

# Concurrent Monitoring – Round VII Report

Monitoring and Evaluation for Project on Climate Resilient Agriculture (PoCRA) In Marathwada Region, Maharashtra

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(Project of Government of Maharashtra in Partnership with the World Bank)



Submitted by

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In Association with

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## Acknowledgement

Sambodhi Research and Communications, in association with TERI, is thankful to the Project Management Unit (PMU), Project on Climate Resilient Agriculture (PoCRA) for awarding the assignment “Monitoring & Evaluation (M&E) for Project on Climate Resilient Agriculture (PoCRA)” in the eight districts of the Marathwada area of Maharashtra.

We would like to thank the Project Director and all the subject matter specialists from PMU for providing their guidance and continuous support to the M & E team for the successful execution of this assignment. Further, the project officials at the district and the sub-divisional level have been very supportive and helpful in the successful completion of the seventh round of Concurrent Monitoring.

We would also like to acknowledge the support received from ground level PoCRA team comprising of Agriculture Assistants, Agriculture Supervisors, Cluster Assistants, Farmer Field School (FFS) Coordinators, FFS Facilitators, Krushi Tais, Taluka Agriculture Officer (TAO), along with Village Climate Resilience Management Committee (VCRMC) members.

Most importantly, we would also like to thank all the participants (respondents) and their families for agreeing to participate in this round of Concurrent Monitoring and patiently responding to the questions.

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## Abbreviations

AA	Agriculture Assistant
BBF	Broad Bed Furrow
CA	Cluster Assistant
COVID-19	Corona Virus Disease 2019
CBP	Capacity Building Program
CFP	Community farm pond
CNB	Cement Nala Bund
CRAT	Climate Resilient Agriculture Technology
DBT	Direct Benefit Transfer
DSAO	District Superintending Agriculture officer
FFS	Farmer Field School
FPO	Farmers Producers Organisation
FPC	Farmers Producers Company
GF	Guest Farmer
HF	Host Farmer
IDI	In-Depth Interview
M&E	Monitoring and evaluation
MIS	Management Information System
NRM	Natural Resource Management
PDO	Project Development Objective
PoCRA	Project on Climate-Resilient Agriculture
PS	Project Specialist
SDAO	Sub-Division Agriculture Officer
SHG	Self Help Group
TAO	Taluka Agriculture Officer
VCRMC	Village Climate Resilient Agriculture Management Committee

# Executive Summary

## Introduction

The Project on Climate Resilient Agriculture (PoCRA) is being implemented by the Maharashtra government in collaboration with the World Bank to enhance the climate resilience and profitability of smallholder farming systems in selected districts of Maharashtra. PoCRA is based on a multi-pronged and comprehensive approach which aims to build climate resilience in agriculture through scaling up tested technologies and practices.

Sambodhi, in partnership with TERI, has been recruited to conduct M&E of PoCRA in all eight districts of the Marathwada region. As part of its mandate on the monitoring and evaluation of the project, one of the key components is to conduct concurrent monitoring of the project, which is being conducted bi-annually for six years. Concurrent monitoring aims at finding out bottlenecks in the implementation of each project component and suggesting solutions for the same. It also aims to get beneficiaries' feedback on the key processes of the different project components.

Further, concurrent monitoring also aims to assess the progress of the project on key indicators as per the results framework, which is measurable through concurrent monitoring rounds. The first concurrent monitoring was conducted from the start of the project till 31st March 2019. With a plan to conduct a total of 12 rounds of concurrent monitoring every six months, the current round, i.e., the seventh round of concurrent monitoring, has considered the period from 1<sup>st</sup> October 2021 to 31<sup>st</sup> March 2022.

## Methodology

Like previous rounds of concurrent monitoring, the current concurrent monitoring-VII (CM-VII) focused on the concurrent process and progress monitoring for different components such as individual matching grants accessed using Direct Beneficiary Transfer (DBT) application, the farmer field school for demonstration of climate-resilient and sustainable farming practices, construction of community assets which are aimed to benefit the farming community of the area including natural resource management works and community farm pond, farmer producer organizations and self-help groups for strengthening post-harvest and value chain strengthening agri-business activities. Feedback on the functioning of the Village Climate Resilience Management Committee (VCRMC), Krushi Tai, satisfaction in project planning, micro-planning, support from project staff, support received and expected by the FPOs/FPCs etc., was also analyzed in the project and control villages. The project MIS data for the period was also analyzed to understand the progress of the project activities during this period. The study area is comprised of eight districts of the Marathwada region of Maharashtra viz. Aurangabad, Beed, Nanded, Hingoli, Latur, Osmanabad, Parbhani and Jalna.

A mixed-method approach has been adopted for all the concurrent monitoring surveys of PoCRA conducted to date. The CM-VII round of the PoCRA project followed the common methodology suggested by PMU which is being used in both the Marathwada and Rest of Project Areas (RoPA) region from the current round. A quantitative survey tool for the beneficiaries and qualitative interview schedules for the other key project stakeholders were finalized in discussion with the PoCRA PMU team.

The survey for the seventh round of concurrent monitoring was conducted in 30 project and 15 comparison villages. A sample of 675 beneficiary respondents was targeted to be covered under the quantitative survey, which includes 450 respondents in the project and 225 respondents in comparison areas. As per the methodology of CM-VII, it was ensured that project to comparison respondent ratio remains 2:1.

A total quantitative sample of 450 was covered in the project area with a sample of 297 covered for individual interventions and 153 for community interventions. In the comparison area, a total of 225 samples were covered with 178 beneficiaries from individual benefits and 47 from community benefits. This sample was proportionately spread in all eight districts.

Also, as part of the qualitative component, a total of 162 samples (36 FGDs and 126 in-depth interviews) comprising of 28 Focus Group Discussions with VCRMC members, eight with Project Specialists; and key-informant in-depth interviews of four SDAOs, 23 Cluster assistants, 26 Agriculture assistants, five DSAOs, 17 FPC representatives, five FFS Facilitators, one FFS Coordinator, 18 Krushi Tais, 18 Agriculture Supervisors and nine Taluka Agricultural officers were conducted.

The quantitative estimates at the aggregate level in the report provide a broad indication, but the estimate may not provide statistical precision as the sampling is not entirely random, and for some categories, the sample size is not adequate. Therefore, a mix of quantitative estimates and qualitative insights have been used to conclude the point of view of monitoring the project.

## Summary of Key Findings in Concurrent Monitoring Round VII

### Cultivation Practices

In the project clusters, during the Kharif season, nearly 91% of the total respondents cultivated their land with an average of 3.8 acres per household. Similarly, 73% of total respondents cultivated Rabi crops (on an average of 3 acres per household), and 4% of respondents cultivated summer crops (on an average of 2 acres per household) in the last 12 months. Nearly 94% of respondents in project clusters had an irrigation source, while in comparison 89% had an irrigation facility. In project clusters, the sources of irrigation in order of adoption by respondent households are open-dug well, borewells, farm ponds, canals/river, and earthen/check dams. Farm ponds are more prominent in project clusters (15%) than in comparison clusters (5%). This may be attributed to project interventions. Also, nearly one-tenth of respondents in comparison areas reported canal/river as a major source of irrigation which was found to be less in project clusters (5%).

In project clusters, on average 3.7 acres of land with Kharif crop, 3 acres of land with Rabi crop, 2 acres of land with a summer crop, 2.8 acres of land with annual crops, and 2.3 acres of land with horticulture plantation was under irrigation in the past 12 months. Around 12% (55 of 449) of respondents in project clusters and 5% (12 of 224) respondents in comparison had their land (on average of 2.3 and 1.7 acres respectively) under orchard plantation. The average age of orchards is 5 years in project and 7 years in comparison areas. Nearly 80% (44 of 55) of orchards in project areas are more recent because of PoCRA intervention since 2018-19, indicating that farmers in project areas are adopting the horticulture plantation more confidently.

The most common Kharif crops cultivated in both project and comparison clusters include Cotton, Pigeon pea and Soybean. Some of the other Kharif crops cultivated were Chickpea, Sorghum, Black gram, Green gram, Maize, Sugarcane, Turmeric, Ginger, Onion and Millet. The most common Rabi crops cultivated in both project and comparison clusters included Chickpea, Sorghum, and Wheat. Vegetables like Onion and Groundnut are mostly grown in summer. Bananas, Papaya, Guava, Sweet Lime, Lemon, and Orange are common crops sown annually. It was observed that nearly 76% of respondents in the project and 78% in comparison clusters faced crop damage. The primary reason for crop damage in both project and comparison clusters is excessive rain, pest/ disease attack, and hailstorm. Nearly 11% of respondents in both project and comparison clusters faced crop damage due to pest and disease attacks.

The percentage of land under certified seeds for Soyabean was higher in comparison area (87%) as compared to project areas (83%). The overall percentage of land under certified seeds for these three crops in both the project and comparison areas is 72% and 79%, respectively. Estimates indicate that more efforts are needed to promote the use of certified seeds in project areas.

### Awareness about PoCRA

A high level of awareness of various PoCRA activities is observed among the communities in project villages. Their awareness of village-level microplanning and water budgeting suggests that the farmers are more keen on learning and adopting climate-resilient farm practices in project villages. Gram Panchayat members (79%), followed by Project staff (52%) - which includes Agriculture Assistant, Cluster Assistant, FFS Facilitator, Project Specialist, Krushi Tai, and VCRMC members (40%) have been the key source of information on PoCRA benefits. A simple PoCRA project display board has proved to be a useful medium to disseminate the project information on services such as CHCs, godowns, processing units, etc., among the farmer community in the project village. PoCRA project staff has also maintained a smart communication ecosystem comprising of WhatsApp groups at the village level to pass on important project benefits-related information which has enhanced the level of awareness among the farmers.

### Women Empowerment

PoCRA has played a significant role in the inclusion and empowerment of women as project beneficiaries. Seven female host farmers who conducted the FFS training in their fields were interviewed during the CM VII round. This is a positive indication of the change that is envisaged through the project. Female farmers leading as host has inspired and motivated other female farmers in the village to participate, learn and adopt climate-resilient technologies. Six women household heads who owned mobile phones reported that they receive and follow agro-met advisories for their agricultural activities. Three female beneficiaries from project support FPCs and six female beneficiaries from project support SHGs have received training on skill upgradation, market awareness, and farm technologies. They are involved in value-added activities of agricultural produce like cleaning, sorting, and grading at their respective FPCs and SHGs. Case studies of two progressive woman farmers, one cultivating vegetable using shade net and another doing apiculture business through PoCRA support, indicates that the project has empowered them to go beyond their domestic responsibilities and work to cope with the climate vulnerabilities and contribute to stabilizing their household income.

## Adoption and training of CRATs

There is higher adoption of CRATs after receiving training in the project. An average of 24% increase in yield and a 16% reduction in the cost of cultivation and pest and disease attack as compared to the levels before the adoption of CRATs is observed in project areas as reported by the respondents. Similarly, changes are also observed in comparison, but the levels are 1% less than those observed in project areas.

## Agrometeorological advisory

Nearly 90% of respondents in project clusters showed a willingness to adopt the CRATs. Nearly three-fourths of respondents in project areas receive agro-met advisory as a part of the project. Nearly 98% of respondents in project clusters as compared to 68% in comparison clusters, showed interest in following CRAT. Nearly 80% of respondents in project areas market their agricultural produce based on market price information they get. The preferred mode of receiving the agro-met advisory is SMS on mobile (2/3<sup>rd</sup> of respondents), through a mobile App, WhatsApp and newspapers. More respondents in project clusters (56%) as compared those in comparison (39%) treated the soil using soil health card information.

**Response on the mobile app:** The majority of respondents across all districts and social categories seek advisory in the mobile app on key aspects such as climate resilient technology, weather, soil nutrient, NRM, fertilizer (chemical and bio), certified seeds, pesticides (chemical and bio), crops (food/cash/plantation), irrigation and crop pest/disease.

## Individual project benefits

Out of 66% of respondents in project clusters who benefitted from the project, nearly 54% had applied or received individual benefits, and 13% had participated in farmer field school (FFS). Activity-wise distribution of the access to individual benefit in both project and comparison clusters are detailed below. It is observed that the highest demand under the project is for drip (30%), followed by sprinklers (23%), horticulture plantation (12%), pipes (8%), and pumps (6%).

**Individual matching grants:** Regarding the status of the application for individual benefits in project clusters, nearly 75% of respondents had received the matching grant in their bank account. It was observed that the transfer of matching grants in current round VII has improved by 13% as compared to that observed during the CM VI round. All beneficiaries were found to be aware of their application status, which is a positive trend.

**Irrigation facility:** More than four-fifth of beneficiaries of irrigation benefits (drip, sprinkler, pipes, and pumps) reported an increase in income and agricultural production as major benefits of adopting these. An increase in income was reported more among the beneficiaries of drip and sprinkler irrigation than among beneficiaries of pipes and pumps. Other major benefits reported were increased availability of water, increase in the area of cultivation in both Kharif and Rabi seasons, change in cropping season, and availability of water in dry spells.

**Drip irrigation system:** Out of 73 beneficiaries who have applied for a project grant for a drip irrigation system, 63 have received and established an irrigation system. Out of 73 beneficiaries, 48 of them (66%) used their irrigation set only when required. Seven beneficiaries used the set regularly, while the remaining used the set seasonally. The mean area irrigated using drip irrigation is 3 acres. Most of the farmers used drip irrigation to irrigate Cotton (46%), Soyabean (37%), Chickpea (24%), and Sugarcane (15%). Other crops include pigeon pea, sorghum, wheat, maize, onion, and turmeric.

**Sprinkler irrigation system:** A total of 56 beneficiaries, who had accessed the sprinkler irrigation system under the project were surveyed. 40 of them (71%) have implemented it in their fields. Except for five, all of them used sprinkler sets only when required. The mean area irrigated using sprinkler irrigation is 3.75 acres. Common crops that are irrigated using sprinkler irrigation include soybean (66%), chickpea (43%), sorghum (7%), wheat (14%), cotton (32%), pigeon pea (10%). Other crops include green gram, maize, onion, and turmeric.

