Food and Agriculture Organization of the United Nations

SUSTAINABLE AND RESILIENT LIVELIHOOD OPTIONS FOR RAIN-FED AREAS OF INDIA THROUGH IMPROVED INTEGRATED CROP LIVESTOCK FARMING SYSTEM

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SDGs:	
Country:	India
Project Code:	TCP/IND/3708
FAO Contribution:	USD 291 000
Duration:	1 November 2019 – 31 December 2021
Contact Info:	FAO Representation in India FAO-IN@fao.org

Implementing Partners

Ministry of Agriculture and Farmers' Welfare, Government of India; National Rainfed Area Authority; Government of Maharashtra; Government of Odisha; Government of Rajasthan.

Beneficiaries

Farmers, smallholder farmers, producers and pastoralists.

Country Programming Framework (CPF) Outputs

CPF Priority Outcome 1: Improved agricultural productivity and increased farm incomes.

Background

India's natural resource base is subject to serious and continuous degradation and is recognised as a challenge for India's growth. Agricultural growth in India should be sustained by addressing problems affecting the production systems of rainfed agriculture (areas that depend on rainfall for agriculture water needs and have few or no irrigation sources), which currently accounts for over which cover more than a half of total cropped area, or 74 million hectares, in the country.

Approximately 40 percent of the population is supported by rainfed agriculture, which accounts for a large share of cropped areas for the production of rice, pulses, oilseeds and coarse cereals, among others. Rainfed areas also host the majority of livestock (cattle, goat and sheep), and span several agroecological regions, many of which also have high levels of poverty. A lack of institutional development, support systems, availability of appropriate inputs, credit, market access, agricultural research and extension has led to the cumulative neglect of rainfed areas for years and caused widespread issues within farming communities.

Rainfed production systems have received little attention, which has contributed to the environmental degradation of many rainfed areas, and is further challenged by the risks of climate suffer. There is a strong need to focus on diverse local production systems that contribute to food and nutrition, as well as livelihoods and income security, by moving away from single commodity intensification approaches and more towards location-specific farming systems.

In addition, there is a need to strengthen extensive livestock systems that depend on common land resources and agriculture residues and improve longer term planning for health care, feed, fodder, drinking water, shelters and institutions.

Addressing the problems of smallholder farmers in rainfed areas requires a better understanding of rainfed farming systems and their constraints, as well as the different agro-ecological territories within rainfed areas of the country. Furthermore, improved characterization of these areas and monitoring of these diverse farming systems are needed. As such, this project aimed to increase farmer incomes and improve resilience through the development of sustainable livelihood models for rainfed areas by supporting the development of effective, location-specific and locally accountable partnerships. Implementation partners developed several technical solutions that were made available to producers, and the overall design incorporated key aspects of each rainfed location and included mechanization tools for production and harvesting and practices for post-harvest handling of commodities. Overall, the implementation of this project enhanced the capacities of civil society organizations.

Impact

The project supported the development of resilient, sustainable livelihood options for rural rainfed area farmers through integrated crop livestock farming systems. This, in turn, will contribute to increased farmer incomes and improved resilience in rural rainfed areas, and when scaled up through policy action, can contribute to the achievement of the relevant SDG Targets.

Achievement of results

The project helped build resilience for farmers by developing sustainable livelihood models for three different rainfed environments, equipping them with tools and providing appropriate policy support, and successfully developed and applied a multidimensional approach to sugar beet cultivation. It supported the transition to sugarcane production in rainfed areas, regulation of input-intensive farming techniques, promotion the transformation of technologies for the processing of substitute crops and supported better use of sugarcane by products for livestock production.

These models were developed in consideration of the differences and specific needs of all three targeted areas and based on participatory rural appraisals (PRA) used to gain a proper understanding of the constraints in each. Each of the livelihood options for the three rainfed areas were thoroughly evaluated to ensure that they addressed the needs of the producer and were practical (implementable).

A technical workshop on pastoralism also provided possible strategies that could be used to address the needs of pastoralists.

