Spineless Cactus Feeding Quality & Feed System Development in Tribal Areas in Odisha

Spineless Cactus in Hilly/ Degraded Lands and Grass pea in Winter Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha Project

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Project Snapshot

1.0 Background

In the context of climate change, the food and fodder availability for both human beings and livestock is being severely affected due to declining land productivity. Around 30% of India's total geographical area is under degradation and climate change is the main driver behind it. As per the National Bureau of Soil Survey and Land Use Planning, soil degradation in India is estimated to be occurring on 147 million ha of land. The situation is affecting more to small and marginal farmers who depend on multiple subsistence livelihood options including livestock rearing.

The Economic Survey of Odisha published in Feb 2021 reveals that the area under fallow land has increased to 10.79 lakh ha in 2019-20 from 10.47 lakh ha in 2018-19. In the context of climate change, due to prolonged droughts, frequent dry spells and desertification, the rural poor and smallholders are getting heavily affected.

The enhanced livestock productivity has a direct bearing on the rural economy. Evidences indicate that feed-related problems accounted for about 36 percent loss (per annum in value terms) in dairy animals and losses due to scarcity of dry and green fodder were estimated to be 11.6 percent and 12.3 percent, respectively (Birthal and Jha 2005).

As per the report submitted by State Level Task Force on Agriculture Development, in Odisha, there is a 55% shortage of green fodder. Based on production statistics, the green fodder availability is 13 million tons against the requirement of 28.7 million tons. Similarly, there is a shortfall of dry fodder by 50% (Rejuvenation of Agriculture, GoO). The scarcity affects the animal productivity most during drier months and hence calls for interventions to make green fodder available during those scarce days.

ICARDA and the Government of Odisha (Directorate of Soil Conservation and Watershed Development, Agriculture and Farmers' Empowerment Department) have joined hands to make the productive use of degraded hilly and wastelands. This initiative has been taken up in collaboration with different research and resource agencies to promote spineless cactus in degraded and wastelands for enhancing fodder availability and grass pea to improve livelihood security of poor and marginal households. The project contributes to the CGIAR thematic areas on increased food and nutrition security for better health and sustainable management of natural resources. The project contributes to the CGIAR thematic areas on increased food and nutrition security for better health and sustainable management of natural resources.

1.1 Goal

Productive use of hilly degraded/ wastelands, and winter crop fallows; and livelihood enhancement through the production of multipurpose spineless cactus and grass pea for fodder, food, and value-added products in the Indian state of Odisha.

1.2 Objectives

a. Introduction and multiplication of local suitable spineless cactus and grass pea species;
b. Standardize zero-till, agronomy, harvest, food/ fodder/ feeding/ value addition strategy;
c. Productive use of waste, degraded, winter fallow land, and enhanced community livelihood;

d. Capacity building of community, department, CBOs, and other stakeholders;

e. Science publications and papers on project impacts;

1.3 Strategy

ICARDA collaborates with agencies/ partners having repute in both research and out-scaling. It also pulls in its in-house skills and competencies for smooth and effective implementation. ICARDA, over the last three years, has been collaborating with OUAT, other research agencies, local communities, and CBOs under this project.

The strategies being followed under the project are illustrated in the chart.

1.4 Geographical Spread of the Project

The project is being intensively implemented in 144 villages of 36 Gram Panchayats of 18 blocks in 6 districts of Odisha. In the extensive districts like Ganjam, Nayagarh, Kandhamal, and Khordha, only foundation nurseries have been established.

Based on the performance and acceptability of the fodder cactus by the local livestock, agencies & individuals from districts like Keonjhar, Jajpur, Sambalpur, Nuapada, Dhenkanal, Kendrapada, and Cuttack are showing interest to take up similar nurseries and plantation activities.