**Pipes and Pumps:** Twenty beneficiaries who have accessed the benefit of pipes from PoCRA were surveyed. Eighteen of them (90%) have received the benefit. Of the 15 beneficiaries who have accessed water pumps as a project benefit and were surveyed, eight of them used water pumps only when required, four used seasonally and three used them regularly. The mean land size irrigated using pipes and water pumps is 4 acres. It is observed that on average, the pump is operated for 6 hours per day during the Kharif season and 7 hours during the Rabi season.



**Shade net:** Three shade net beneficiaries are growing vegetables in their shade net, and one of them was also involved in horticulture activity. All four received technical guidance on how to cultivate to achieve better productivity with the help of an agriculture assistant. The average investment is around Rs 1.75 Lakh last year. All beneficiaries were able to sell their produce easily directly via haat or retail mode and through local dealers. The average earning from the activity is Rs. 3.85 lakhs last year. All of them anticipate the benefits of an increase in income, production, ability to produce a high-value crop, and an increase in employment opportunities for locals.

**Horticulture plantation:** Of the 22 project beneficiaries of the horticulture plantation, nearly half of them were found to have received training. The main crops grown by beneficiaries were Custard apple (27%), Pomegranate (9%), Orange (9%), Guava (17%), Sweet lime (36%), and Lime (5%). The activity is practised on an average of 1.6 acres of land. All 22 respondents have installed drip irrigation for efficient use of water. One beneficiary has started production of sweet lime and sells his produce in the market.

**Individual farm pond:** Eight beneficiaries have experienced an increase in income through increased agriculture production of cotton, pigeon pea, chickpea, sorghum, maize, sugarcane and wheat and increased availability of water for irrigation.

**Feedback on BBF Technology:** 29 farmers in the project and six in comparison have benefitted from the use of BBF technology. It is reported by farmers in both project and comparison areas that BBF technology helped in the drainage of excess water, root development by avoiding water stagnation, and moisture conservation. This led to an increase in production. The average area cultivated using BBF technology in project and comparison areas is 3 acres and 5 acres respectively. Cotton, Pigeon Pea and Soyabean were primarily grown using this technology.

### Farmer Field Schools (FFS)

A total of 57 FFS farmers were surveyed from project villages which include 25 host farmers and 32 guest farmers. Twenty-three (92%) host farmers find differences in the quality/cultivation of produce from the demo and control plots. 18 host farmers see higher yields and 19 observe fewer pest attacks, 15 farmers noted more climate resilience to weather, and 6 host farmers reported less tillage and better quality due to reduced use of fertilizers/ chemicals. The top five FFS technologies as reported by FFS participants are the use of climate-resilient varieties (78%), preparation of pesticides formulation and spraying (24%), Zero tillage (16%), intercropping (15%) and preparation and use of BBF (13%).

### Community Works – NRM and Community Farm Ponds (CFP)

Nearly three-fourths (75%) of the respondents in the project and 55% in comparison clusters were aware of the planning for the development of community assets according to the water balance. Around 80% of the respondents in project villages and 34% in the comparison villages shared that a social audit has been done in their village. Around 77% (40 of 52 respondents) in project clusters and 75% (33 of 44 respondents) in comparison clusters experienced an increase in groundwater level after the construction of NRM structures. 90% (47 of 52 respondents) of respondents in project clusters are willing to maintain the community assets. In project villages, it is observed that generally, 3 to 15 members come together to apply for CFPs. In 94% of the project cases, the asset was found on-site. None of the farm ponds has an inlet-outlet, though they had linings.

### PoCRA-supported FPCs and SHGs

A total of 18 project-supported FPCs were covered, and feedback from a total of 49 FPC respondents (18 FPC directors and 31 members) was taken as part of the CM VII round. These 18 project-supported FPCs have 3,576 male members, 1,170 female members, 187 members from the SC category, and 46 members from the ST category. This membership comprises 2,299 small and marginal farmers. All FPCs are operational. Around 94% of members shared that they always participate in general body meetings of their FPCs, and 90% of members participate in the decision-making process of their FPCs. Nearly 25% of all 49 FPC respondents, including directors and members, have received training on financial planning (67%), leadership development (33%), and skill upgradation. Around 71% (22 of 31) members were aware of the business plans prepared by the FPC. A total of 8 SHGs were covered, and feedback from a total of 26 SHG respondents (10 SHG presidents and 16 members) was taken as part of the CM VII round. Nearly 31% of all 26 SHG respondents, including the president and members, have received training on especially skill upgradation, market awareness, and farm technologies. The training on business establishment was received through the agriculture department. 70% (18 of 26) of respondents shared that they save regularly every month, while the rest reported that they are currently not saving regularly. The average monthly saving is approximately Rs. 650. Around 25% of respondents noted that their SHGs are involved in income generation agribusiness.

activities such as custom hiring centres. All members of sampled FPCs receive access to farm equipment from custom hiring centres.

## Key recommendations

- 1. Empowerment of community-based organizations:** It has been observed that the project benefits are reaching the beneficiaries, however mostly these are for individuals. Therefore, the project should make efforts to involve and empower the community-based organizations, namely VCRMCs and FPCs, not only to facilitate releasing of matching grants but also to monitor and report the utilization of the assets.
- 2. More efforts towards women's empowerment:** PoCRA focused on increasing women's participation and empowerment since the design phase. To promote small-scale income-generating livestock activities for women and other selected beneficiaries identified, the social assessment was carried out during the project preparation phase. As a result, in most of the villages, the participation of women was found high. Although there is a representation of women in the VCRMC and FPC board members, to make FPCs more inclusive, representation of women, differently abled persons, single women and widows should be encouraged. It is suggested that members of VCRMCs and Krishi Tais should take initiatives to introduce various government welfare schemes like widow remarriage scheme, widow pension scheme, and mahila kisan yojana to needy women in the village and help them avail those benefits. This will strengthen their well-being and improve their participation in productive activities. It is further suggested that project-supported FPCs maintain a gender-sensitive approach and gives priority to women's membership so that participation of women in economic activities is increased.
- 3. Linkage with financial and marketing institutions:** The majority of the project interventions are capital intensive which normally a small or medium-category farmer cannot afford. Also, most of the owners of the FPCs are large landholders. Small landholder farmers are keen to develop FPC, but they are not able to arrange the initial investment. Therefore, they normally approach private investors who take high charges. Efforts should be made to link them with formal financial institutions where they can get loans at a lower interest rate. Market linkage is one of the major challenges for FPCs. In wholesale markets, FPCs are not able to compete on pricing, whereas, in retail, the market brand image offers a challenge. Demand creation for their core product is not being done. There is an urgent need to develop and strengthen the institutional arrangement for an efficient marketing system that can help in remunerative prices and minimise the cost of production. FPCs dealing with the same product should aggregate their product and market as one brand. This will allow them to compete with competitors in a better way. FPCs should align themselves to create synergy and should not act as competitors.
- 4. Institutionalizing business planning for FPCs:** It emerged during a discussion with FPC representatives that there is an absence of an effective business plan that may result in a missing future perspective. Therefore, it is deemed essential to ascertain an institutional framework that can be useful in a sustainable manner. It is also recommended to make effective provisions of visioning exercise and capacity building to the technical as well as management staff of the FPCs that may be useful for the efficient functioning of the FPCs. The SIYB (Start and Improve Your Business) training for Board members and management team is also recommended. The SIYB programme (conceptualized and implemented by ILO) is structured into four separate training packages, which are designed to respond to the progressive stages of business development.
- 5. Training for warehouse and CHCs operations:** Farmers use the warehouse for taking advantage of future markets which is dependent on several factors beyond their control. Warehouse business with processing makes a good business proposition. Warehouse operators should be trained in Good Warehouse Management Practices (GWMP). The training can be given out by using small instructional contextualized videos and a few virtual sessions. Training on the repair and maintenance of machines shall be given to the members so that they may save money which is going to other vendors for repair and maintenance. Machines are operational only seasonally. Warehouse and CHCs should develop other business streams to keep staff and members engaged throughout the year.
- 6. Convergence with NREGS for NRM works:** The construction of NRM structures has been part of the PoCRA program. However, the achievement of the number of NRM structures constructed has been low across all districts. In this scenario, it is suggested that the convergence with government programs like National Rural Employment Guarantee Scheme (NREGS) can boost the production of NRM structure. The NRM works listed in PoCRA's village-level micro-plans can be included in the shelf of works maintained for the NREGS scheme. Further, based on the feedback received from PS Agriculture and PS procurement, it is also recommended that periodic refresher training related to NRM works to be given to all PS Agriculture.

# 1. Project Background

The Government of Maharashtra, in partnership with the World Bank, conceptualized the Project on Climate Resilient Agriculture (PoCRA) for 5,142 villages in 15 districts of Maharashtra<sup>1</sup>. The Project Development Objective (PDO) of PoCRA is *to enhance climate resilience and profitability of smallholder farming systems in selected districts of Maharashtra*<sup>2</sup>. PoCRA is a first-of-its-kind climate-resilient project undertaken in the agriculture sector. This is envisaged to be achieved by promoting climate-resilient agriculture systems, post-harvest management, value chain promotion, and institutional development<sup>3</sup>.

The project is built around a comprehensive, multi-sectoral approach that focuses specifically on building climate resilience in agriculture through scaling up tested technologies and practices. This project attempts to bring transformational changes in the agriculture sector by scaling up climate-smart technologies and practices at the farm and (micro) watershed levels.

The overall project vision is to contribute towards three critical impact areas: a) Water Security, b) Soil Health, c) Farm Productivity & Crop Diversification. The project aims to contribute to drought-proofing and management of lands in states' most drought and salinity/sodicity-affected villages.

The project has been implemented in 15 districts in Maharashtra, which include eight districts of the Marathwada region (Aurangabad, Nanded, Latur, Parbhani, Jalna, Beed, Hingoli, Osmanabad), six districts of the Vidarbha region (Akola, Amravati, Buldana, Yavatmal, Washim, Wardha), Jalgaon district of Nashik Division and approximately 932 salinity affected villages in the basin of Purna river spread across Akola, Amaravati, Buldana and Jalgaon districts<sup>4</sup>. Figure 2 highlights the villages where the project is being implemented. This project will be implemented in six years from 2018-2024<sup>5</sup>. Out of the 15 districts where PoCRA is implemented, the current assignment is conducted in eight districts of the Marathwada region, covering 347 mini watershed clusters. The project is being implemented in a phased manner reaching out to 70 clusters in year I, 175 clusters in year II, and 102 clusters in year III.

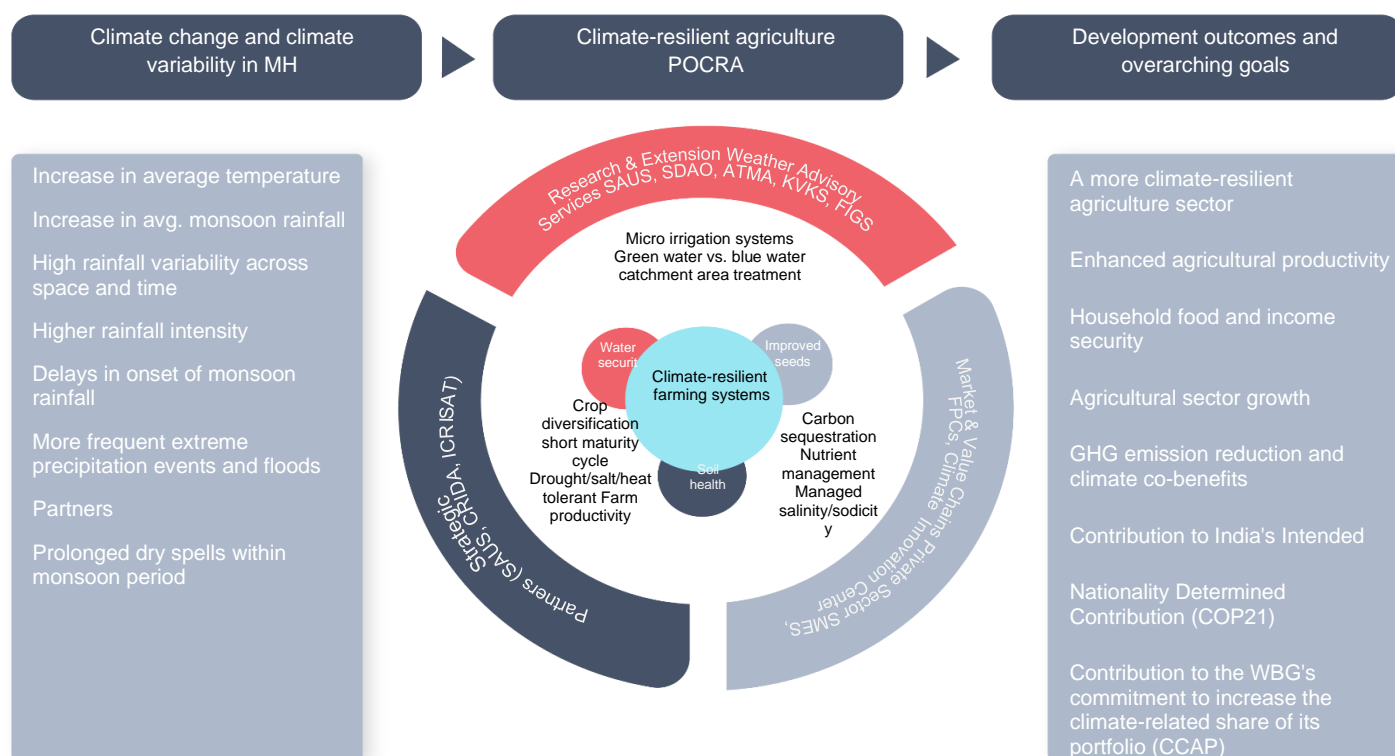


Figure 1.1 PoCRA strategic overview, thematic linkages and expected achievements.