An integrated farming scheme was developed based on the results and lessons learned from the project activities in Odisha, which were integrated into the government programme. More than 1 700 pastoralists were trained on improved animal health, nutrition and trade practices and over 14 000 animals were vaccinated. These interventions helped raised awareness among producers on the importance of proactively managing pastoral ecosystems and the need to better manage their assets, i.e. crops and livestock. Training sessions were also held with 500 farmers to promote livelihood models using farmer-to-farmer learning platforms (Rearer Field Schools) and community dialogues, organized with experts and through visits.

Additionally, the project improved market access for each of the three rainfed sites, as well as neighbouring villages, due to both government procurement schemes and open market transactions. In three villages in Odisha, the project provided access to markets to over 200 producers, while two villages in Baramati (75 farmers) gained access to value chain activities. As a result, farmers reported higher net income because of lower costs from the improved practices and better access to inputs delivered by the project.

Implementation of work plan and budget

The project achieved all outputs despite facing constraints related to the COVID-19 pandemic. Some activities were rescheduled due to delays in securing permissions from the authorities, and the project received a no-cost extension to 31 December 2021. Resource allocations reflected the investments required for the capacity building of stakeholders and implementation partners. All the project activities were implemented within the planned budget.

In the early stages of the project, weekly meetings for all locations were held virtually to accommodate the COVID-19 restrictions. Experts from the National Rainfed Area Authority (NRAA) took part in reviews, and all stakeholders were briefed on project status, plans and challenges, with appropriate support provided where needed. The project applied PRA methods and introduced Free, Prior and Informed Consent (FPIC) in Odisha and Rajasthan.

Follow-up for government attention

There is a need to broaden the agenda and adopt an integrated approach on pastoralism-related issues. Further policy support is needed to recognize the importance of indigenous sugar beet seed development, with an emphasis on appropriate mechanization to accommodate and promote beet cultivation in rainfed areas. It is also noted that these measures could be further supported and developed using NRAA technical and administrative resources, and there is a need to identify additional financial support to sustain the outcome of the project.

Sustainability

1. Capacity development

The project involved the partners across different sectors and levels (government, civil society, research and the private sector), which will help ensure the sustainability of the capacities developed in the future. The project's activities were carried out in close collaboration with government and local authorities, including state governments and respective departments of the Government of India, and the NRAA was continuing discussions regarding policy issues at the time of reporting, including a broader policy framework to implement the recommendations from the project.

2. Gender equality

Women play an important role in agro-pastoral communities and were actively involved throughout implementation. In Baramati (Maharashtra), women play an active role in crop management and were trained on crop cultural/agronomic practices, increasing their engagement opportunities in crop activities. The harvesting of sugar beet was also supported by women members of the community. In Odisha, women were also engaged in capacity building activities for managing harvest activities: women members of the self-help group (SHG) identified were trained on improved nutrition through the consumption of millet. Water structures constructed along pasture routes made it easier for women short-range pastoralists to access water for their animals. Community women were also involved in the wool value chain. The introduction of shearing machines made readily available to women will allow for their participation in the shearing process, which is predominantly an activity carried out by men. This will continue to increase cost savings as there is no longer a need to call upon community shearers every season.

3. Environmental sustainability

In the long term, the multidimensional approach for sugar beet cultivation will further contribute to water conservation and the renewable energy sector (for instance for biofuels).

4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

The project recognised the rights of the targeted beneficiaries to protect their farming system located in specific rainfed areas, and to sustain their livelihood situation in the project activities.

5. Technological sustainability

The project used inexpensive technologies that are appropriate for rainfed ecosystems, and the introduction of good practices adopted by community members will help ensure their continued use.

6. Economic sustainability

At the time of reporting, project partners were accessing donor (corporate social responsibility) funding and working with local and subnational state governments to mobilize support from other programmes.

DOCUMENTS AND OUTREACH PRODUCTS

Documents

- March 2020. *Baseline survey Report – Early Trends*. 24 pp.
- April 2020. *Impact of COVID-19 on the Pastoral Ecosystem: Challenges and Way Forward*. 6 pp.
- May 2020. *Architectural Map of CFC*. 4 pp.
- August 2020. *Support Services to Pastoralists*. 7 pp. PDF
- June 2021. *Wool Value Chain in Deserts*. 18 pp. PPT
- *Government of India and Rajasthan Schemes*. 4 pp. DOC
- *Integrated Farming Systems Plan*.
- *Integrated Pasture Development Programme*. 32 pp. PDF
- *Integration of FPIC Report*.
- *Pastoralism Comprehensive Policy Doc*. 26 pp. PDF
- *Pastoralist Pass*port. 52 pp. PDF
- *Pastoralist Constraint Identification Report*. 6 pp. PDF
- *Policy Brief - Role of FPOs in Post-Harvest and Marketing*.