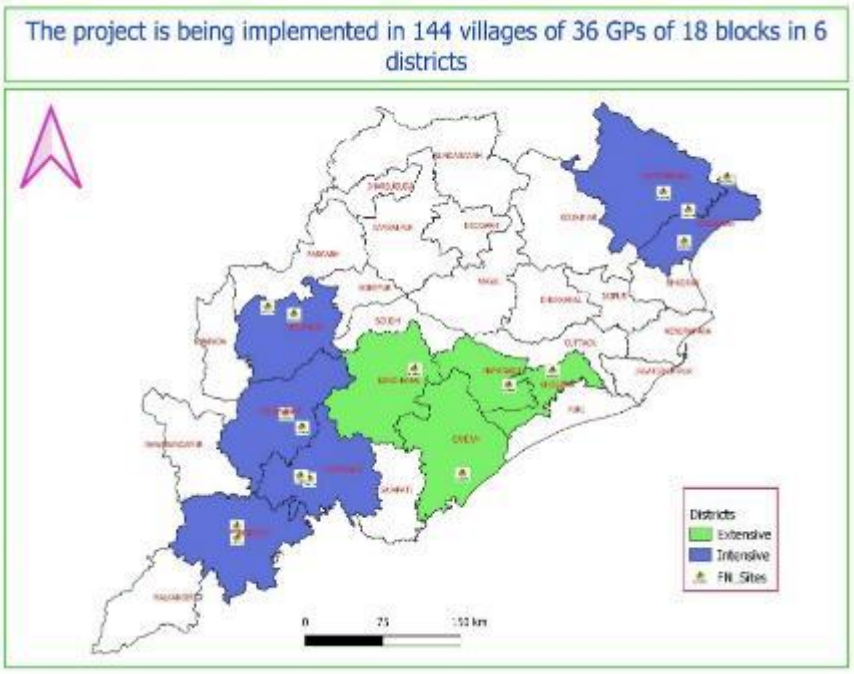

Figure 1: Map on project districts

2.0 Testing Spineless Cactus Accessions for Feeding Quality & Feed System Development

Feed Mix Demonstrations

As per the research outcomes, cactus is highly palatable, digestible, and reduces the water requirements of the livestock. However, cactus must be combined with other feed to prevent diarrhea occurrence and to complete the daily diet, as they are poor in proteins, although rich in carbohydrates and calcium (Nefzaoui and Ben Salem, 2002). To test the palatability of the spineless cactus, feed-mix demonstrations have been conducted in all project districts. The feed mix is being prepared by mixing both dry and green fodder at a 50:50 ratio. Out of the 50% of the green fodder, 25% is chopped cactus, and the rest 25% is other traditional green fodder like local grass etc. 50% of the dry fodder mainly consists of chopped straw, hay, pulse stover, etc. The key steps adopted for conducting the feed mix demonstration are presented in the flow chart below.

The following graph indicates the feed consumption rates of both large and small ruminants. The rate of consumption was highest for *white Rocca palumba* variety followed by *1270* and *mammilion fodder* among large ruminants whereas, for small ruminants, *Orelha de elefante Mexicana* was the most preferred variety.