<sup>1</sup> Source: PoCRA Project Appraisal document

<sup>2</sup> Source: ibid

<sup>3</sup> Project implementation status report as on 31<sup>st</sup> March 2021, Maharashtra PoCRA

<sup>4</sup> Source: PoCRA-Terms of Reference

<sup>5</sup> Source: ibid

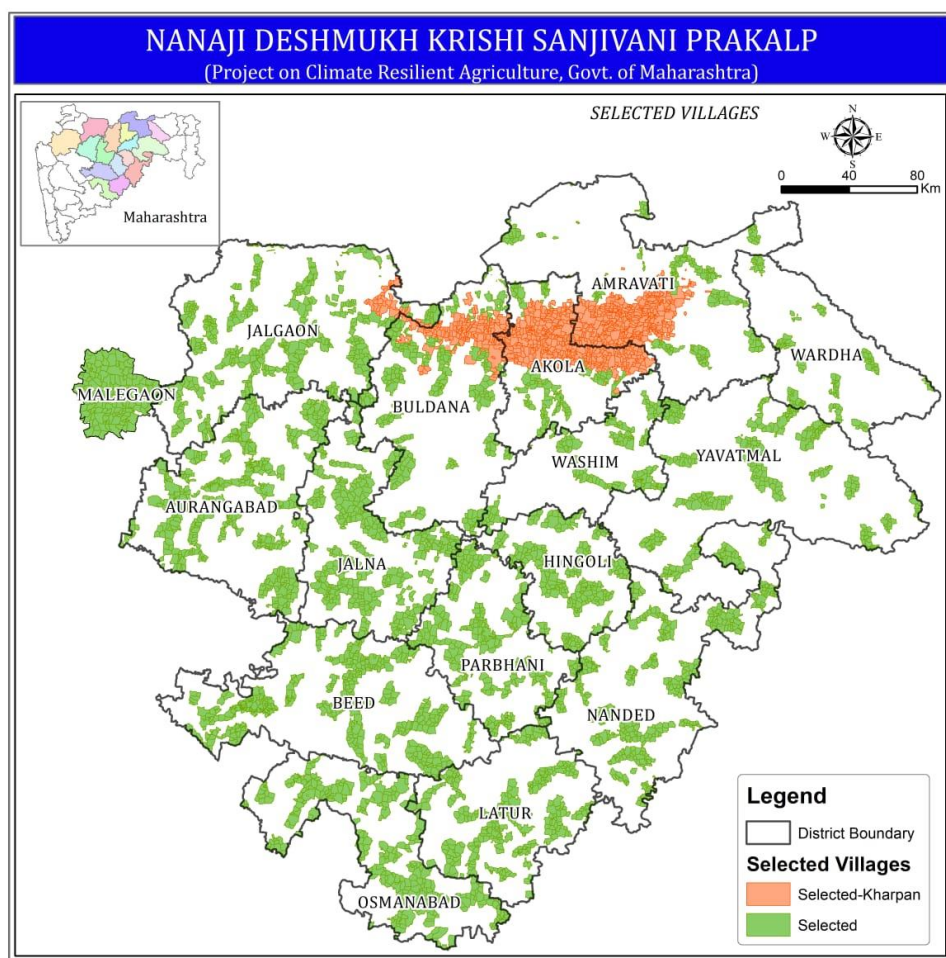


Figure 1.2 Nanaji Deshmukh Krishi Sanjivani Prakalp (PoCRA) project area and villages

## 2. Objectives of Concurrent Monitoring of PoCRA

Along with evaluating the impact of PoCRA, the other key objective of the assignment is to conduct concurrent monitoring of PoCRA for its implementation in the Marathwada Region. The objective of concurrent monitoring is:

- To assess the progress of the project on key performance parameters.
- To find out which key components of the intervention are effective, what are the process bottlenecks in the implementation of the project, and to get feedback from the key stakeholders on the implementation so that it can be improved.
- To validate the veracity of the MIS data by validating the information in the MIS progress reports.



### 3. Overarching Monitoring Framework

The framework in the figure below presents the overarching approach that has been adopted for the concurrent monitoring of PoCRA:

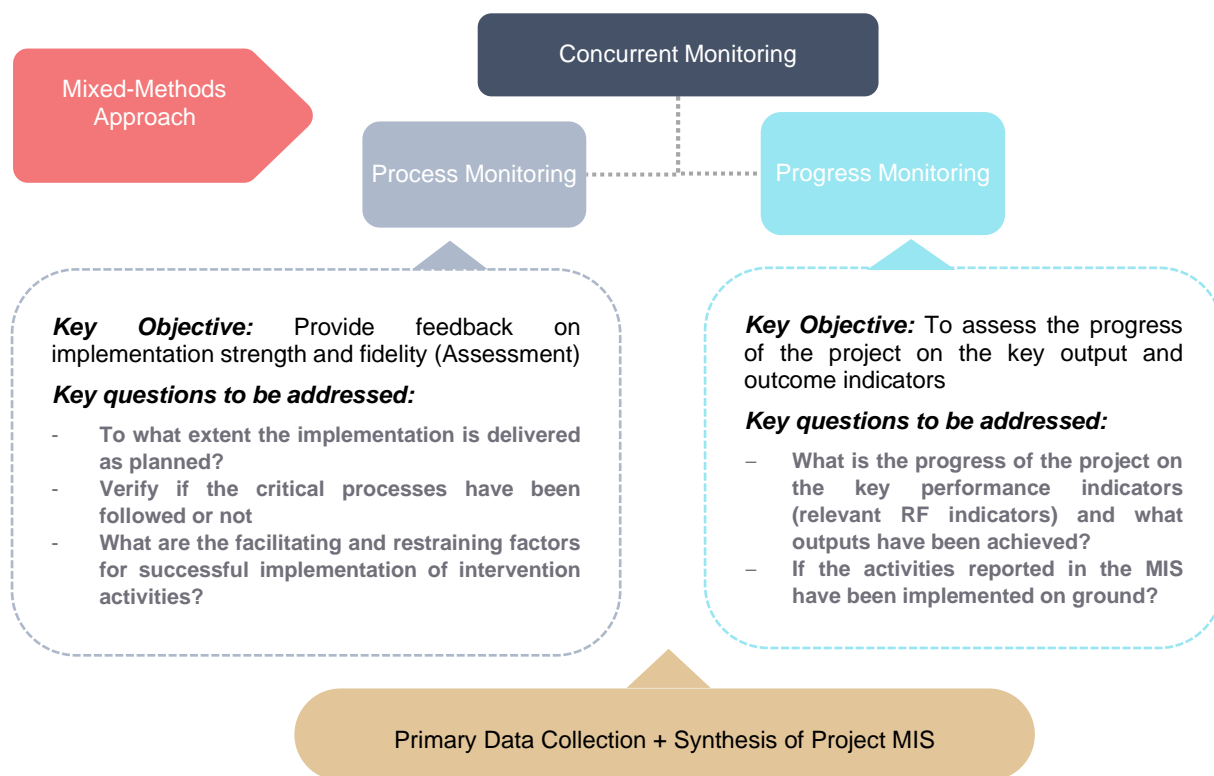


Figure 3.1 Overarching methodology

**Building the premise for concurrent monitoring:** The project development objectives along with the list of activities planned to be conducted within the project areas are specified in the ToR. The project activities are carried out in three phases across project districts and clusters. The sample for each concurrent monitoring is selected in line with the sampling methodology proposed in the ToR. It is envisaged that the processes that are being implemented and would need to be monitored should be listed. A detailed discussion with the PMU team, and relevant stakeholders, and a secondary literature review of relevant documents was done to understand these key processes. Also, during the listing of processes, the Sambodhi team studied the ongoing schemes or projects of similar nature in the comparison areas so that a premise for assessment could be built. The overall objective of the bi-annual concurrent monitoring reports is to provide feedback to the PMU on the status of project implementation and provide recommendations for course correction.

**Limitation of concurrent monitoring:** To provide quick feedback to PMU on progress and processes every six months, the sampling size and methodology of concurrent monitoring rounds have limited scope to statistically capture the difference between different rounds or over time. While for a few variables in the report, a comparison of their values with those observed during previous rounds has been undertaken, the analysis is broadly indicative.

**Methodology approach in CM VII round:** Like previous rounds of concurrent monitoring, the CM-VII focused on the concurrent process and progress monitoring for the six-month period from 1<sup>st</sup> October 2021 to 31<sup>st</sup> March 2022 which includes different components such as individual matching grants accessed using Direct Beneficiary Transfer (DBT) application, the farmer field school for demonstration of climate-resilient and sustainable farming practices, construction of community assets which are aimed to benefit the farming community of the area including natural resource management works and community farm pond, farmer producer organizations and self-help groups for strengthening post-harvest and value chain strengthening agri-business activities.

A mixed-method approach has been adopted for all the concurrent monitoring surveys of PoCRA conducted to date. The CM-VII of the PoCRA project followed the common methodology suggested by PMU which is being used in both the Marathwada and Rest of Project Areas (RoPA) region from the current round. A quantitative survey tool for the beneficiaries and qualitative interview schedules for other key project



stakeholders were finalized in discussion with the PoCRA PMU team. The survey for CM VII was conducted in 30 project and 15 comparison villages. A sample of 675 beneficiary respondents was targeted to cover under the quantitative survey, which includes 450 respondents in the project and 225 respondents in comparison areas. As per the methodology of CM-VII, it was ensured that project to comparison respondent ratio remains 2:1.

Also under qualitative survey, a total of 162 samples (36 FGDs and 126 in-depth interviews) covering various key stakeholders of the PoCRA project were conducted. The quantitative estimates at the aggregate level in the report provide a broad indication, but the estimate may not provide statistical precision as the sampling is not entirely random, and for some categories, the sample size is not adequate. Therefore, a mix of quantitative estimates and qualitative insights have been used to conclude the point of view of monitoring the project. Feedback on the functioning of the Village Climate Resilience Management Committee (VCRMC), Krushi Tai, satisfaction in project planning, micro-planning, support from project staff, support received and expected by the FPOs/FPCs etc., was also analyzed in the project and control villages. The project MIS data for the period was also analyzed to understand the progress of the project activities during this period. The study area is comprised of eight districts of the Marathwada region of Maharashtra viz. Aurangabad, Beed, Nanded, Hingoli, Latur, Osmanabad, Parbhani and Jalna.

A detailed explanation of the methodology for conducting concurrent monitoring, sampling and distribution of the sample covered is presented in Annexures.

## 4. Project Component Wise Implementation Progress

### 4.1. COMPONENT A: Promoting Climate Resilient Agricultural System

#### A.1: Promoting climate-resilient agricultural systems

The objective of this component is to develop evidence-based mini watershed plans and cluster development plans to guide the design and implementation of multi-sector project interventions aimed at enhancing climate resilience in the local agricultural systems. Under this component, the project focuses on: (i) mobilizing farmers/communities and training them on participatory planning processes, (ii) preparing the watershed plans (with water budgeting), as well as the cluster development plans, through collaboration with strategic partners and local agencies, and the hiring of specialized consulting firms, and (iii) the quality review and technical sanction of the mini watershed plans by the local agencies.

During project preparation, the GoM, with support from the PMU, completed the selection of the villages based on a rigorous, science-based approach. The GIS tools were used for the mapping of 1,794 village clusters demarcated based on prevailing watersheds in the 15 project districts. Following a multi-criteria assessment, the clusters were then ranked according to their climate vulnerability (exposure, sensitivity and adaptive capacity). Subsequently, 670 clusters were selected for PoCRA implementation, covering 4,210 most climate-vulnerable villages and 932 additional ones that are affected by the high level of soil salinity and sodicity. Under this component, one mini watershed plan was to be developed for each cluster, covering 5 to 10 villages and an area of around 5,000 ha.

The PoCRA developed 670 mini watershed plans (of which 347 are for the Marathwada region) under this component to consolidate information and data from the participatory village-level microplanning process. This process was coordinated by the Village Climate Resilience Management Committee (VCRMC) through participatory processes with the farming communities and other local stakeholders; village-level micro plans are subsequently aggregated at the cluster level to form a mini watershed plan. The project completed the preparation of 130 mini-watershed plans in Year 1 of project implementation, 350 plans in Year 2 and 190 plans in Year 3.

#### A.2: On-farm climate-resilient technologies and agronomic practices

The objective of this component is to promote the transfer of on-farm technologies and agronomic practices that enhance climate resilience in the agricultural systems prevailing in the project area. Under this component, the project promoted **Farmer Field Schools** to promote the demonstration of climate-resilient varieties of field crops as well as productivity-enhancing agronomic practices.

The project also provides **matching grants** to eligible individual farmers to:

support the adoption of climate-resilient varieties and farming practices, promote carbon sequestration through fruit tree cultivation and enhanced crop residue management, encourage crop diversification by supporting protected cultivation for horticulture, enhance on-farm water-use efficiency through micro irrigation and farm ponds, and promote small-scale income-generating livestock activities for women and other selected beneficiaries identified in the PoCRA social assessment carried out during the project preparation phase

Using online application portal for availing the benefits under PoCRA is easy. Almost all the interviewed beneficiaries informed that they did not face difficulty in registering and applying for the matching grants on online portal. During the initial phase they faced difficulties, however the ease in online application process indicates that the PoCRA PMU and IT team overcame the shortcomings.

*Team Leader (M&E), Sambodhi*

##### 4.1.1 Progress of FFS

The two key stakeholders in FFS are the host farmers and guest farmers. Host farmers are the ones who host the farmer field school on their agricultural land. Guest farmers are the one who attends the FFS sessions to learn through demonstrations of new climate-resilient agriculture technologies promoted under PoCRA. The total number of FFS participants to date is 4,97,579. The total number of guest farmers is 4,78,721 and the host farmers were 18,858.

The total number of host farmers who attended during the season of Rabi 2021-22 is 2400 (344 female farmers and 2056 male farmers). The total number of guest farmers who attended the FFS sessions is 43,490 (5647 female farmers and 37,843 male farmers). During CM VII round beneficiary survey, a total of 57 FFS farmers were surveyed from project villages which include 25 host farmers and 32 guest farmers.

The top five FFS technologies as reported by FFS participants are the use of climate-resilient varieties (78%), preparation of pesticide formulation and spraying (24%), zero tillage (16%), intercropping (15%) and preparation and use of BBF (13%). Also, to increase the participation of women in the project, it was observed that the FFS were conducted for women exclusively, as well as guidance was provided to women and vulnerable groups for the formation of small teams in the village. Looking at the cropping season-wise distribution, 74% of the guest farmers participated during Kharif and the rest 26% during Rabi. In comparison, all six guests participated during the Kharif season.

