

# CGIAR research program on integrated agricultural production systems for the poor and vulnerable in dry areas (CRP drylands Central Asia)



*Sesame strips cultivated on saline margins in a cotton field plantation*



*Agroforestry trial with Populus trees at dekhan farm waterlogged lands, Koybak, Karakalpakstan*

**Thematic Area:** Integrated agricultural production systems for the poor and vulnerable in dry areas

**Purpose:** Increasing livestock productivity by increasing winter feed production from arable land and hayfields.

**Geographic Scope:** Karauzyak district, Karakalpakstan in Uzbekistan

**Timeline:** 2015-2016

**Partners:** The Consultative Group for International Agricultural Research (CGIAR), The International Center for Agriculture Research in the Dry Areas (ICARDA) and International Centre for Biosaline Agriculture (ICBA)

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Being predominantly an agro-pastoral agricultural system, the area around the Aral Sea is affected by a very high degree of land degradation, characterized by intensive soil salinity, rising of water table and increasing mineralization, declining of rangeland productivity, as well as biodiversity loss. The most vulnerable are borderline territories, where the situation is even worse because of increasing load of both natural and anthropogenic factors as a result of intensive irrigated agriculture from the one side and degraded overgrazed pastures from the other. Lack of good quality forage for winter, low grazing capacity of desert pastures and remote markets to engage in trade activities, negatively affects the incomes of local people. These conditions deteriorate the livelihoods of the people and induce out-migration, leading to loss of local traditional knowledge and experience of land and water use.

In order to alleviate these problems, within the framework of CGIAR Research Program on Integrated agricultural production systems for the poor and vulnerable in dry areas (CRP Dryland Systems), ICARDA and ICBA engaged in a research activity "Increasing livestock productivity by increasing winter feed production from arable land and hayfields" in 2015. Several demonstration trials were established in shirkat (cooperative farm) "Koybak" and dekhan farms in Karabuga - both sites located in Karauzyak district in Karakalpakstan, Uzbekistan. These sites are the most representative of the agro-pastoral systems of the much larger Amu Darya River watershed in the transition zone between irrigated agriculture and Kyzylkum sandy desert, with a population of at least 1.6 million people living mostly in remote rural areas.

The main goal of this research activity was to study the effective management of marginal or low quality land and water and cultivation of non-conventional crops for the purpose of livestock forage and other alternative uses. The key insight stemming from this study is that even in extreme conditions of high soil salinity and water logging, there are many salt loving species (known as halophytes) and salt tolerant non-traditional crops suitable for producing good quality forage and grains.

## Activities and Outcomes

In collaboration with local farmers, scientists tested several varieties of the most valuable crops, including: six (6) forage and vegetable legumes varieties, three (3) varieties of sorghum, three (3) atriplex varieties, two (2) pearl millet varieties, two (2) fodder beet varieties, two (2) topinambur varieties, two (2) kochia varieties, as well as salinity resistant varieties of alfalfa, amaranthus indigofera, perennial sorghum, sweet clover, sainfoin, sesame sunflower, triticale - as high potential sources for forage production.

In particular, a new mungbean variety called Durdona, which was grown in fallow edges of rice fields in the Karabuga village, nearly doubled yields and incomes of local farmers, whilst improving the soils quality and health.





*Mung bean variety "Durdona" planted in trial farm in Koybak, Karakalpakstan*

All these non-traditional forage crops can be planted in abandoned field margins of the traditional crop fields which are normally used to cultivate cotton, rice or winter wheat. Since flooding irrigation is used for growing rice, there is no need to use extra water for the cultivation of the forage crops as drainage water stemming from the irrigation of rice, cotton or wheat will be sufficient. Scientists call this phenomenon as 'one drop of water per two crops'.

Thus, the cultivation of non-conventional forage crops results in effective utilization of water resources, while simultaneously supporting ecosystem functions and increasing economic benefits for local households.

In the spring of 2015, Ms. Sultanova and other researchers identified interested women farmers from three different villages in Koybak, Karabuga and Karauzyak. The researchers worked closely with the women farmers throughout the year and held a series of field training seminars to disseminate research results from June to November 2015 in several villages. These seminars covered different aspects of alternative forage crops for animal feeding in winter, as well a highly popular master cooking class on preparation of food recipes from non-traditional nutritious crops, such as topinambur, proso, quinoa, pearl millet, and sorghum.

The goal of these seminars was to help the farmers learn about the income-generating advantages and nutritional benefits of the new forage crops stemming from about 16 cultivars and improved lines originating from ICBA germplasm. During these seminars, Dr. Kristina Toderich, Head of ICBA's Regional Office, Dr Ravza Mavlyanova from the AVRDC Regional Office and Dr. Zulfiya Sultanova from Tashkent State Agrarian University, delivered hands on presentations on the crop characteristics, their nutritional value and different uses for forage, food, oil production. Special emphasis was placed on cultivation techniques, especially the root zone salinity management, irrigation regime and pest control.

The small holding farm of Mrs. Almash Adambetova was used for demonstration purposes, where two best-bet biosaline practices associated with agroforestry and mixed farming livestock system had been evaluated. Fifteen (15) householders from neighboring villages participated in the evaluation of these practices. The area allocated to new forage crops was small but enough to showcase the opportunities for growing poplar, apple, apricot, mulberry, Russian olive and different kinds of berry shrubs that were inter-cropped with nontraditional salt tolerant crops suitable for winter forage.

Inspired by the research results presented during these seminars, about forty-five (45) women farmers decided to create a Rural Women Learning Alliance in order to join forces with the scientists and with each other to identify and promote strategies for diversifying household incomes through cultivation of nontraditional crops.

### Future Directions

Future ICBA activities will consist of: conducting one field training on winter forage cultivation and processing for 30 livestock keepers in Koybak and neighbor villages; one Farmer Day on forage diversification in mixed farming system, storage and utilization for better livestock feeding in winter for 30 person (14 women and 16 men); testing of forage options for saline lands in Karabuga village and neighboring villages for 10 households engaged; Natural NRM; learning of alliance around crop diversification and winter forage production on marginal lands (innovation platform) for 45 women from 9 villages engaged.



*First field training seminar on livestock forage production (Women Rural Alliance members), household trial, Koybak, Karakalpakstan*

See more at: <http://drylandsystems.cgiar.org/news-opinions/rural-women-empowered-knowledge-improve-own-livelihoods#sthash.Hl1bbydx.dpuf>

<http://mel.cgiar.org/uploads/reporting/k56gfw3brhjQbZ9tCz8L4unVnJtIU.pdf>