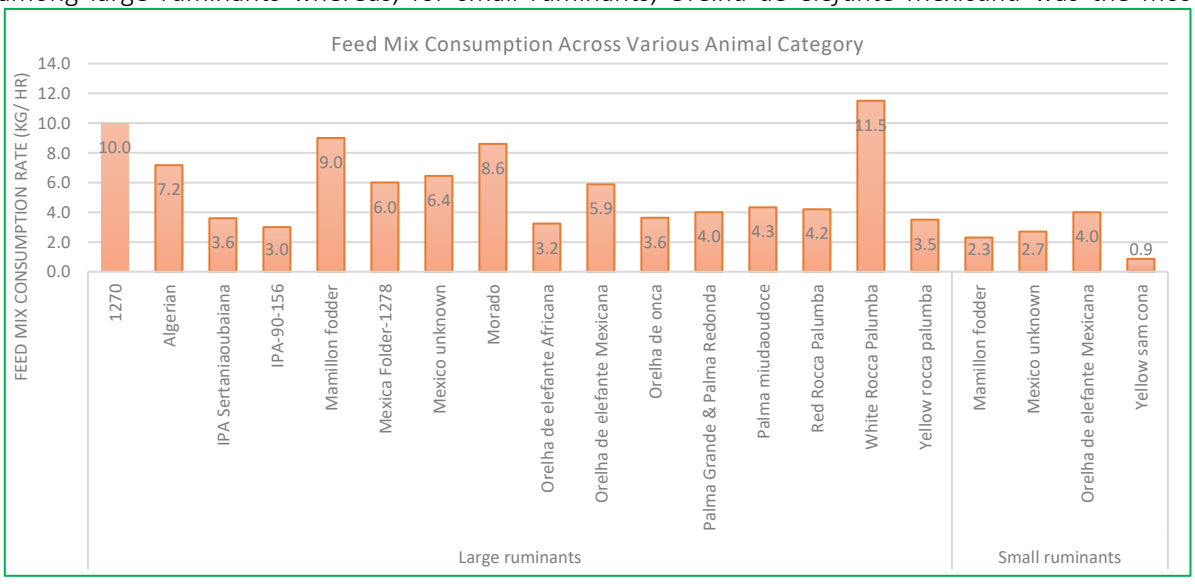

Figure 2: Species wise feed mix consumption rate

During this reporting period, 152 feed mix demonstrations have been conducted across the project districts covering both small & large ruminants. Since the inception of the project, 284 such feed mix demonstrations have been conducted where 432 numbers of animals have been fed with mixed feed to test palatability of spineless cactus and the related observations have been recorded for ranking of various species as alternate fodder.

3.0 Equipment, Machinery & Implements:

The ICARDA promoted Farmers' Committees (144 FCs) have been provided with equipment like Chaff Cutter for chopping of tender cactus and other fodders for their animals (150 Nos.), and Spiral Seed Grader for cleaning and grading of seeds/ grains (144 Nos.). The 36 Gram Panchayat level Custom Hiring Centres (CHC) have been provided with one Zero Tillage Seed cum Fertilizer Drill each.

Table 1: Equipment, machinery & Implements details

Sl. No.	Name of the Equipment	No. of equipment provided	No. of villages covered
1	Chaff Cutter	150	144
2	Zero Tillage Seed cum Fertilizer Drill	36	36
3	Spiral Seed Grader	144	144

Chaff cutter

Zero tillage seed cum fertilizer drill

Spiral Seed Grader

***Personal information including Name, Business Title, Email, Phones, Images and GPS points included in this report have been authorized in writing or verbally by the data subject.**

The Organizers

Directorate of Soil Conservation & Watershed Development (DSC&WD), Odisha has its headquarters in Bhubaneswar, Odisha. It is the state level nodal agency for implementing Watershed Development component of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and is dedicated towards the soil, water and natural resources conservation, management, education, research and extension in the state of Odisha, India. The efforts and programs of the Department are aimed not only at providing soil cover to mitigate accumulated soil erosion, but also at providing the rural and farming communities with basic amenities, infrastructures and incentives for creating sustainable alternative farming systems with a view to wean them away from the destructive traditional methods of cultivation as well as uplifting the socio-economic status at large. Convergence with MGNREGS and various schematic programs of the line departments also provides opportunities for comprehensive area development and wider impacts across the sectors. For more information, visit, http://www.soilconservationorissa.gov.in/)

Government of Odisha (ଓଡିଶା ସରକାର) governs the state of Odisha in the Republic of India. The state government has various well established departments to undertake the integral development of the state. The head of state of Odisha is the Governor, appointed by the President of India on the advice of the Central government , who heads the council of ministers, a judiciary, and a legislative branch.. The Chief Minister is the head of the council of the ministers and is vested with most of the executive powers. The State High Court is located in Cuttack. The legislative assembly of Odisha is unicameral, consisting of 147 members of the legislative assembly (MLA); (for details on various government initiatives, please visit, http://www.odisha.gov.in/portal/default.asp).

ICARDA (International Centre for Agricultural Research in the Dry Areas) established in 1977 is one of the 15 such centres supported by the CGIAR and mandated to promote agricultural development in the dry areas of the developing countries. The centre works on the problem-solving needs of resource- poor farmers through development and delivery of new technologies for sustainable growth in agriculture, in a partnership and multi-stakeholder approach, working in 50 countries. Its research and training activities cover crop improvement, water and land management, integrated crop-livestock-range land management, and climate change adaptation. The ICARDA gene bank holds over 155000 accessions from over 110 countries: traditional varieties, improved germ plasm, and a unique set of wild crop relatives of food legumes such as chickpea, lentil, fieldpea and fababean, wheat, barley, oats and other cereals, forage crops, range land plants, and wild relatives of each these species. ICARDA works in strong partnership with national agricultural research systems, Government Ministries, Community Linked Institutions; (For details, please visit: http://www.icarda.org/).