*Table 4.1 Crop-wise host farmer demonstration and guest farmer participation*

Crop	Host farmer demonstration (%)	Guest farmer participation (%)
Cotton	28	47
Maize	4	13
Soybean	40	44
Turmeric	4	9
Rabbi Jowar	-	6
Chick Pea	-	13
Onion	-	3
Cotton + Pigeon Pea	-	6
Soybean + Pigeon Pea	20	13
Others(specify)	4	-
Total %	100	100
<b>Total N</b>	<b>25</b>	<b>32</b>

Among the 25 host farmers, 15 farmers were motivated by agriculture assistants, seven farmers were motivated by FFS facilitators, and three farmers were motivated by VCRMC. Regarding honorarium, 10 of them have received it. The honorarium for two host farmers is in the process, while 13 host farmers shared that they have not received it. Twenty-three (92%) host farmers find differences in the quality/cultivation of produce from the demo and control plots. 18 host farmers see higher yields and 19 observe fewer pest attacks, 15 farmers noted more climate resilience to weather, and 6 host farmers reported less tillage and better quality due to reduced use of fertilizers/chemicals.

The distribution of reasons cited by both host and guest farmers for participating in the FFS in project areas were as follows:

*Table 4.2 Reason for FFS participation*

Reasons for participation	FFS participants (%)
	Valid N = 57 (Multiple reasons)
Was interested to learn new technologies related to agriculture	88
To increase production and income	65
To reduce the cost of production	46
To learn how to apply fertilizers and pesticides more effectively	37
To utilize water more effectively	7

Reasons for participation	FFS participants (%)
To save their crop from climate variation (high temperature /low rainfall/very high-intensity rainfall etc)	12
No specific reason was suggested by friends/family	-

On asking if they have attended all technology sessions conducted under PoCRA FFS, 65% of FFS farmers responded in affirmation. Rest 35% of FFS farmers could attend 3 to 4 FFS sessions on average and cited the following reasons for not being able to attend all sessions. The most common reason for not attending FFS was the priority of other personal work.

*Table 4.3 Reasons for not attending all FFS sessions*

Reason for not attending all FFS sessions	FFS participants (%)
	N = 11
Did not find the sessions useful	9
Had to skip the session due to personal work	73
Was not aware of the session's timings	18
Total %	100

It was observed that the time of the next FFS session was informed to nearly 46% through SMS or WhatsApp message, 32% were informed by the FFS facilitator during the FFS session and the rest 23% were informed in person by other project staff such as cluster assistant, agriculture assistant, and Krushi Tai. Nearly 61% of the participants find the timing of the FFS session convenient. 44% of all the sample guest farmers have reported that their queries were satisfactorily answered by FFS host farmers. 51% of all FFS participants, including host and guest farmers, have requested training on topics apart from what is covered under FFS.

Some of the key topics on which they expect training are orchard plantation, goatry, certified seeds, and the marketing of agricultural produce. 93% (53 of 57) of all FFS participants including host and guest farmers think that they have benefitted from attending the FFS session.

*Table 4.4 Training and Adoption of CRAT technologies demonstrated in FFS*

CRAT Technologies demonstrated in FFS	Project (%) Multiple Response (N = 55)		
	Received Training	Already practising before the training	Adoption rate after the training
Use of Climate-resilient varieties	85	73	78
Intercropping	33	9	15
Zero- tillage	24	13	16
Use of green Manure	27	15	16
Cultivation by BBF	20	11	13
Preparation of Broad Bed Furrow	15	11	13
Soil Amendments	11	4	4
Protective Cultivation	15	5	7
Preparation of pesticide formulations & spraying	27	20	24

CRAT Technologies demonstrated in FFS	Project (%) Multiple Response (N = 55)		
	Received Training	Already practising before the training	Adoption rate after the training
Foliar application of 2% DAP	15	7	7
Spraying techniques with safety measures	7	2	4
Seed treatment with bio-fertilizers	11	7	9
Irrigation by Drip/Sprinkler	18	13	13
Crop residue management	4	2	2
Installation of pheromone traps (4-5/ha)	5	4	4
Thinning & Gap filling	4	2	2
Preparation and application of Dashaparni extract	5	2	4

*The top five FFS technologies as reported by FFS participants are (i) use of climate resilient varieties (78%), (ii) preparation of pesticides formulation and spraying (24%), (iii) Zero tillage (16%), (iv) intercropping (15%) and (v) preparation and use of BBF (13%).*

Of the total FFS participants, including host and guest farmers 77% found that the technologies learned through farmer field school demonstration sessions have been very helpful in reducing the impact of climate vulnerability (less rainfall, high temperature). The rest 33% found the technologies helpful to some extent. All the participants reported that the information provided by the FFS facilitator was useful. Nearly 95% of the FFS participants, including host and guest farmers, are willing to continue using the technologies. 5% of respondents reported that they do not find the technologies useful. The technologies are expensive and difficult to apply in fields.

*Table 4.5 Perceived benefits from FFS*

Benefits from FFS participation	Project (%) Multiple Response (N = 53)
Awareness of good agriculture practices	79
Better awareness of the use of inputs (fertilizers, seeds etc)	77
Improvement in soil health	30
Soil moisture was conserved around the crop roots	26
Fewer diseases in crops	32
Better water management for agriculture	19
Increase in crop production or yield	43
Saving in seed input cost	19
Saving in fertilizer input cost	13
Overall reduction in cost of production	6



### **Feedback from FFS Coordinators**

FFS coordinator helps in facilitation of FFS activities in the project villages which includes activities mainly related to note down the observations from FFS app, check the attendance of guest farmers, preparation of timetable for the FFS well as coordination and skill development of the facilitators. The method adopted for improving the skills of the facilitator is by enhancing their knowledge during the meetings conducted twice a month. Demo sessions are also conducted exclusively for the facilitators. The monitoring method adopted by the coordinators for evaluation of work is to review the observations communicated by the facilitator in the FFS sessions on every first and third Saturday of the month at the SDAO office. Other than meeting, they are trained through webinars and WhatsApp, and they are also given demonstrations on the field.

The efforts made by the FFS coordinator to promote improved agriculture practices were mainly motivating farmers for the use of climate resilient seeds along with the BBF technologies. For increasing the participation of women, the help of SHG is taken so that the women will be motivated to attend the FFS. The most used technology adopted by farmers after the FFS session is IPM, in which formulation of Nimboli Ark was mostly used by farmers, followed by BBF technology, and intercropping. Coordinators also expressed need for the training of facilitators through KVK and retired scientists of Agriculture stream. Other than a meeting, they are trained through webinars and WhatsApp as well as demonstrations on the field.

### **Feedback from FFS Facilitator**

To know the feedback on implementation of FFS activity in the project, a total of 5 FFS facilitators were interviewed for qualitative information, the response received from them was as follows.

#### **Roles and Responsibilities:**

As per the FFS Facilitators, they were involved in mobilizing farmers for FFS, giving farmers information about the new technologies as well as training them for doubling the income of farmer, reducing the cost of cultivation and increasing income.

#### **Training to farmers:**

The facilitators see their role in training the farmers on the new technologies in farming. The most popular activity as well the activity which was most demonstrated was found to be BBF, preparation of Dashparni Ark followed by Neem. The other popular technologies were bird perches, seed treatment and extract preparation. Almost all the facilitators said that they train the farmers for the disposal of empty pesticides in the FFS. The most used disposal method was found to be burying of bottles in the ground.

#### **Participation of women in FFS:**

In most of the villages the participation of women was found in the FFS but the proportion of women was comparatively less than men in the FFS as per the facilitators. This was due to the priority given to domestic work over FFS by the women farmers. In some cases it was also found that women find the morning time inconvenient to attend the FFS. In some cases the time for FFS was kept as per the convenience of women in villages. The FFS were also arranged in many villages exclusively for women.

#### **Awareness related to Climate Change and Organic Farming:**

The traditional techniques used by the farmer to fight climate change are spraying intensively to avoid pests, intercropping and use of farmyard manure. There was variation in the use of organic farming and the use of organic fertilizer was found to be between 2- 50% in the villages. Awareness regarding the use of banned pesticides was found to be satisfactory in villages, as reported by the facilitators.

### 4.1.2 Progress on Matching Grant

Regarding the status of the application for individual benefits in project clusters, nearly 75% of respondents received the matching grant in their bank account. All beneficiaries were found to be aware of their application status, which is a positive trend.

*The transfer of matching grants in CM VII is higher (by 13%) as compared to that observed during the CM VI round.*

*Table 4.6 Status of application*

Status of application	N = 241	%
Application for a matching grant through DBT application	9	4
Verification of application by Cluster Assistant	5	2
Desk-1 - Approval by the VCRMC committee	8	3
Desk-2 - Spot verification by Agriculture Assistant	3	1
Desk-3 - Approval and pre-sanction by SDAO	24	10
Work under implementation & document submission by the beneficiary	3	1
Work implemented by the beneficiary	3	1
Demand by the beneficiary for matching grant	1	1
Desk-6 - SDAO	5	2
Transfer of matching grant to the beneficiary account	180	75

*Table 4.7 Reasons for applying for a benefit*

Reasons for applying for the benefit	Project (%) Multiple Response (N = 241)	Comparison (%) Multiple Response (N = 179)
It will help increase the water supply for agriculture	76	84
It will help increase production and income	70	65
These practices are climate-friendly	25	22
Was suggested by my friends/family	5	7
The process of application is simple	6	6
The grant is received quickly	18	11

### 4.1.3 Status of individual benefits and suggestions

Of the total 236 beneficiaries of individual activities interviewed, around 58% of beneficiaries have constructed assets at the site. Rest have either not started the activity due to financial issues or they are under construction. Almost all beneficiaries (99%) had a good experience with the application process.

Table 4.8 Feedback on DBT application processes

Suggestions on DBT application processes	Project (%)
	N = 218
Satisfied with the current process	39
Support in filling the application through the DBT application portal	12
Process of applying and getting benefits can be simplified	7
Matching grant should be increased	27
Documentation process in the application should be simplified	16

In the following section, the feedback from those beneficiaries who had accessed individual benefits and whose application has received approval and pre-sanction from SDAO has been reviewed.

#### 4.1.3.1 Drip irrigation system

Out of 73 beneficiaries who have applied for a project grant for a drip irrigation system, 63 (86%) have received and established the irrigation system. Out of 73 beneficiaries, 48 of them (66%) used their irrigation set only when required. Seven beneficiaries use the set regularly, while the remaining use the set seasonally. The mean area irrigated using drip irrigation is 3 acres. Most of the farmers used drip irrigation to irrigate Cotton (46%), Soyabean (37%), Chickpea (24%), and Sugarcane (15%). Other crops include pigeon pea, sorghum, wheat, maize, onion, and turmeric.

Shri Kisan Bhagwan Bhote from Dera village, Paithan Taluka, Sambha ji Nagar adopted drip irrigation in his 1 acre field. The total cost of drip irrigation was Rs.60,000/- out of which he got a matching grant of Rs.38,000/-. He has also switched over from Pigeon pea cultivation to cotton crop due to drip irrigation facility.

22 beneficiaries (19 from the general category, 3 from the OBC category) out of 63 beneficiaries reported that they faced difficulty in accessing the benefit. Mostly the difficulty was faced in obtaining the micro-irrigation quotation/plan from the dealer (70%), geotagged photos with the asset examiner (35%), providing proof of permanent water supply (45%), and providing agreement/consent in case of the common source of water supply (8%). All these project beneficiaries acknowledged benefitting from using drip irrigation.

#### 4.1.3.2 Sprinkler irrigation system

A total of 56 beneficiaries, who had accessed the sprinkler irrigation system under the project were surveyed. 40 of them (71%) have implemented it in their fields. Except for five, all of them used sprinkler sets only on the requirement. The mean area irrigated using sprinkler irrigation is 3.75 acres. Common crops that are irrigated using sprinkler irrigation include soybean (66%), chickpea (43%), sorghum (7%), wheat (14%), cotton (32%), pigeon pea (10%). Other crops include green gram, maize, onion, and turmeric. Like drip irrigation beneficiaries, 12 (8 farmers from the general category, and 4 from NT) reported difficulties in obtaining a micro-irrigation plan from the dealer while accessing the project benefits.

Drip and Sprinkler irrigation systems are found very much effective in terms of water and fertiliser saving to the extent of 25-30%. In case of vegetable crops, the saving of irrigation water even goes up to 50-60%. The quality of farm produce is improved and fetches good market price.

*Agronomy Expert, Sambodhi*

#### 4.1.3.3 Pipes

Twenty (20) beneficiaries who have accessed the benefit of pipes from PoCRA were surveyed. 18 of them have received the benefit (90%). Most of them (55%, or 10 of 18 beneficiaries) were found to be used as per the requirement. Six beneficiaries were found to be using it regularly and the rest two seasonally. The mean land irrigated by pipes is 3.4 acres. Except for one beneficiary from the general category, none reported any difficulty in taking benefit of the pipe.

#### 4.1.3.4 Water pumps

Of the 15 beneficiaries who have accessed water pumps as a project benefit and were surveyed, eight of them used water pumps only on the requirement, four used seasonally and three used them regularly. The mean

land size irrigated using water pumps is 4 acres. Of the 15 beneficiaries interviewed, 12 beneficiaries used the water pump with a power rating of 5HP, while the remaining two used pumps of 7 HP power and one used a 3 HP pump. Nealy 50% of them used capacitors. Except for two beneficiaries, all knew the diameter of the pipes they used. The diameter of pipes ranged from 0.5 inch to 2-inches.

It is observed that on average, the pump is operated for 6 hours per day during the Kharif season and 7 hours during the Rabi season. Except for two, none of the respondents reported difficulties in accessing the benefit.

