Towards Sustainable Food Production for Marginal Lands in Aral and Caspian Sea Basins

The Aralo-Caspian lowlands, a prime example of marginal and saline environments, face serious threats to sustaining the ever-growing population and the livelihoods of local farmer groups. Water scarcity and variable climatic conditions have resulted in the use of low-quality, mineralized water for irrigation which has adversely affected agricultural output and farmer incomes, further threatening the fragile balance. Given that most of the commonly cultivated crops, like cotton, wheat, and corn are sensitive to salinity, identifying drought- and heat-tolerant as well as water-use efficient alternative crops is imperative. This will improving agricultural production and sustaining the livelihood of farmers and agropastoralists – especially those dependent on marginal quality land and water resources.

The International Center for Biosaline Agriculture (ICBA) launched the integrated, interdisciplinary “Towards Sustainable Food Production for Marginal Lands in Aral and Caspian Sea Basin” project which involved extensive research in the drylands regions in upper stream Kyrgyzstan and downstream Uzbekistan countries and Caspian Sea Basin, especially the saline prone areas in the Shirvan plain of the Kur-Araz lowlands in Azerbaijan, where irrigated agriculture has a long history of soil and water salinization concerns.

Activities and Outcomes

Among the numerous project successes is the development of an inventory of existing practices which resulted in an “ideas” book. Furthermore, the novel methods and innovative approaches applied by the project helped to identify new sources of feed/food consumption by using marginal resources and helped change local farmers’ and agropastoralists’ perceptions regarding marginal, even degraded croplands and land improvement options which in turn helped to raise awareness on pasture improvement and afforestation. Finally, special focus was given to institutional set-up and policy instruments for optimum utilization of marginal lands.

Field, laboratory, and lysimeter experiments were performed on several species of halophytes and salt tolerant crops by using different irrigation management techniques to reduce soil salinity and increase crop production. The crops included sorghum...
crop varieties in seed germination rate, plant height, and accumulation of green biomass when cultivated on soils with light clay texture and low level of soil salinity. A sharp decrease (by about 2.6 times) in plant density and survival rate was observed for maize and for traditional legumes grown on medium saline soil with heavy texture.

A key outcome of the project included three field training seminars for young men and women at local farmer level on technology of cultivation and seed production of selected new valuable crops adapted to the local environment. In addition, three farmer/community-based seed multiplication units on salt-tolerant cereals, legumes and forage perennial plants were set up. Approximately 5% of female farmers were involved in Self-Help Groups activities on agroforestry trials, cultivation of dual-purpose crops and halophyte on farmer and household lands. At least 15 women were trained in seed quality legumes, fodder shrubs and cereals production, specifically sorghum and pearl millet.

**Future Directions**

The development of an information database is planned to include crop suitability, crops calendar, and diversification maps to inform stakeholders about best practices for strengthening food and water security in marginal lands. ICBA along with partner institutions will further promote biosaline technologies based on utilization of halophytes as well as water and land management in the area. This will help define improved strategies and carry out field experiments, training of trainers, capacity building for farmers and pastoralists, and support events such workshops and farm-fairs.