

## Networking and Collaborations

### International Organisations

- MoU with International Center for Agricultural Research in Dry Areas (ICARDA)
- Cactus Net, Food and Agricultural Organisation (FAO)

### National Organisations

- Central Agro-Forestry Research Institute (CAFRI), Jhansi
- Indian Grassland and Fodder Research Institute (IGFRI), Jhansi
- National Institute for Abiotic Stress Management (NIASM), Baramati, Pune

- Central Institute for Arid Horticulture (CIAH), Bikaner
- Central Arid Zone Research Institute (CAZRI), Bhuj
- Central Soil Salinity Research Institute (CSSRI), Karnal
- MOU with CSIR - Central Leather Research Institute (CLRI), Chennai

### NGO

- Nimbkar Agricultural Research Institute (NARI), Phaltan, Satara

## Important Visits



Visit of Dr. R. S. Paroda, Ex DG, ICAR



Visit of ICARDA scientists



Visit of Dr. K. P. Vishwanatha, VC, MPKV, Rahuri

## Future Prospects

- Explore industrial and medicinal properties of cactus
- Promoting cactus as supplementary fodder crop in the farmer's field of Dry Regions
- Promote fruit type cactus cultivation on degraded lands in arid and semi-arid regions of India

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# Spineless Cactus

A potential source of green fodder for dry areas



Cactus (*Opuntia ficus indica*) also known as prickly pear or cactus pear is one of the most suitable crop species for arid and semi-arid climate. It has remarkable ability to withstand long period of dry spell due to inherent physiological adaptations, such as CAM photosynthetic pathway. Cactus forms a good component in the dryland ecosystem due to high water use efficiency. Cactus can be cultivated on poor type of soil with limited water where no any other crop can grow. Cactus has multipurpose uses as a nutritive fodder, fruit, vegetable, medicinal uses as Antacid, arterio sclerosis, anti cholesterolic, prostatitis and hyperglycemia, industrial importance for value added products and good species for countering the effect of climate change. Cactus is rich in minerals like Ca, Mg, Na, P and K. Cactus contains more than 85% of water so it can be fed with other fodder crops during dry spell condition which will be resulted to overcome water scarcity situation in arid and semi-arid regions.

Considering the importance of the cactus, BAIF has initiated research and development work during the year 2015. Though the cultivation of cactus is primarily aimed for food and fodder, the research at BAIF was mainly focused on fodder with an aim to provide an alternate fodder crop to the farmers of arid and semi-arid regions of India to address their livelihood issues. The major Research work comprises of collection and evaluation of cactus germplasm, standardizing the propagation and production technology, adaptation trials in arid and semi-arid regions; develop protocol for feeding cactus in animals and promotion through field demonstrations on farmer's field.



Accession 1280



Accession 1308



Accession 1270

## Outcome of Research Initiatives

- Collected over 100 cactus accessions from various ICAR and private research institutes and explorations by personal visits.
- Developed cactus arboretum and evaluated them for adaptability, growth and yield performance.
- Standardized nursery techniques and tissue culture protocol for mass multiplication and developed cactus production technology.

- Nutritional evaluation of various cactus accessions for proximate and trace minerals.
- Developed protocol for cactus feeding in goats and cattle as a potential source of green fodder.
- Multiplication and adaptability trial of various cactus accessions in arid regions of Kutch (Gujarat) and Barmer (Rajsthan).
- Assessment of financial viability of Cactus cultivation.



Propagation in pots under shade net



Propagation through cladode pieces



Micro propagation in cactus



Cactus arboretum at BAIF, Urulikanchan



Cactus production technology



Cactus feeding trial in goats



Cactus cultivation on degraded land



Adaptation trials in Barmer



Cactus feeding trial in cattle



Farmers training in cactus cultivation



Decentralized Cactus nursey in Karnataka



Supply of cactus planting material



Demonstrations at farmer's field



Fruiting in cactus



Yellow and red colour fruit

### Package of practices for Cactus cultivation

| # | Particulars                         | Details   |
|---|-------------------------------------|---|
| 1 | Site selection and land preparation | Select light soil with good drainage where other crops cannot be grown. Prepare raised beds of 2 feet width and 1 feet height to avoid water stagnation during rainy season.                              |
| 2 | Curing of cladodes                  | After removing one year old fresh matured cladodes from mother plants, cure them for 10 to 15 days under shade before planting.   |
| 3 | Planting in the field               | Plant the single cladode erect facing flat portion to east on raise bed by fixing 1/3rd cladode part underground at a spacing of 2 m × 1 m.   |
| 4 | Manure and fertilizers              | Apply 1-2 kg well decomposed FYM per plant at the time of planting. Application of 2 Kg FYM alongwith 100 gm urea per plant is useful in enhancing the new sprouts after every harvest for biomass.       |
| 5 | Water management                    | Do not water plants till 10 days after planting. Then after apply 1-2 lit water per plant at 15 days interval.  |
| 6 | Weed control                        | Keep the field weed free by manual weeding.   |
| 7 | Harvesting and biomass yield        | The matured cladodes may be harvested at the age of 1 year by keeping basal two cladodes. Biomass yield of 8-10 kg per plant will be obtained during first year and it will increase in subsequent years. |
| 8 | Biomass utilization                 | The freshly harvested spineless cladodes may be fed to goat/sheep/ cattle/ buffalo as 30 % replacement to other green fodder.   |
|   |                                     | Establishment cost of 200 sq. meter cactus nursery is around Rs. 8000 including planting material and maintenance cost of one year.   |

### Development Initiatives

- Decentralized cactus nurseries established at BAIF campus in Urulikanchan, Wagholi (Maharashtra), Lakkihalli (Karnataka), Nanodara (Gujarat) and Barmer (Rajasthan) to cater the ever increasing demand of planting material.
- Supplied over 90000 cladodes and established over 800 field demonstrations on farmer's field in Maharashtra, Rajasthan, Gujarat, Karnataka and Andhra Pradesh as a source of fodder for livestock.
- Cactus planting material supplied to various agencies like KVK's, SAUs, NGOs and Govt. Seed farms to promote cactus as an alternative fodder.
- As Capacity Building Support, developed e-Learning module, video clip, booklet for cactus promotion and published popular articles, research papers on cactus cultivation.
- Developed network with National and International organisations working on spineless cactus