*Table 4.9 Purpose of Pipes and Pumps*

Purpose	Pipes Respondent (%)	Pumps Respondent (%)
Lifting of water from river/canal	40	33
<b>Transport water from the well to the pond</b>	<b>67</b>	<b>58</b>
<b>Transport water from the pond to the field</b>	<b>13</b>	<b>8</b>
Total %	100	100
Valid N	18	15

*Table 4.10 Irrigation System used with Pipes and Pumps*

Irrigation system	Pipes Respondent (%)	Pumps Respondent (%)
	Valid N=18	Valid N=15
Drip/ Sprinkler	44	54
<b>Flood irrigation</b>	<b>28</b>	<b>23</b>
Furrow irrigation	11	-

As the following table reflects an increase in income was reported more among the beneficiaries of drip and sprinkler irrigation than beneficiaries of pipes and pumps. Other major benefits reported were increased availability of water, increase in the area of cultivation in both Kharif and Rabi seasons, change in cropping season, and availability of water in dry spells.

The benefit accrued from the above four individual benefits is listed below:

*More than 80% of beneficiaries of micro-irrigation benefits (including drip, sprinkler, pipes, and pumps) reported an increase in income and agricultural production as the major benefits of adopting these systems.*

*Table 4.11 Benefits Perceived from Drip, Sprinkler, Pipes, and Pumps*

Benefits Perceived	Drip (%)	Sprinkler (%)	Pipes (%)	Pumps (%)
Increase in income	100	78	100	100
Increase in production	<b>80</b>	<b>83</b>	<b>94</b>	<b>87</b>
Increased availability of water for protected irrigation	<b>51</b>	<b>53</b>	<b>56</b>	<b>60</b>
Change in cropping pattern	35	38	-	13
Availability of water during dry spells	24	35	-	27
Efficient use of water	10	13	6	7
Increase in quality of agricultural produce	11	13	-	-

Benefits Perceived	Drip (%)	Sprinkler (%)	Pipes (%)	Pumps (%)
Increase in area of cultivation during Kharif Season	3	5	-	-
Increase in area of cultivation during Rabi Season	8	10	6	7
Increased water availability for the Rabi season	6	13	-	-
Timely availability of water for irrigation	-	-	6	7
Total %	100	100	100	100
Valid N	63	40	18	15

#### 4.1.3.5 Individual farm pond

13 beneficiaries who accessed the benefit of an individual farm pond were interviewed. Eight of them have received and implemented the benefit. Two farm ponds have an inlet and outlet but no grass cultivation on their bund. According to half of the respondents, once the farm pond is filled with water, it lasts for around 90 days. All the respondents use the water as per requirement. Currently, none of the beneficiaries is using the farm pond for inland fishery activity. Except for three, the beneficiaries did not face any difficulty in accessing the benefit from PoCRA. The beneficiary has experienced an increase in income through increased agriculture production of cotton, pigeon pea, chickpea, sorghum, maize, sugarcane and wheat and increased availability of water for irrigation.

#### 4.1.3.6 Shade net

All four shade net beneficiaries who were surveyed have received training on how to do cultivation in vegetables in their shade net, and one of them was also involved in horticulture activity. All four got technical guidance on how to cultivate to achieve better productivity with the help of an agriculture assistant. Three of them were using it regularly, and one had reported that he used it seasonally. The average investment is around Rs 1.75 Lakh last year. All beneficiaries sell their produce easily directly via haat or retail mode and through local dealers. The average earning from the activity is Rs. 3.85 lakhs last year. On asking about their plan to dispose of the shade net after it is damaged, two beneficiaries plan to burn and rest two beneficiaries were not sure about their plans.



#### Case Study: Farm Pond, Paithan

Shri Mangal Bhai Shivaji Kale. constructed a farm pond of the size 100 x 100 sq feet with project support. He is now cultivating pomegranate, and sweet lime on nearly 20 acres of the land which was left barren as water was not available earlier.

shade net. Three shade net beneficiaries are growing

During the discussion, farmers have suggested to have localized training of shade net operation. They need specific training on crop variety suitability in the shade net and dealing with excess rainfall under the shade net. They also want training on diverse crops under the shade net. It emerged that there is a need for block-wise shade net farmer groups, to stop the overflowing of the market during one time so that they can regulate the market price of the produce.

*Environment Expert, TERI*



*"It took some time for me to understand vegetable cultivation in the shade net. However, it was surprising at the first instance that a modern method like controlled environment resulted in higher productivity of my capsicum and cucumber. My crops were protected from high temperature, erratic rainfall, pests and diseases. I thank POCRA for providing me training on innovative concepts of high value crop cultivation, management of shade net, crop production practices, new ways of insect and disease handling, soil fertility and water management. After the introduction of shade net, I get a steady source of income",*

Muktha Valmiki Jadav, Pishor village, Kannad district in the Marathwada region,

None of the shade net beneficiaries faced any difficulty in accessing the benefit from PoCRA. All of them anticipate the benefits of an increase in income, production, ability to produce a high-value crop, and an increase in employment opportunities for locals.

#### 4.1.3.7 Horticulture plantation

Of the total 29 beneficiaries who have access to the benefit, 22 (76%) have received support and implemented it. Of the 22 project beneficiaries of the horticulture plantation, nearly half of them were found to have received training. The source of training was the department of agriculture (five beneficiaries), KVK (one beneficiary) and rest three received the training from progressive farmers.



#### Case Study on Horticulture in Nandar, Paithan

Dwarka Bhai Bhimrao, has cultivated 4 acres of Custard Apple plantation with project support. He planted 1540 plants, with almost 100% survival in 2<sup>nd</sup> year. Earlier he was growing Pomegranate, therefore aware of fruit plantation, taking proper care along with fencing done. This year, he is expecting 5-7 kgs fruit per plant which will gradually increase to 40-50 kgs per tree in 8-10 years. He has been cultivating Pomegranate for the last 15 years. The market is at Solapur, Pune and Paithan. Normally, the pick-up van takes Rs.8000/- to transport the produce to the big market in Solapur. He also pays Rs.2000/- for harvesting and loading the pick-up van with a capacity of 25 quintals. There is no market fee, and the average market rate is Rs.40- Rs.50/- per kg. He gets 20-25 kgs of Pomegranate per tree.

The main crops grown by beneficiaries were Custard apple (27%), Pomegranate (9%), Orange (9%), Guava (17%), Sweet lime (36%), and Lime (5%). The activity was practised on an average of 1.6 acres of land. Half of the beneficiaries sourced their saplings from government nurseries and the rest from the agriculture university and government-approved nurseries. A total of 9468 saplings were planted, of which around 8890 (94%) saplings survived. All 22 respondents have installed drip irrigation for efficient use of water. Two beneficiaries reported to have faced difficulty while purchasing saplings from Government approved nurseries. One beneficiary has started production of sweet lime from horticulture activity and is able to sell his produce in the market. He has experienced an increase in his annual income.

#### 4.1.3.8 Construction of open dug well

Four beneficiaries who accessed the benefit from the project have received and implemented the activity. The mean diameter of the well is 25 feet, and the depth is 60 feet. Three farmers reported that the water in their wells is available throughout the year. Using the water from the wells, they irrigate nearly 4 acres of their cultivated land. For one farmer, the water in his well lasts till November. Two respondents faced difficulty in accessing the benefit under PoCRA and cited that the compulsion of having agricultural land of more than 0.4 hectares is an issue. All beneficiaries anticipated the benefit of an increase in income, an increase in the availability of water for protected cultivation, and a change in cropping pattern.

#### 4.1.3.9 Adoption of BBF technology

29 farmers in the project and six in comparison have benefitted from the use of BBF technology. It is reported by farmers in both project and comparison areas that BBF technology helped in the drainage of excess water, root development by avoiding water stagnation, and moisture conservation. This led to an increase in production. The average area cultivated using BBF technology in project and comparison areas is 3 acres and 5 acres respectively. Cotton, Pigeon pea and Soyabean were primarily grown using this technology.

### A.3: Climate-resilient development of catchment areas

The objective of this component is to enhance the management of surface water and groundwater resources in the catchment areas of the project's mini watersheds; this in turn will help improve the performance of dryland farming by reducing agriculture's vulnerability to extended in-season dry spells and lower than normal annual rainfalls. Improved water management is a core ingredient of the GoM strategy to "drought-proof" agriculture and is essential to achieve increased water security, water-use efficiency (more crop per drop), enhanced farm productivity, more stable year-to-year yields, and ultimately, higher farm income.

The activities implemented under this component are derived directly from the Cluster Development and Investment Plans prepared under Component A.1. They are implemented in the watershed catchment areas and provide the foundation for the measures adopted in Component A.2 for improved on-farm availability (surface water harvesting structures), use (micro irrigation systems) and quality of water for agriculture.

#### 4.1.4 Status of community benefits and suggestions

##### 4.1.4.1 Natural Resource Management (NRM) Works

This sub-section presents the findings from the concurrent monitoring of the NRM community interventions based on the quantitative interviews with PoCRA NRM intervention beneficiaries, beneficiaries of similar interventions in the comparison area, and from the qualitative interviews with key project stakeholders. The total sample of beneficiaries of community-based NRM assets in project and comparison villages is 52 and 44 respondents. All the assets constructed in project villages were found on the site. Nearly all the assets in the project and comparison villages were already constructed. The distribution of community/NRM works beneficiaries interviewed in the project and comparison clusters are as follows:

*Table 4.12 Community NRM works done*

Community/ NRM works	Project (%)	Comparison (%)
	N = 52	N = 44
Continuous Contour trenches	-	14
Construction of Earthen Nala Bunds	4	11
Construction of Cement Nala Bunds	-	5
Recharge shaft	2	
Desilting of old water storage structure	15	3
Compartment /graded bunding	71	50
Common land (e-class) community farm pond	8	7
Others	-	10

When asked whether the planning for the development of community assets is done according to the water balance, nearly three-fourths of the respondents in the project and 55% in comparison clusters responded in affirmative, around 19% in project and 20% in comparison responded in negative, and nearly 6% from the project and 25% from control clusters were not aware of the development planning.

Around 80% of the respondents in project villages and 34% in the comparison villages shared that a social audit has been done in their village. The distribution of rating of the quality of constructed assets reported by the respondents in both project and comparison clusters is depicted in the table below, which shows satisfaction with the quality of assets was slightly better in project areas than in comparison areas.

*Table 4.13 Feedback on the quality of assets*

Feedback on the quality of assets	Project (%)	Comparison (%)
	N = 52	N = 44
Very unsatisfactory	13	7
Somewhat unsatisfactory	4	23
Neither satisfactory nor satisfactory	10	-
Somewhat satisfactory	52	50
Very satisfactory	21	20
Total %	100	100

Based on the feedback from the respondents, the distribution of benefits accrued through the constructed community NRM works in both project and comparison clusters is as follows:

*Table 4.14 Benefits from NRM works*

Benefits accrued from NRM works	Project (%)	Comparison (%)
	Valid N = 52	Valid N = 44
Increased availability of water for protective irrigation	77	76
Increase in yield/production	58	74
Change in cropping pattern	42	42
Availability of water during dry spells	25	11
Increase in area of cultivation during Kharif Season	13	5
Increase in area of cultivation during Rabi Season	12	5
Increase in income	27	11
Total	100	100

When asked if they have experienced an increase in groundwater level near their farm after the construction of these NRM assets, 77% (40 of 52 respondents) in project clusters and 75% (33 of 44 respondents) in comparison clusters responded positively. Rest in both project and comparison clusters are hopeful that it may increase in future. When the respondents in the project clusters were asked about their willingness to be involved or involvement in the maintenance of these assets post-construction, 90% (47 of 52 respondents) responded positively. They would like to contribute to the maintenance activity of NRM works as follows:

Table 4.15 Maintenance of NRM works

Maintenance of NRM works	Project (%)
	N=47
Willing to be part of the structure maintenance committee	71
Willing to pay for maintenance of the structure	10
Willing to provide labour support from self or family for maintenance of the structure	12
Expecting maintenance by local government institutions	7

#### 4.1.4.2 Community Farm Pond (CFP)

Similar to the feedback on NRM assets, feedback was taken from beneficiaries of community farm ponds. The beneficiary sample for community farm ponds includes 26 beneficiaries from the project area. In project villages, it is observed that generally, 3 to 15 members come together to apply for CFPs. In 94% of the project cases, the asset was found on-site. None of the farm ponds has an inlet-outlet but has linings.

**Status of application:** All 26 beneficiaries shared that they have received the matching grant in their bank account.

**Motivation for applying and application process:** Following are the sources of motivation and support for the application process for the beneficiaries in project clusters.

Table 4.16 Source of motivation and support for the application process

Source/ Support	Motivation for application (%)	Application process (%)
	Valid N =26	N = 26
Self	81	19
Family members	12	19
VCRMC members	8	12
e-Seva Kendra/ CSC	4	4
Project staff (including cluster assistant, agriculture assistant, and FFS facilitator)	-	19
Gram panchayat members	-	27

**Source of funds:** The various sources of funds for 26 CFP beneficiary respondents in project clusters were found to be as follows:

Table 4.17 Source of fund

Source of fund	Project (%)
	Valid N = 26
Used own funds	85
Loan from friends/extended family members/neighbours	4
Loan from the money lender	8
Loan from bank/microfinance companies	19

**Dimensions of CFP and water availability:** The mean length, width, and height of CFP in the project cluster ranged from 50 ft, 50 ft, and 20 ft. The average duration for which water lasts in the CFP once filled is 90 to 120 days.

**CFP features and benefits:** Nearly 77% of CFP beneficiaries use the asset as per the requirement. Of the 26 CFPs, farm pond display boards are available at 18 sites. All beneficiaries shared that their CFPs do not have an inlet/outlet, and 42% (11 of 26) do not have grass cultivation on their farm pond bunds. All CFPs have a lining on them. A total of 120 acres of land is irrigated using water from these 26 CFPs in the project area. The main source of water for these CFPs is an open-dug well. Other sources of water are borewells and rivers. Almost in all the CFPs, water is filled using a motor pump and pipes. 72% of CFP beneficiaries did not face any issues in accessing the benefit from PoCRA.