- *Policy Brief - Institutions for Integration*.
- *Policy Brief - Rearer Field School*.
- *Policy document and recommendations*. 6 pp
- *Project report on "Climate resilient sugar beet based cropping system model for higher income in rainfed areas"*. 73 pp.

Outreach Materials

- **T. Motilal.** 2021. [Commentary] *Domino effect of COVID-19 lockdown on transhumant pastoralists in Rajasthan*. https://india.mongabay.com/2021/06/commentary-domino-effect-of-covid-19-lockdown-on-transhumant-pastoralists-in-rajasthan/.
- Information, Education and Communication (IEC) Poster.
- Booklets and posters:
  - English literature on sugar beet cultivation. 5 pp.
  - Fall Armyworm in Maize.
  - IPM in Maize.
  - Marathi literature on sugar beet cultivation.6 pp.
  - Millet Recipe Book (Odia).
  - Organic Bio-inputs.
  - Package of Practices for Different Crops.
  - Package of Practices for Vegetables.
  - Participatory Varietal Trial in Ragi.
  - Pest and Disease Management.
  - Programme Brochure.
  - Various programme videos (in high and medium resolution).

ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	**Enhancing resilience and sustainability of livelihood options in rural rain-fed areas farmers through integrated crop livestock farming system**		
Outcome	Increased farmer incomes and improved resilience through sustainable livelihood models developed for rural rain-fed areas		
	Indicator	Total turnover (in INR) of agricultural commodities reported by farmers adopting livelihood models promoted by the project and connected to markets.	
	Baseline	0	
	End Target	25% increased income.	
	Comments and follow-up action to be taken	Participating producers and pastoralists in the project sites and near-by villages reported increased access to market opportunities, both via government procurement schemes and also through open market transactions. Farmers reported reduced costs because of improved practices and better access to inputs, which positively impacted famer net income. A total of 1736 pastoralist in Dhani Bhopalaram, Kalu, Kelan, and Rajasar Bhatiyan were trained on improved animal health, nutrition and trade practices, and over 14 000 animals were vaccinated. In Odisha, over 200 producers in 3 villages Bhurkadhoda, Chhindpani and Patperpali were provided access to markets. In Baramati, Maharashtra, 75 farmers located in 2 villages (Parwadi and Shetphalghade) were provided access to value chain activities.	
Output 1	Sustainable and resilient livelihood models developed for each rain-fed area		
	Indicator	Target	Achieved
	Number of livelihood models developed for promotion in each rain-fed area.	3	Yes
Baseline	0		
Comments	Three models were developed. In Odisha, a landscape-based integrated model was developed, which was mapped to different schemes available from the government. The plan developed for the project villages was passed by the Gram Sabha and the District Convergence Committee. This was shared with the district administration, department of agriculture and farmers empowerment groups for inclusion in schemes and further scaled up. In Baramati, Maharashtra, a sugar beet cropping system model was developed to introduce sugar beet as an alternate to cultivating sugar cane in rainfed conditions. Sugar beet was grown both as a sole crop and as an intercrop with sugarcane. Participating farmers (75) were linked up with the sugar mill to ensure timely processing of the crop after harvest; in Rajasthan, pastoralists now have access to basic support services through Common Facility Centers (CFCs) and renovated water bodies that contribute to the enhanced resilience of pastoralism in the programme cluster.		
Activity 1.1	Constraints identified		
	Achieved	Yes	
	Comments	Each of the three locations used PRA tools to gain insights into the constraints being faced in practicing rainfed farming. In Rajasthan a constraint identification assessment was undertaken via surveying 394 transhumant sheep pastoralists along Barmer-Jaisalmer-Ganganagar-Haryana route. In Baramati, Maharashtra, over 100 farmers and producers were reached out to understand the challenges emerging from cultivation of sugarcane under rainfed conditions. In Nuapada, Odisha over 200 farmers and producers were engaged with to determine the challenges they face in managing the crops and livestock under the rainfed conditions	
Activity 1.2	Develop suitable livelihood options		
	Achieved	Yes	
	Comments	In Nuapada, Odisha, rainfed-based crop diversification models were developed, especially for upland and midland areas. Indigenous paddy in the midlands and lowlands, and millets, pulses and oilseeds were part of the models that were developed. In Bikaner Rajasthan, the URMUL Rural Health, Research and Development Trust, developed a package of support services through a Letter of Agreement that would be required by pastoralists. These included both livestock and pastoralist requirements. In Baramati, Maharashtra, alternate methods of sugar beet cultivation (small farmer, mechanization, etc.) were explored in developing livelihood options.	

