CRP: Dryland Systems

Center: ICARDA

Flagship: South Asia

Action Site: Chakwal (Pakistan)

Activity title: Identification, demonstration and validation of promising technologies and diversification options for enhanced productivity & livelihood security.

Sub activity: Introduction of Cactus (*Opuntia ficus-indica*) as a multi-purpose crop under intensive production system

Activity leader: Mounir Louhaichi

Key partner(s): NARC (Pakistan)

Target audience: Agro pastoralists

Objective: Increase resilience and improve use of marginal lands of agropastoral production systems while enhancing capacity development of farmers and extension agents through training, field days, etc.

Introduction of Cactus (*Opuntia ficus-indica*) as a multi-purpose crop under intensive production system

Introduction:

In Pakistan, rangelands are the major source of feed for about 167.5 million heads of livestock. At present rangelands are being grazed by all kinds of livestock. About 40 percent of feed requirements for horses, donkeys and camels, 60 percent of the goats and sheep are met from rangelands whereas only 5-10 percent of the population of cattle and buffaloes graze in the rangelands despite they are heavily overgrazed, and has reduced the carrying capacity by 30 to 50 percent of their potential. Livestock are under-fed throughout the year because of lack of quality feed and it goes worst during the lean periods (December-February and May-June). Therefore, concerted efforts will be needed to improve the forage production from these rangelands on sustainable basis.

In this situation, the cactus plant (*Opuntia spp*.) has a potential to produce high biomass of green forage –ranging from 30-250 tons/ha and have a source of essential nutrients. The introduction of cactus can reduce the pressure on scarce water resources and rangeland vegetation. Simply during feeding, pads would be harvested, cut into small pieces, and distributed to animals - a 'cut and carry' methodology that is common in many cactus-cultivating countries including Brazil, South Africa, and Tunisia. The main objective of plantation of cactus in the dry area of Chakwal is to overcome the pressure exerted on already deteriorated rangelands and non-availability of feed during scarcity months. Furthermore, the fruit of cactus can be sold at the local market to general additional income and enhance livelihood of agro-pastoral communities.

Materials and Methods:

Cactus pear (*Opuntia ficus-indica)* was planted at Latifal, Chakwal Pakistan (33°08'56" N, 72°49'54" E, elevation 1,454 ft) in five farmers (Mohammad Sarfraz, Ch.Naveed, Skindar Hayat, Fazal Hussain,Kizar and Taher Babar) field. The area is characterized by monsoon climate with hot summer and cool winters with a mean maximum temperature of ca 38°C in summer and with potential evapotranspiration exceeding 1,500 mm. The average seasonal rainfall is 900 mm, falling mostly (70%) in summer months from July to September. Soil moisture levels are dominated by rainfall from July through September although occasional rainfall occurs throughout the year.

Figure 1: Site of Latifall. Chakwal, Pakistan

In 2003, cactus pear (*Opuntia ficus-indica*) pads were brought to Pakistan from Tunisia. Since then they have been growing under controlled conditions at the National Agricultural Research Center for the last 14 years. Under the CRP-DS SA program, it was decided to utilize these pads of cactus in the dry areas of Chakwal, Pakistan as animal feed. After detail discussion with the local community regarding planation of cactus as a crop, voluntarily 5 farmers agreed to plant cactus on their one Kanal (30x30 m) land. Before plantation of cactus, on each piece of land, it was ploughed and Farm Yard Manure (FYM) properly mixed. So in the first week (dated 3,4,5 one day on each farmers field) of May , single cactus pads were planted on three farmers land at a distance of (1x1 m) and the distance between rows were kept 2 meter. After plantation, approx. 10 liters of water were applied with bucket to each pad. In October, depending on farmer's choice, wheat or barley will be planted on 2 meter strip for the production of grain till the cactus will be ready for cut and carry to feed animals. This practice is known as alley cropping. The same practice was repeated in the last week of May (24 - 25 May, 2015) for the remaining 2 farmer's field. Cactus will be evaluated over time to assess adaptation, growth and productivity.

Figure 2: Plantation of cactus (*Opuntia ficus-indica*) on farmer's field as a crop.

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