*Table 4.18 Benefits from CFPs*

Benefits accrued from CFPs	Project (%) N = 26
Increase in income	85
Increase in production	81
Increased availability of water for protective irrigation	81
Change in cropping pattern	50
Availability of water during dry spells	15
Increase in area of cultivation during Kharif Season	4
Increase in area of cultivation during Rabi Season	12
Increased water availability for the Rabi season	4

#### 4.1.4.3 Training and adoption of CRATs

One of the key aspects of the project is to promote CRATs through training via farmer field schools and increase willingness among the farmers to adopt the same. Regarding the same, the respondents in both project and comparison clusters were asked if they have received any training on CRATs and if they have adopted any of the CRATs in the past year. The technology-wise distribution of training received, and its adoption is detailed below in the table.

*Table 4.19 Training and adoption of climate resilient technologies*

Climate resilient technologies	Received Training in past 1 year Multiple Response		Adoption in past 1 year Multiple Response	
	Project (N = 449)	Comparison (N = 224)	Project (N = 449)	Comparison (N = 224)
Contour cultivation	63	64	62	60
Cultivation by broad bed furrow (BBF) method	16	14	10	4
Intercropping	17	20	12	13
Use of improved seed Varieties	46	50	38	42
Seed treatment	27	28	23	24

Climate resilient technologies	Received Training in past 1 year		Adoption in past 1 year	
	Multiple Response		Multiple Response	
	Project (N = 449)	Comparison (N = 224)	Project (N = 449)	Comparison (N = 224)
Integrated Nutrient Management	22	13	18	9
Integrated Pest Management	25	14	21	11
Furrow opening	12	3	8	3
Foliar spray of 2% Urea at flowering and 2% DAP at boll development	19	14	17	13
Drip/Sprinkler Irrigation	11	8	10	7
Protective irrigation through farm pond	6	1	3	1
Conservation tillage	6	3	4	2
Incorporation of biomass	4	0	2	0
Mulching	1	0	1	0
Cultivation of citrus crops on broad ridges	2	0	2	0
Canopy management in fruit crops	3	0	2	0
Shade net	1	1	1	1
Land preparation	3	0	2	0
Use of machinery or agricultural tool in farming	3	0	3	0
Use of pheromone traps	1	0	1	0

It is observed that there is higher adoption of CRATs after receiving training in the project as compared to comparison clusters. Around 93% of respondents in project clusters and 88% in comparison clusters reported being benefitted from the adoption of CRATs. The reasons cited by those who did not benefit are lack of technical knowledge (project 90% and comparison 72%), difficulty in applying technology in the field (project 62% and comparison 56%), unavailability of advanced agriculture machinery/ implements (project 24% and comparison 50%) and extreme climatic situation (comparison 16%).

No respondent in project areas has reported the extreme climatic situation as the reason for non-adoption implying the positive impact of PoCRA intervention and hence the increase in resilience capacity in project areas. Almost all the beneficiaries covered in the project clusters have received at least one training. An average of 24% increase in yield and a 16% reduction in the cost of cultivation and pest and disease attack as compared to the levels before the adoption of CRATs is observed in project areas as reported by the respondents. Similarly, changes are also observed in comparison, but the levels are 1% less than those observed in project areas.



Table 4.20 Benefits perceived from CRATS

Benefits through CRATs	Project Multiple Response (N = 449)	Comparison Multiple Response (N = 224)
Reduced cost of cultivation	79	84
Soil and moisture conservation	29	34
Better control over pests and diseases	50	51
Improved soil fertility	35	34
Optimum use of pesticides and fertilizers	34	21
Improved germination rate	15	12
Increased water availability	15	11
Improvement in coping mechanism	3	1

Within each social category, the proportion of farmers receiving different types of training has been analysed as depicted in the below table. Although there is variation by training types, more percentage of NTs did not attend the training in comparison to the overall percentage of non-attendance and percentage of non-attendance under other caste categories.

Table 4.21 Percentage of project beneficiaries who received different training (% within each social category)

Types of training	Gen	OBC	SC	ST	NT
Contour cultivation	66	58	45	56	55
Cultivation by BBF method	18	16	23	13	5
Intercropping	18	21	23	13	14
Use of improved seed	46	58	50	44	23
Seed treatment	27	32	41	31	18
Integrated Nutrient Management (INM)	19	26	23	19	50
Integrated Pest Management (IPM)	21	47	32	19	36
Furrow opening	8	42	18	19	14
Foliar spray of 2% Urea at flowering & 2% DAP at boll dev.	17	16	23	31	41
Drip/Sprinkler	11	21	18	6	0
Protective irrigation through farm pond	6	16	0	6	5
Conservation tillage	6	16	0	6	0
Incorporation of biomass	3	11	9	0	9

Types of training	Gen	OBC	SC	ST	NT
Mulching	2	0	0	0	0
Cultivation of citrus crops on broad ridges	2	5	5	0	0
Canopy management in fruit crops	4	0	0	0	0
Shade net	1	0	0	0	0
Land preparation	3	0	0	6	5
Use of machinery	4	0	0	6	5
Use of pheromone traps	1	0	0	0	0

Total samples (N) = General-311, Nomadic tribe=27, OBC=56, Scheduled caste=26, Scheduled tribe=22

Within each category of farmers by landholding size, the proportion of farmers receiving different types of training has been analysed as depicted in the below table. As can be seen, more than 50% of farmers with different landholding sizes have not received training. It warrants more focus to cover farmers from all categories under different training programmes.

*Table 4.22 Percentage of project beneficiaries who received different training  
(% within beneficiaries by landholding)*

Types of training	Large > 5 Ha	Medium 2 – 5 Ha	Small < 2 Ha
Contour cultivation	56	56	61
Cultivation by BBF method	22	22	15
Intercropping	11	11	18
Use of improved seed	44	44	48
Seed treatment	33	33	26
Integrated Nutrient Management (INM)	44	44	22
Integrated Pest Management (IPM)	67	67	22
Furrow opening	33	33	9
Foliar spray of 2% Urea at flowering & 2% DAP at boll dev.	33	33	19
Drip/Sprinkler	11	11	11
Protective irrigation through farm pond	11	11	6
Conservation tillage	0	0	8
Incorporation of biomass	0	0	3
Mulching	0	0	1

Types of training	Large > 5 Ha	Medium 2 – 5 Ha	Small < 2 Ha
Cultivation of citrus crops on broad ridges	11	11	2
Canopy management in fruit crops	0	0	3
Shade net	0	0	1
Polyhouse	0	0	1
Land preparation	0	0	3
Use of machinery	0	0	3
Rainwater Harvesting	0	0	1
Use of pheromone traps	0	0	1

Total samples (N)= Large farmers: 12, Medium farmers: 144, Small farmers: 294

**Willingness to adopt climate-resilient technologies promoted under the project:** Nearly 90% of respondents in project clusters showed a willingness to adopt the CRATs.

**Following agrometeorological advisory:** Nearly three-fourths of respondents in project areas received agro-met advisory as part of the project. Around 40% of them receive the advisory on daily basis, 20% receive it thrice a week, 20% receive it once a week and rest at a lesser frequency. Two-thirds of them receive it on mobile. Other sources from where respondents in project areas receive agro-met advisory are the agriculture department (15%), KVK (6%), newspaper (11%) and NGOs (1%). A similar trend is observed in comparison areas. It is observed that 98% of respondents in project clusters, as compared to 68% in comparison clusters, showed interest in following the agrometeorological advisory regularly.

*Table 4.23 Agromet services received*

Type of Agro-met advisory received	Project Multiple Reponse (N=335)	Comparison Multiple Response (N = 219)
Weather forecasting	87	79
Intercultural operations	25	22
Diseases and pest control measures	42	24
Real-time contingency plan	10	8
Use of disease/pest-resistant varieties	32	12
Market price information	8	9

It is observed that nearly 95% of respondents in project areas who receive agro-met advisory find it useful and relevant in contrast to 75% in comparison areas. The rest of the respondents in comparison areas either find the information as general advice or not useful.

Table 4.24 Perceived benefits for Agro-met advisory

Benefits from Agromet advisory received	Project Multiple Response (N = 335)	Comparison Multiple Response (N = 219)
Helps in taking timely decisions related to the initial stage of crop cultivation	81	76
Helps in deciding irrigation frequency	39	38
Helps in the selection of crops for certified seed variety	50	34
Helps in the selection of crops for intercropping	17	11
Helps in the control of pests	27	16
Helps in soil health management	5	5
Helps in preparing a contingency plan	1	1

Nearly 80% of respondents in project areas who received agro-met advisory market their agricultural produce based on market price information they get and it has helped them realize better selling prices. The same is the case with 65% of respondents in comparison areas. The preferred mode of receiving the agro-met advisory as reported by respondents in both the project and comparison areas in order of preference is SMS on mobile (2/3<sup>rd</sup> of respondents), through a mobile app, WhatsApp and newspapers.

**Treating soil using soil health card information:** Nearly 51% of respondents in comparison clusters did not have soil health cards as compared to 31% of respondents in the project. It was observed that more respondents in project clusters (56%) as compared to those in comparison (39%) treated the soil using soil health card information. Around 25% of project clusters did not find the information on soil health cards useful as compared to 46% in comparison clusters. About 50% of respondents from both clusters reported that they did not have the technical knowledge to use the soil health information.

**Response on the mobile app:** Responding to the question if they would like to get a mobile app for agriculture and allied activity-related information or advisory services, nearly 85% of respondents both in the project and comparison clusters responded positively. The majority of respondents across all districts and social categories seek advisory in the mobile app on key aspects such as climate resilient technology, weather, soil nutrient, NRM, fertilizer (chemical and bio), certified seeds, pesticides (chemical and bio), crops (food/cash/plantation), irrigation and crop pest/disease. However, attention should also be given to those advisories on which the respondents recorded low demand. Generating awareness among project beneficiaries about crop residue disposal, organic farming, horticulture, the market for agricultural produce, agri-business, poultry/ goatry/ fishery, and environmental safeguards must be prioritized.

The distribution of responses on various advisory features on a mobile app for both clusters are listed below.

Table 4.25 Response on advisory features on a mobile app

Advisory features on a Mobile App	Project Multiple Response (N = 449)	Comparison Multiple Response (N = 224)
Climate resilient technology	72	65
Weather	50	53
Soil nutrient	43	26
Natural resource management	36	18
Crop (Food/ Cash/ Plantation)	17	21

Advisory features on a Mobile App	Project Multiple Response (N = 449)	Comparison Multiple Response (N = 224)
Irrigation	19	12
Certified seed	26	3
Fertilizer (chemical and bio)	21	3
Pesticides (chemical and bio)	14	0
Crop pest/ disease	9	3
Crop residue disposal	7	3
Organic farming	3	0
Horticulture	7	0
Poultry/ Goatry/ Fishery	3	0
Markets for agri-produce	0	3
Agri-business	0	6
Environment safeguards	2	9
Total	100	100

## 4.2 COMPONENT B: Post-Harvest Management And Value Chain Promotion

### B1: Promoting Farmer Producer Companies

The main objective of this component is to strengthen the capacity of FPOs to (i) develop and successfully implement bankable proposals linked to climate-resilient agri-food systems and to be funded by financing institutions, (ii) operate as agribusiness entrepreneurs (Farmer Producer Companies, FPC) that generate a sustainable profit for their members; and (iii) successfully perform a range of primary processing activities for climate-resilient commodities promoted by the project, using green technologies where appropriate. Under this component, the project will finance: (i) the development of a Capacity Enhancement Needs Assessment (CENA), and (ii) the implementation of a Capacity Development and Coaching program (CDC) to meet the needs identified in the CENA.

The FPCs that have applied to receive support or have received support through PoCRA were sampled from each district, and feedback from their members was taken to understand the current activities taken by the by FPCs and get feedback on the support received through PoCRA till now. Two FPCs who have received/applied for support from PoCRA were randomly selected from each district. A total of 18 projects-supported FPCs were covered, and feedback from a total of 49 FPC respondents (18 FPC directors and 31 members) was taken as part of the quantitative survey of CM VII round.

These 18 project-supported FPCs have 3576 male members, 1170 female members, 187 members from the SC category, and 46 members from the ST category. This membership comprises 2299 small and marginal farmers. The year of establishment of FPCs is as follows: 2017(n = 2), 2020(7), 2021(7) and 2022 (2). Almost all respondents shared that their FPC has both male and female members and agreed that their FPC is operational. During the survey, 94% of 31 members shared that they always participate in general body meetings of their FPCs, and the rest 6% sometimes attend them. Nearly 90% of members participate in the decision-making process of their FPCs. Nearly 25% of all 49 FPC respondents, including directors and members, have received training on especially financial planning (67%), leadership development (33%), and skill upgradation. 71% (22 of 31) members were aware of the business plans prepared by the FPC.

Under the qualitative survey in CM VII, 16 FPCs were interviewed. 14 of them were only the group of farmers who were not involved in any kind of Agribusiness activity before applying for the matching grant from PoCRA. The activities in which the surveyed FPCs were majorly involved are the aggregation of produce, providing agricultural inputs like seeds, and fertilizers, providing access to market for produce, providing training to farmers on best agricultural practices and value addition of agricultural produce like sorting, grading etc. Out of these 16 interviewed FPCs, 14 were engaged in custom hiring centres (CHCs) and others. 2 FPCs received support for godown. One received the grant for Refer Van and Cleaning Grading Machine. The majority of the FPCs reported the project cost between 15-20 Lakhs. Only one FPC with the grant received for Godown had a project cost of Rs. 48 lakhs as reported by the Director.

#### **Jai Bhadra Shetkari Producers Company at Bori village, Ambad Block, Jalna District**

This company processes tur and chana from nearby villages. There are 15 members in the company. They have capacity to process 85 quintal of dal per year. Before establishing the FPC, the farmers used to sell the raw tur and chana in the market at the price of INR 5000 to 7000 per quintal; however, after processing, now they are able to sell the product at price of INR 12000 per quintal.

The processing of each quintal of dal required 7 to 8 units of electricity at a maximum rate of INR 13 per unit. Accordingly, for the calculation of the FPC, INR 5 is the costing for the processing of one kg of raw dal (Tur or Chana). There is a 40% profit margin after meeting the expenditure related to the processing of the dal.

