

# Projects Description *for* ARASIA TC Programme TC Cycle 2016-2017



**Project Number:** RAS/5/072

**Project Title:** Enhancing the Use of Salt Affected Soils and Saline Water for Crop and Biomass Production and Reducing Land and Water Quality Degradation in ARASIA States Parties

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**Overall objective:** To improve agricultural productivity of salt-affected lands and saline water resources through the application of management and improved crop diversification using both conventional and nuclear methodologies.

**Project duration:** 2 years

## PROJECT DESCRIPTION

**Regional Gap / Problem / Need Analysis:** Land degradation by salinity is a global problem especially in the ARASIA region affecting crop productivity as well as livelihood therefore there is an urgent need to address this issue. Loss of agricultural land globally by salinization is reported to be about 2000 ha.day<sup>-1</sup> and 20% of the irrigated land. On the other hand, because of low and erratic precipitation, high temperatures, climate change impacts, the quality of water is rapidly deteriorating. Furthermore the over abstraction of water (much higher than the recharge) is one of the major factor of sea water intrusion in the coastal region and bringing high salt contents in the aquifer. This then coupled with upstream and downstream movement of water has resulted in higher salinity levels in most of the dry region. The only exceptions are regions and part of countries where high precipitation recharges the groundwater aquifers and has maintained fresh quality of groundwater. Salinity problem mainly arises from irrigation management (whether they are large or small irrigation systems). Such irrigation practices without drainage management triggers the accumulation of salts in the root zone, affecting several soil properties and crop productivity negatively. Additionally, improper cultivation practices and mis-management of soil and water resources have deteriorated the status of already salt-affected lands and converted them gradually into depleted soils of low productivity. Therefore, many farmer's and their families abandon their lands which also results in socioeconomic impacts. As a consequence, there is urgent need to rehabilitate such vast agricultural areas affected by salinity and bring them to production, enhancing the economic status quo of the farmers. Since the extent of these salinity affected lands (and water) is increasing rapidly diminishing the area of arable lands and fresh water, it is imperative that the salt affected lands and water needs to be part of the 'agricultural production system'. How can they be used efficiently and economically is a challenge for the researchers, end users (farmers) and more importantly for the policy makers. The salt-affected lands are a valuable resource that cannot be neglected nor easily abandoned even with their lower crop yields, especially in areas where significant investments have already been made in irrigation and drainage infrastructure. Diversification of cropping systems and patterns, preferences and choices of production systems and the whole value chain needs to be established to use these marginal environments into profitable ones. In addition to these 'less-productive' physical resources, there is a social and environmental dimension why these resources have to be considered as part of the food, water and nutrition security perspectives.

**This project is proposed as a regional activity for the following reason(s):** The ARASIA region faces increasing problem of water scarcity, poor quality water, poor soil condition. Hence the agricultural production has exhibited a very rapid decline in many of the ARASIA countries. The participating countries share and face common problems of vital importance that hamper agricultural production and decrease

farmers' income, endangering the water and food security of the region. The upstream and downstream movement of both surface and groundwater impacts all the countries in one way or other and has to formulate common solutions that could reduce the problems. Furthermore, trade relations also exist in many of these countries where yield is also related to exporting products and bi-products to other neighboring countries and hence regional cooperation is necessary. Over the years the partners have worked and tried to take the solutions a step forward through regional and international collaborations, through technical, technological, and human resource perspective. The proposal aims to further take the achievements forward in building on existing work and have project framework and models to tackle the problem of salinity, as part of opportunities rather than limitations. Large body of data skills and experience are now available in most ARASIA countries concerning salt affected soils. Accordingly effective package of technology need to be formulated.

**Stakeholder Analysis and Partnership:** The proposed proposal will foster partnership with the national agricultural systems of the partner countries and strengthening their capabilities in using both isotopic methodologies versus the conventional methodologies to quantify the problem of salinity. The partner countries have been involved in the preparation of this proposal in terms of identifying the gaps from the on-going ARASIA project to improve agricultural production in salt affected lands. Based on the achievements of the ARASIA meetings and further discussions on the new proposal, the partners identified gaps to be undertaken in the new project. A key component would be to look at the new, improved and better developed varieties of crops and other plants that can be introduced and naturalized both under existing high-salinity conditions and in new salinized areas. These new genetic material will be acquired and shared with partner countries of the new ARASIA project. The partner countries will also benefit in developing the human resources under the program, that would include researchers, extension and farmer's as part of the national programs. Outcome of this project will lead to preparation of guidelines and brochures to the farmers. The project could offer the opportunity through interactive approaches to establish partnerships among the participating countries or between the member states and the UAE, being the lead country (through ICBA that specializes on the management of salinity in the region and globally), with the latter playing a dominant and catalytic role in implementing and monitoring of the salt-affected land reclamation and water management.

**Role of nuclear technology:** Assistance will be requested from IAEA both in terms of use of radioisotope material for monitoring salinity in soil and water. In addition, the technical backstopping to the member countries will also be provided by IAEA. The countries that have relatively advanced laboratories for using nuclear techniques will be part of team to provide analytical assistance to other countries. Soil moisture neutron probe will be used to measure soil water content under saline conditions.