these technologies and the regional developments in utilizing nuclear power. As such, a system for the identification of radioecologically sensitive regions needs to be established. This will be based on a number of components including a geographical information system (GIS) database of the terrestrial compartment; habitat and process modeling; environmental factors; and the extent and type of radioactive pollution that could possibly afflict the aforementioned sensitive regions.

### RADIOLOGICAL PROTECTION IN KUWAIT

The current radiological regulation and protection regime in Kuwait is shared by three different entities :

- The MOH Radiation Protection Department (RPD), which acts as the national regulatory body;
- The MOI General Department of Civil Defence, which is responsible for radiological emergency planning; and
- The Kuwait Environment Public Authority (KEPA), which oversees the monitoring of ambient atmospheric radiation levels.



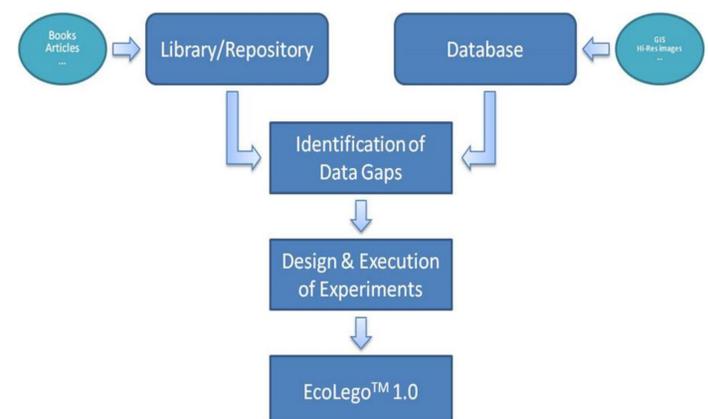
### PROJECT DESCRIPTION

The ultimate aim of this project is to create an EDSS (Environmental Decision Support System) for Kuwait, which will be able to integrate information in a spatial and temporal resolution to be combined with radioecological transfer models. This will be based on a number of components, including: a geographical information system (GIS) database of the terrestrial compartment; habitat and process modeling; environmental factors; and the extent and type of radioactive pollution that could possibly afflict radioecologically sensitive regions. This will allow the derivation of critical load maps and identification of endangered ecosystems. In addition, it allows for the identification of critical pathways to protect the environment and humans from unexpectedly elevated and routine releases of radioactivity during the operation of a nuclear power plant, research reactor or any other nuclear application in the medical or any other scientific field. The sensitivity of the Arabian Gulf region, with its very special marine and terrestrial environmental conditions, is a driving force to keep balance between the industrial use and the preservation of nature for a sustainable development and exploitation of natural resources.

### PROJECT OBJECTIVES

This project aims to build the foundation for a sound and robust radionuclide-based EDSS:

- To compile/collate existing global and local radioecological/spatial/temporal data for arid climate and store it in a Database.
- To establish a national radioecological library/repository.
- To identify gaps in the existing data and formulate methods to fill them.
- To identify, design and conduct relevant and related experimental studies to be undertaken in Kuwait to fill in gaps identified via the results observed from objectives 1-3.
- To develop a preliminary/prototype radioecological model for arid climate based on Ecolego™ modelling software.



### EXPERIMENTS

- Establishment of laboratory and preparation of special equipment for experiments on radionuclide migration in arid soils of Kuwait.
- Experiments on transfer of Naturally Occurring Radioactive Material (NORM) and heavy metals from Kuwait soils to plants.
- Investigation of the mobility of radionuclide in soil and in soil-plant system, determination of transfer factors.

### PERSPECTIVES

The situation in Kuwait specifically is to be considered as challenging: The risk of contamination does not stem from local/national sources alone. A number of neighbouring or regional countries have already embarked on major nuclear power projects, or are seriously considering doing so. All aforementioned countries are within close proximity to the State of Kuwait, calls for a good radionuclide-based EDSS. The DESSAK project to provide such EDSS has been launched in 2014 and is expected to be completed by 2018.