The waste material after processing the dal is mainly sold as fodder and also used as fuel in boilers. Presently, they are using the processed dal for their own consumption. However, the FPC has a plan to install a grading and sorting machine in future and launch their own brand of dal in the market.

The member size of FPCs ranged from 10 to 1500 members. The majority of the board directors reported that they had taken training for the business at some point after starting the activity. On average, all members participate in group meetings conducted by FPCs. Everyone is given a chance to have a say in the decision-making process. To improve the participation of women, tribal populations and other marginalized groups, efforts like providing membership discounts, and constituting smaller groups to provide guidance and encourage their participation, etc. are taken. However, despite these efforts, household chores keep women busy resulting in their low participation. Records of registration, attendance and financial transactions are maintained in most of the FPCs. Annual audits are also conducted in a few of them.

Most FPCs said that the profit is being utilized for the expansion of the business. Financial assistance has also been forthcoming. Since these farm implements are now available to members at cheaper rates, farmers are saving up on rent, thereby increasing their economic output. This has made them financially profitable and improved their standard of living. The support received from project staff has been satisfactory.

Many FPCs stated that they give special discounts on services to women members, which is generally an additional 5-10% less than the actual market rate, and some FPCs said that they give training to women for skill development and strengthening. In

the case of custom hiring centres, all machinery and tools were found in good condition. The members of the CHCs delivered services which are generally 5% less than the market rate.

The FPCs who received training shared that on average 2-3 Directors received the training. Only 5 of the 16 interviewed FPCs shared that they have received training for the activity. The main subject of trainings is import export of agricultural commodity, seed processing, waste management, as well as how to navigate challenges through preparation of business plans and FPC management. The Warehousing Corporation and the Govt. of Maharashtra were the training imparting agencies for the training. There is a general demand for more training programmes.

Swaroop Shetkari Producer Company Limited at Sultanpur in Aurangabad district company has an agro-machinery bank in the area. The machinery bank consists of Rotavetor, tractor, trolly, BBF, and plough. It was established in 2021-22 FY. There are different rents for different types of machinery for the members of the bank – i) Rotavetor INR 1000 per acre; ii) Cultivator INR 750 per acre; BBF INR 1500 per acre.

All rental cost includes cost of diesel and wage of the operator.

The rental cost increases by INR 500/- for the non-members. The demand for the agro-machinery is high, and the company is not able to meet the demand in time due to lack of machineries.



The FPCs reported that they did not find any specific challenge in fund arrangement as the members have gathered the amount for establishing the business. Almost all the FPCs said that the initial fund for the establishment of the activity was raised by the members. Two FPCs reported that they borrowed money from relatives as well as one FPC took the assistance of a bank loan for raising the money. Many FPCs also expressed the challenge that they are not getting support from banks for the expansion of the business as banks are asking for properties as mortgages.

The major help received was from the project staff as well as the Agriculture department for the preparation of the business proposals, and many FPC shared that the Chartered Accountant also helps in the preparation of the business plan. Some also use it for paying off the debt of the FPC. The FPC directors expected the help of the agriculture department for getting the loans for expanding the current business activities.

### PoCRA Supported SHG Beneficiaries

Another key component of PoCRA is to strengthen the existing self-help groups in their entrepreneurial ventures by providing them with financial support. This is aimed to strengthen the post-harvest activities and value chain of the major crops and to strengthen the supply chain for the climate-resilient crop varieties in the project area.

The SHGs that have applied to receive support or have received support through PoCRA were sampled from each district, and feedback from their members was taken to understand the current activities undertaken by the SHGs and get feedback on the support received through PoCRA till now. One SHG who has received/applied for support from PoCRA was randomly selected from each district. A total of 8 SHGs were covered, and feedback from a total of 26 SHG respondents (10 SHG presidents and 16 members) was taken as part of the CM VII round. The year of establishment of SHGs is as follows: 2012(n = 2), 2014(1), 2017(1), 2020(2) and 2021(2). 65% of respondents shared that their SHG has both male and female members.

Nearly 31% of all 26 SHG respondents, including the president and members, have received training on especially skill upgradation, market awareness, and farm technologies. The training on business establishment was received through the agriculture department. 70% (18 of 26) of respondents shared that they save regularly every month, while the rest reported that they are not currently saving regularly. The average monthly saving is approximately Rs. 650. 25% of respondents noted that their SHGs are involved in income generation agribusiness activities such as custom hiring centres.

## B2: Strengthening emerging value-chains for climate-resilient commodities

The main objective of this component is to promote the participation of FPOs in emerging value chains for climate-resilient commodities. Under this component, the project will provide co-financing (under the FPO Matching Grant scheme): (i) to implement growth-oriented sub-project proposals from eligible FPCs (and where applicable, other FPOs as well) in the selected value chains; and (ii) to establish FPO-run custom-hiring centres (CHC) for agricultural machinery. This component contributes to climate co-benefits by focusing on value chains for climate-resilient commodities, by promoting green technologies in primary processing (use of solar energy, including for storage), and by encouraging the selection of fuel-efficient (less energy) and technology efficient (loss reducing) farm machinery and equipment.

### 4.2.1 Support to FPCs/ SHGs for undertaking Agribusiness

15 FPC directors and six SHG presidents have reported that their groups were involved in agribusiness activities. The year of receiving the PoCRA grants is as follows:

*Table 4.26 Year of grant for agribusiness to project-supported FPCs and SHGs*

Year of grant	FPC (N=15)	SHG (N=6)
2018-2019	1	-
2019-2020	2	2
2020-2021	4	2
2021-2022	8	-
2022-2023	-	2

The agribusiness activity-wise number of respondents who reported the PoCRA support to their respective FPCs and SHGs is as follows:

*Table 4.27 Agribusiness activity-wise support from PoCRA*

Agribusiness activity	FPC Respondent Valid N = 15	SHG Respondent Valid N = 6
Custom Hiring Centre	13	6
Godown	1	-
Grading & Packing unit	1	-

Facilities/services which members of sampled FPC receive are as follows:

*Table 4.28 Facilities/ Services provided by project-supported FPCs and SHGs*

Facilities/ Services	FPC Respondent (%) Valid N = 31	SHG Respondent (%) Valid N = 7
Marketing support in selling my agricultural produce	16	-
Purchasing seeds through FPC	33	-
Purchasing chemicals fertilizers through FPC	27	-
Grading and sorting of my agricultural produce with the support of FPC	7	-
Getting access to equipment/tools for agriculture	73	100
Access to godown facility	11	-

Around 33% of the total FPC respondents have sold their agricultural produce through their respective FPCs. The most common crops sold through FPCs are Soybean, Chickpea, Pigeon peas and Cotton. Fifteen surveyed FPCs and six surveyed SHGs have received financial support from PoCRA.

**Finance for agribusiness activities:** The status of funding for agribusiness activities as reported by the directors of project-supported FPCs is detailed below.

*Table 4.29 Status of funding for undertaking agribusiness activities*

Finance head	FPC Range of Amount (Approx.) N = 15	SHG Range of Amount (Approx.) N = 6
Total value of AB project	Rs. 8 lakhs to Rs. 80 lakhs	Rs. 17 lakhs to Rs.20 lakhs
Bank loan	Rs 8 lakhs to 54 lakhs	Rs. 7 lakhs
Self-capital	Rs. 4 to 26 lakhs	Rs. 2.5 lakhs
PoCRA grant	Rs. 8 lakhs to 54 lakhs	Rs. 11 lakhs

In the case of bank loans, the directors of the project supported FPC and presidents of SHGs shared that the loan instalments were being repaid regularly.

#### 4.2.1.1 Custom Hiring Centre (CHC)

The type of machines available in CHCs of the PoCRA-supported FPCs as reported by the respondents are as follows:

*Table 4.30 Type of machines available in PoCRA-supported FPCs and SHGs*

Type of machine available in CHC	FPC Respondent N = 13	SHG Respondent N = 6
Tractor large more than 35 HP	1	6
Tractor small up to 35 HP	2	-
Multicrop thresher (<30 HP)	-	6
Cultivator – 9 tyne	-	5
Plough	3	5
Power weeder	1	-
Cultivator -9 tyne	3	-
Rotavator	1	-
Seed drill (BBF) – 9 tyne	1	-
Bed Maker	1	-
BBF Machine	2	-

All the respondents of FPCs and SHGs shared that the members were provided with machines from CHC at lower rates. The various features of CHC services are as follows:

*Table 4.31 Features of CHCs of PoCRA-supported FPCs and SHGs*

Features of CHCs	FPC Respondents	SHG Respondents
<b>Area under CHC service</b>	Valid N = 13	Valid N = 6
Within 50 hectares	3	-
50 to 100 hectares	5	6
More than 100 hectares	3	-
Service not provided	2	-
<b>Farmers Serviced</b>		
1 to 50	3	4
51 to 100	7	2
101 to 150	1	-
151 and above	2	-
<b>People trained for operating equipment</b>		
0 Men	7	3
1 to 5 Men	5	2
6 and above Men	1	1

Features of CHCs	FPC Respondents	SHG Respondents
0 women	9	6
1 to 5 women	3	-
6 and above women	1	-
<b>Perceived Benefits</b>	(Multiple Response)	
Machines available at discounted rates	11	6
Reduction in cost of cultivation	7	6
Solution to labour issues	6	6
Increase in rural employment	2	-
<b>Difficulty faced by farmers in accessing CHC</b>	(Multiple Response)	
High fuel cost	2	-
Machines not made available to all	1	-
Cannot operate the machines	2	-
Skilled labour not available	1	-
Very high demand leads to a shortage of availability	3	-
Cost of maintenance is very high	2	-
Some machines are non-operational	2	-

According to the respondents, all villagers were aware of the CHC facility and were able to access the same. The display board for CHC was found to be available in all the villages.

#### 4.2.1.2 Godown (Warehouse)

One FPC director has reported the presence of a godown under PoCRA support. The details of the various features of the godown are as follows:

*Table 4.32 Features of Godown (Warehouse) of PoCRA-supported FPCs and SHGs*

Features of Godown/ Warehouse	Response
Total Capacity in Metric Ton (MT)	<b>150</b>
Capacity utilized in MT	75
Purpose of godown	Grain processing and Storage
Crops stored	Soyabean & Pigeon pea
Farmers benefitted	Upto 50
Rate for storage (INR/quintal/month)	Rs. 4/- to Rs. 8/-
Discount for members	Yes

Features of Godown/ Warehouse	Response
Total Capacity in Metric Ton (MT)	150
Perceived benefits of warehouse	Storage available at discounted rates

According to the respondents, all villagers were aware of the warehouse facility, and half of them were able to access the same. The display board for the warehouse was available in the villages. The warehouses have insurance.

### B3: Improving the performance of the supply chain for climate-resilient seeds

The main objective of this component is to improve the supply of seed varieties (volume, quality, availability, affordability and access) with short duration cycles as well as drought-, salinity- or heat-tolerant features, for crops produced by small and marginal farmers in the project area. Under this component, the project will: (i) undertake an assessment of the SAU's breeder seeds programs and a gap analysis of the demand and supply of seed varieties in the project area; (ii) finance the set-up of seed hubs; (iii) strengthen the capacity of key stakeholders in the seed supply chain, and (iv) provide support to selected players in the seed supply chain through matching grants. This component contributes to climate co-benefits by enhancing the availability of climate-resilient seed varieties in the project area.

#### 4.2.2 Land under certified seeds

One of the key objectives of the project is to promote the use of certified varieties of climate-resilient seeds. To validate this objective, respondents in both project and comparison clusters were asked about the area under cultivation for each crop using certified seeds. It was found that the overall area under certified seeds was relatively higher in comparison villages as compared to project villages.

The percentage of land under certified seeds for soybean was higher in comparison area (87%) as compared to project areas (83%). However, an increase of 7% in land under certified seeds for Soyabean in project areas is observed when compared to the estimate of the CM VI round (76%). The same is the case for the Pigeon pea, wherein it was observed that the comparison sample had a higher percentage of the land (81%) under certified seeds as compared to the project (41%). An increase of 4% in land under certified seeds for Pigeon pea in project areas is observed when compared to the estimate of the CM VI round (37%). The percentage of land under certified seeds for Chickpea is approximately the same in both project and comparison areas i.e. about 60%. The overall percentage of land under certified seeds for these three crops in both the project and comparison areas is 72% and 79%, respectively. Estimates indicate that more efforts are needed to promote the use of certified seeds in project areas.

*Table 4.33 Land under climate seed varieties for specified crops in the study area*

Crop	Land under production (acres)		Land under climate-resilient seed varieties (acres)		% Land under climate-resilient seed varieties	
	Project	Comparison	Project	Comparison	Project	Comparison
<b>Soybean</b>	807 (N = 254)	358 (N = 128)	668 (N = 216)	312 (N = 114)	83	87
<b>Pigeon pea</b>	58 (N = 25)	21 (N = 12)	24 (N = 10)	17 (N = 8)	41	81
<b>Chickpea</b>	591 (N = 195)	164 (N = 65)	355 (N = 118)	101 (N = 39)	60	62
<b>Overall</b>	1456	543	1047	430	72	79

(\*An independent two-sample t-test was done to compare the means of land under certified seeds for Soybean, Pigeon pea, and Chickpea estimated for CM VII and CM VI rounds. The resulting means for each crop in the CM VII round are statistically significant when compared to those estimated using CM VI dataset at a 95% confidence level.)



## 4.3 COMPONENT C: Institutional Development, Knowledge And Policy For A Climate-Resilient Agriculture

### C1: Sustainability and institutional capacity development

The objective of this component is to strengthen the institutions associated with the project from the central to local level through capacity development, to (i) safeguard the sustainability of the project interventions beyond the project lifetime, (ii) promote spill-over impacts to villages and districts not covered by PoCRA, and (iii) mainstream climate-resilience in the agenda of institutions supporting agricultural growth and rural development in Maharashtra. Under this component, the project will finance (i) the preparation of crop production contingency plans; (ii) the revision of Strategic Research and Extension Plans (SREP); (iii) the implementation of an annual Knowledge Sharing and Learning Plan; and (iv) the design and implementation of a comprehensive ICT platform for the project.