Activity 1.3	Evaluate livelihood options		
	Achieved	Yes	
	Comments	Each of the livelihood options for the three rainfed areas were thoroughly evaluated to ensure that they addressed the needs of the producer (matching checked with identified constraints) and were practical (implementable). This was even more important given the COVID-19 induced travel restrictions, which will likely have a positive impact of the communities.	
Output 2	Improved capacity for wider adoption of resilient livelihood models		
	Indicator	Target	Achieved
	Number of farmers trained for promoting livelihood models.	TBD	Yes
Baseline	0		
Comments	The project's capacity building strategy included a combination of interventions; farmer-to-farmer learning platforms, such as the Rearer Field School, community dialogue, training sessions with experts and sugar mill exposure visits for sugar beet farmers. Each site was supported by community resource persons, and these approaches were complemented by engagement with policy-makers at regular intervals. Relevant policy dimensions were identified, and where possible, these were incorporated into the project activity plan.		
Activity 2.1	Baseline schemes		
	Achieved	Yes	
	Comments	Appropriate schemes were identified that complemented project objectives. These schemes covered mechanization of operations (through the submission on mechanization), input supplies, livestock management (vaccination), rural employment guarantees, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), etc.	
Activity 2.2	Convergence		
	Achieved	Yes	
	Comments	In Odisha, convergence was achieved with the submission on agricultural mechanization, Agricultural Technology Management Agency, Odisha Millets Mission (OMM), and Odisha Livelihood Mission (OLM), on seed supply, agricultural implements and capacity building for millet, pulses, paddy and vegetable cultivation. In Rajasthan, the project leveraged MNREGA to support the restoration of water bodies and building of CFCs. It also received support from the Animal Husbandry Department. For sugar beet cultivation, crop mechanization was a key focus to ensure the improved sustainability of livelihood options. Furthermore, it was important to partner with value chain players that would procure and process sugar beets, which requires equipment modification to the existing sugar cane plant. The sugar cane mills were mapped and the most suitable partner was selected to carry out the processing plant modification.	
Activity 2.3	Demonstrations		
	Achieved	Yes	
	Comments	Field demonstrations were planned across the three sites, however, the implementation had to be fine-tuned due to COVID-19 travel restrictions. These included crop demonstrations in farmer fields and also in development plots. The total area under sugar beet pilot cultivation was 89 acres and crop demonstration trials were held on 2 acres at the Vasantdada Sugar Institute (VSI) research farm and on farmer plots in Nandadevi (Baramati). Animal health camps were organized with support from veterinary doctors and para-vets from the Animal Husbandry Department. Vaccinations were also provided at the CFCs supported by the project. All these interventions raised awareness among producers on the need to better manage their crop and livestock assets in order to improve their income.	

