

# Projects Description for ARASIA TC Programme

## TC Cycle 2014-2015



**Project Number:** RAS/5/068

**Project Title:** Developing Effective Practices for Combating Desertification

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**Overall objective:** To develop effective soil and water management and cropping practices for combating desertification caused by soil salinity, low productivity and water shortages.

**Project duration:** 2 years

### PROJECT DESCRIPTION

**Regional gap / Problem / Need analysis:** Drought caused by climatic change coupled with considerable shortages of fresh water supply in all over arid Region countries of the Middle East in general and in Iraq in particular. Consequently, the entire area witnessed rapid advancement of desertification process over arable fertile land. Improper agricultural practices and bad management of soil and water resources converted what were previously fertile soils into depleted soils of extremely low productivity. Furthermore, most of the soils of (70% to 80%) of the total area of Lower Mesopotamian Plain (LMP) was converted to saline alkali soils of large salts content distributed along soil profile. Therefore, large number of farmer families abandoned their farms which resulted in sever socioeconomic impact. Accordingly, rehabilitation of such vast area and re-habituated farmers is of considerable importance to all concerned countries. However, large quantities of underground brackish water available in the area may serve as a possible water resource that can be sustainably used for crop and livestock production. Agricultural practices and cropping systems may be needed to be modified for sustainable cropping of the area. Appropriate and effective amendments must be used to alleviate the sodium hazard both in the irrigation water and in the Rhizosphere as well. All these issues will be addressed under this research project to achieve the objectives. This project is proposed as a regional activity for the following reason(s): The problem outlined above must be addressed through regional project because the problem is common among the countries of the region. Other important reason is the fact that effects of desertification is of trans-boundary effects.

**Stakeholder analysis and partnership:** End users/beneficiaries: People living in salt affected areas and in areas with water shortage for food production. End users: Information collected and the outcomes from the project help farmers implement improved soil, water and crop management practices that enhance agricultural productivity of these degraded soils, reduce/mitigate land degradation-desertification and improve environmental benefits (e.g.,, reducing soil erosion, improving land productivity and water quality). The counterparts will also benefit from the project by strengthening their human resource capacity on the use of isotopic and nuclear techniques to improve land and water management practices. There will be partnership opportunities between the participating countries and the International Centre for Biosaline Agriculture.

**Role of nuclear technology:** Soil moisture neutron probe, instead of other conventional soil moisture sensors will be used to measure soil water content under saline conditions. Fallout radionuclides (FRN) and carbon -13 are used to assess the extent of soil erosion and soil quality (soil carbon), respectively.- Nitrogen-15 labelled nitrogen fertilizer will be used to assess nitrogen use efficiency as influenced by changes in soil-water-nutrient and cropping practices to address soil desertification. Other stable isotopes including oxygen-18 and hydrogen-2 are useful for identifying water pathways in soil plant systems and partitioning soil evaporation and plant transpiration. Information obtained will be useful to identify farm management practices that reduce water losses through evaporation. Finally, carbon isotopic discrimination (CID) techniques will be useful to screen salt tolerant plants to be used