Activity 2.4	Production Support	
	Achieved	Yes
	Comments	The VSI partner for sustainable sugar beet successfully developed and deployed tractor-operated sugar beet seed drills for sole cropping, as well as intercrop sowing. Over 100 farmers were trained on proper harvesting and post-harvest handling of sugar beet. Farmers were trained on primary processing before the crop is taken to the sugar mill. Beet pulp (a residue from the processing of sugar beet) was successfully used as a mix in the fodder for milch animals. This blend led to improved milk production and also created an additional income earning opportunity from the crop. The pastoralists in Bikaner Rajasthan were able to access high-quality wool shearing equipment at the CFC, and they had timely access to animal husbandry services for the animals vaccinated. In Nuapada, Odisha, small-scale little millet dehullers were piloted through the project for ease of household processing and consumption. A ragi thresher-cum-pearler was handed over to an SHG in the project area in collaboration with OMM. This thresher was successfully tested using a solar energy cart. A field visit was conducted to Jawadhu hills, Tamil Nadu, to learn from various millet processing initiatives undertaken by the farmer producer organization (FPO). The Komna block FPO members were also part of this visit. A large-scale little millet processing unit was in the process of being established at the district-level at the time of reporting.
Activity 2.5	Advocacy for Policy Change	
	Achieved	Yes
	Comments	In Bikaner, Rajasthan, regular discussions were held with stakeholders, including Gram Panchayats, block officers, district administration and ministry AHFD, during which time they were updated on the project progress and requests for further support. The URMUL made a presentation on the need for an integrated approach to pastoralism, and a formal presentation on the Integrated Pasture Development Program was made to the Ministry of Animal Husbandry and Dairying (Government of India). Due to continuous engagement with the State Government of Odisha at district and state levels, NRAA and FAO were made part of the state level technical committee on integrated farming. Based on the feedback from NRAA and project experience, the Odisha Rainfed Agriculture Mission was also launched by the State Government of Odisha. These interventions created an enabling environment to promote the landscape based integrated farming approaches in government policy.
Output 3	Market access for sustainable commodities	
	Indicator	Target / Achieved
Indicator	Numbers of farmers selling their products through project promoted marketing interventions.	TBD
Baseline		
Comments	Over 500 participating farmers and producers across the three project sites were connected to markets. All project partners delivered on enabling market access to the producers in the three rainfed areas. The project activities were implemented under very difficult circumstances due to the COVID-19 pandemic and related travel restrictions. Project partners used all possible means, including virtual meetings, to build awareness about market opportunities.	
Activity 3.1	Buyer-seller meets	
	Achieved	Yes
	Comments	Project partners identified market opportunities in both public procurement and the private sector. In Nuapada, Odisha, key crops were mapped to the government procurement system and an IEC campaign was done with all producers prior to the procurement season. For the pastoralists in Bikaner, Rajasthan, project partners mapped local and regional markets for wool, meat and dairy products. Sample products were created and virtual marketing was done with regional buyers. Sugar beet is only procured by sugar mills, therefore regular interactions were initiated between farmers and sugar mill staff to establish a common understanding of product quality standards, proper crop harvesting and handling techniques, etc..

Activity 3.2	Sales activities	
	Achieved	Yes
	Comments	In Nuapada, Odisha, different crops and crop combinations were promoted as part of the project. With the support of NRAA, FPO was chosen as the procurement agency for procurement of finger millet in the Komna block. A total of 195 farmers were registered and connected to the public procurement system for finger millet. Additionally, farmers were connected to the little millet procurement initiative through the OLM for Kharif 2021. Little millet collected is planned to be utilized in supplementary nutrition programs. For the pastoralists in Bikaner, Rajasthan, project partner collaboration with URMUL Desert Crafts (the textile wing of the URMUL group of organisations) led to access to natural dyeing facilities and processing centres established in other pastoral clusters in the state. Women artisan collectives working with URMUL Desert Crafts sampled and developed sheep wool felt and apparels using traditional Rajasthani designs and techniques. After a complete mapping of production volumes and production areas, sugar beet producers were connected to the nearest sugar cane processing mill that procured the sugar beet at an agreed upon price.
Activity 3.3	Agri-value system promotion	
	Achieved	Yes
	Comments	Farmers in Nuapada were trained on proper harvesting and post-harvest handling of crops. Crop handling equipment, such as tarpaulins, threshers and moisture meters, were made available to the project villages, which helped in improving the quality of the material sold. At the CFCs located in Bikaner, Rajasthan, proper bathing facilities and high-grade shearing machines from the global brand Heigniger were provided for use by pastoralists, which ensured clean and efficient collection of sheep wool. In Baramati, Maharashtra, harvested sugar beet was transported in tractor trailers to sugar mills soon after harvest to ensure limited moisture loss. This also helped in the timely processing of sugar cane juice and improved the product quality. A quality assessment of the processed sugar beet was done and information on the output quality was shared with producers, which will be used at the time of planning for the next crop.

Partnerships and Outreach
For more information, please contact: Reporting@fao.org

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