#### 4.3.1 VCRMC

A total of 28 FGDs of the VCRMCs were conducted during the survey. The response to the FGD was satisfactory with the presence of a minimum of 7 VCRMC members in the FGD.

##### VCRMC Composition and Functioning

The VCRMCs were formed as per the guidelines of the project and every VCRMC has 50% women members. A representative from various social groups was found in the VCRMC as per guidelines. Proceedings of the meeting were mostly maintained by AA/CA in all of the VCRMCs. The newly formed VCRMCs were unaware of the documents to be maintained due to a lack of training on the functioning of the VCRMCs. The committees hold meetings to raise awareness about the project through Gram Sabhas. The meeting dates are decided in the previous meeting of VCRMC.

In the quantitative survey, 75% respondents in project villages feel that VCRMC represents all sections of the society while 12% do not have a say.

Almost all the VCRMCs stated that the meetings are held once a month, mainly for scrutiny and approvals of the applications. Some VCRMCs also said that the meetings are arranged as per the applications received as per the need of the project. One VCRMC reported that the meeting is done once every two months. The key agenda of the meetings is to discuss and approve the application of the farmers. It is suggested that Sarpanch being the ex-officio head of VCRMC can broaden the scope of VCRMC meetings by transforming them into a platform for community mobilization to promote the adoption of climate-resilient technologies at the village level.

Except for 4 out of 28 VCRMCs, the rest have not done any financial transactions because either they have not received any funds or the committees were in the process of opening new bank accounts with new signatories. The four VCRMCs who received the fund have mainly spent it on the remuneration of Krushi Tai as well as on the purchase of registers, tables and chairs in gram panchayats under the project. The utilization of the financial support given to VCRMCs through PoCRA has improved the infrastructure at the gram panchayat's offices. Being an institution with financial independence, VCRMCs are recognized and seen as an important entity in sustaining the PoCRA project effort in ensuring climate resilience in the village.

All VCRMCs are aware and convinced of the current prioritization criteria for the allocation of benefits. It is observed that women's participation during interviews was low. In one of the FGDs, out of the seven women members, only three women were present, and one woman was interacting. A similar observation was noted by the sociology expert during the field visit, it was observed that women's involvement in the VCRMC meetings was very less for decision-making. The committee members suggested the need for training, workshops and awareness-building sessions for improvement in decision-making.

### **Capacities build through training**

In many VCRMCs, it was observed that some of the members were not aware of their roles and responsibilities due to the lack of training. Very few members availed of training for the project but it was related to shade net. Some members said that they received training on NRM, but the women of the village could not attend due to the burden of housework. Only four VCRMCs have undergone initial training that introduced them to different components of PoCRA and the role of VCRMC, with a focus on shade nets. The committee members suggested the need for training for improvement in decision-making. Only 4 VCRMCs have received training related to the roles and responsibilities of the VCRMC committee.

During the qualitative interview, the PS HRD mentioned that they attend the VCRMC meetings regularly and the frequency of VCRMC meetings attended in last 6 months was found to be 5-10 in some cases while the online VCRMC meetings were 25. In some districts, the online VCRMC meetings are also arranged by the PS HRD.

### **Mobilisation and efforts for making villages climate resilient**

Farmers who are yet to start work after pre-sanction are supported through awareness, guidance, connecting them with financial stakeholders or facilitating linkage with shops for asset purchase on credit/based on faith and referring them for capacity building sessions. The plantation drive was the most common response from the members when asked about the efforts for making villages climate-resilient. Some VCRMCs mentioned the ban on the use of axe is also adopted in their villages.

### **Grievance redressal**

Through interaction with VCRMCs and farmers during FGDs, we have not come across any severe grievances. The VCRMCs reported that the complaints which are received are resolved through discussion with the farmers. The complaints are generally related to delays in payment and pre-sanctions. Three Gram Panchayats have installed the complaint box in their office premise.

### **Reasons for delay in the approval of individual grant application**

Uploading of incorrect documents by farmers and delayed spot verification by AA results in delays in the approval of individual grant applications.

### **Awareness of environmental safeguards**

Awareness about environmental safeguards was found to be limited to only not felling of trees as well as tree plantation drives in the village.

## **C2: Maharashtra Climate Innovation Center**

The main objective of this component is to establish a Climate Innovation Center (CIC) to support local private sector capacity to scale up technologies for a climate-resilient agri-food system in Maharashtra. Under this component, the project will finance the development phase (feasibility study and business plan, set-up costs, equipment, and facilities) and the early stages of implementation of the CIC (working capital). This component contributes to climate co-benefits by promoting the development of private sector-led technologies that support the adaptation of agriculture production and output processing to climate variability, as well as a reduction in GHG emissions and an increase in carbon sequestration.

The preparatory work on Climate Innovation Center has started, and progress on this component will be detailed in the upcoming CM reports.

## **C3: Knowledge and Policies**

The main objective of this component is to: (i) generate and disseminate cutting-edge knowledge on a range of issues related to climate-resilient agriculture, and (ii) provide analytical underpinnings to improve the policy and strategy framework required to further enhance resilience in the agri-food system in Maharashtra (and beyond). Under this component, the project will finance the development of analytical sector studies and the dissemination of their results. These include, among others, the development of state-of-the-art climate and agro-hydrological models that help: (i) determine the level of sustainable withdrawal of surface and groundwater in a given watershed under various climate and land use scenarios, and (ii) generate suitability maps for Managed Aquifer Recharge (MAR), and (iii) assess the magnitude of MAR in the project area. In addition, the project will finance efforts towards a multi-stakeholder dialogue on policies promoting climate resilience in agriculture, as well as direct payments to farmers for environmental services (e.g. soil carbon sequestration, groundwater conservation). This component will also look at reliable ways to quantify potential mitigation benefits from activities promoted by the project and aim at providing a pathway to carbon financing in the project area.

## 4.4 Cross-Cutting Issues

### Women's Empowerment and Functioning of Krishi Tai

The project has adopted a gender-sensitive approach to prioritize the needs of women stakeholders in planning and implementation through 'Krishi Tai' (women mobilizers) at the village level. Krishi Tai is nominated by VCRMC and acts as an interface between project officials and the village community and helps in mobilization efforts. She is expected to work in close coordination with VCRMC members, agriculture assistants, cluster assistants and the village community. She is responsible to ensure the active participation of women in all meetings and project activities. Capacity building of Krishi Tai is undertaken through training and exposure visits.

In the Marathwada region, the overall effectiveness of the presence and performance of Krishi Tai generated mixed responses. Only in a few villages (where VCRMC retained earlier Krishi Tais), they were well aware of their roles and responsibilities and promptly participated in all VCRMC meetings. They raised awareness about the project benefits through home visits and motivated small/marginal/women farmers and landless farmers to avail of various benefits. They also facilitated the application processes and procedures. Although some of them had attended training for aspects related to community mobilization, account maintenance and agricultural practice, none of them was aware of FFS as a vehicle for the extension of climate-resilient farming practices. Hence, they could not impart any information to women farmers.

#### Case Study on Performance of Krishi Tai



Ms. Vaishali Vaidya is Krishi Tai. When women members in Nanded village were asked about her performance, they said they were very satisfied. Specific questions were asked on how much they could be comfortable if instead of Krishi Tai, there was a male assistant. They said that it is easy to communicate with a woman (KT) than a man. Being a woman, the KT also can visit their home without any restriction, sit down and talk on different matters, not limited to project issues. This way the rapport building and comfort level is high with KT which could not be possible with male staff.

However, in some of the villages, Krishi Tai was not even aware of the name of the project and hardly understood their roles and responsibilities. They barely attended any VCRMC meetings and often their husbands/men in the family represented them. The token attendance of men did not serve any purpose since they were not keen on any project-related activities. The VCRMC members were also indifferent to the absence of Krishi Tai in their meetings.

The reasons for the poor performance of Krishi Tai were found to be multidimensional. In most of the villages, Krishi Tai has not received any virtual or in-person training. Some virtual training was organized which was deemed to be unsatisfactory due to various reasons. Participants were unable to clear their doubts since they did not get any opportunity to speak during the training sessions. Poor network connectivity further dampened their spirits and many had to disconnect before their training session got over. Krishi Tais who did not have access to android phones or uninterrupted network connectivity decided not to attend virtual training programs. Most of the Krishi Tais need to be provided in-person training on project objectives, components, roles and responsibilities and their performance evaluation criteria.

In some villages, Krishi Tais have been appointed for nearly two years, but have been remunerated for only six to eight months. They are entitled to a monthly salary of Rs. 500. Lack of remuneration is making Krishi Tais less motivated and many expressed their displeasure to continue work if they are not remunerated on time. In a few cases, VCRMCs have nominated Krishi Tais just to meet the administrative requirement of the project and hence did not seek any participation from them.

In control villages, in the absence of the Krishi Tai or a dedicated female mobiliser for women, the role of Krishi Mitra was explored to understand their influence in community mobilization. Krishi Mitras (men) act as agriculture extension representatives and spread information regarding government programs/projects/schemes to make appropriate decisions. In the control villages, it was found that the Krishi Mitras did not particularly target women farmers but helped all farmers (irrespective of gender) to get benefits from schemes. They also helped farmers to make an online application through the website of the department. The village communities, in general, found their services to be helpful, especially in clearing their doubts and providing information regarding credit, market, agricultural practices and guidance on grievances redressal. The communities also relied on the traditional wisdom of their neighbours.

Although Krishi Mitra played an important role in mobilizing and awareness generation in control villages, the role of Krishi Tai cannot be undermined since they are expected to exclusively mobilize small and marginal women farmers and the landless. With proper training and timely remuneration, they can become effective agents in mobilizing women and transferring relevant knowledge and helping translate PO CRA policy objectives into action.

## 4.5 Agromet Services

Nearly three-fourths of respondents in project areas received agro-met advisory as a part of the project. Around 40% of them receive the advisory on daily basis, 20% receive it thrice a week, 20% receive it once a week and rest at a lesser frequency. Two-thirds of them receive it on mobile. Other sources from where respondents in project areas receive agro-met advisory are the agriculture department (15%), KVK (6%), newspaper (11%) and NGOs (1%). A similar trend is observed in comparison areas. However, it is observed that 98% of respondents in project clusters as compared to 68% in comparison clusters, showed interest in following the agrometeorological advisory regularly.

*Table 4.34 Type of Agro-met Advisory received*

Type of Agro-met advisory received	Project Multiple Response (N=335)	Comparison Multiple Response (N = 219)
Weather forecasting	87	79
Information related to interculture operations	25	22
Diseases and pest control measures	42	24
Real-time contingency plan	10	8
Use of disease/ pest-resistant varieties	32	12
Market price information	8	9

It is observed that nearly 95% of respondents in project areas who receive agromet advisory find it useful and relevant in contrast to 75% in comparison areas. The rest of the respondents in comparison areas either find the information as general advice or not useful.

*Table 4.35 Benefits from agromet advisory*

Benefits from Agromet advisory received	Project Multiple Response (N = 335)	Comparison Multiple Response (N = 219)
Helps in taking timely decisions related to the initial stage of crop cultivation	81	76
Helps in deciding irrigation frequency	39	38
Helps in the selection of crops for certified seed variety	50	34
Helps in the selection of crops for intercropping	17	11

Helps in the control of pests	27	16
Helps in soil health management	5	5
Helps in preparing a contingency plan	1	1

Nearly 80% of respondents in project areas who received agro-met advisory market their produce based on market price information they get, and it has helped them realize better selling prices. The same is the case with 65% of respondents in comparison areas. The preferred mode of receiving the agro-met advisory as reported by respondents in both the project and comparison areas in order of preference is SMS on mobile (2/3<sup>rd</sup> of respondents), through a mobile app, WhatsApp and newspapers.

## 4.6 Awareness of Micro Plans and Water Budgeting

Around 66% of respondents in project clusters were aware of the village-level micro-planning (as part of the PoCRA project) that was conducted in their villages to decide which watershed management activities should be done in their village. Around 80% of them had participated in the development of their village's micro-plans developed as part of the PoCRA project. 96% of the respondents in the project village found the water budgeting application used in the micro-planning process useful, while the rest did not find it useful. 75% of respondents in project villages feel that VCRMC represents all sections of society, 13% say it is not representative, and the rest 12% do not have a say. The response suggests increased awareness of the importance of the water budget at the village level and the participation of women and vulnerable communities in the decision-making.

## 4.7 Project Satisfaction

As the following table reflects, a high level of satisfaction was observed when asked about various activities undertaken under the PoCRA project. Apart from village micro-planning activity, in all other activities, the majority of the respondents were found to be satisfied. More than four-fifths of the total respondents were either somewhat satisfied or very much satisfied. Dissatisfaction (very unsatisfactory or somewhat unsatisfactory) was reported in one-tenth or less than one-tenth cases.

*Table 4.36 Feedback on project satisfaction*

Concerns	Very unsatisfactory	Somewhat unsatisfactory	Neither satisfactory nor unsatisfactory	Somewhat satisfactory	Very Satisfactory
Village micro-plan rating (N = 409)	5	25	6	32	32
Process of accessing benefits (N=409)	4	21	6	27	42
Work of VCRMC (N = 409)	3	15	6	32	45
Support from Project staff (N = 409)	6	14	6	32	43
Knowledge of FFS facilitator (N = 409)	5	12	7	37	40
Work of Krushi Tai (N = 409)	4	14	7	35	41



## 5. Key Observations and Recommendations

### 1. Micro irrigations systems and accessories

#### Drip irrigation

- Most farmers shared that the use of drip irrigation for sugarcane is much more complex. The laterals are required to be rolled back at least three times during its growing period, viz., at the time of interculture and the harvest. The laterals get entangled in sugarcane plants and it becomes a very laborious and time-consuming task while retrieving them. Farmers are unaware of the importance of pressure in drip irrigation system operation.
- Although pressure gauges have been installed, they become non-functional within one or two years. So, there is a need to ascertain that pressure gauges are properly installed and that their functioning is clearly explained to the farmer.
- Most of the time electricity is not available for operating the pump. So, it is not possible to operate the drip system on regular basis. Load shading has become a common feature in the villages. Thus, the drip system can only be operated whenever electricity is available including at night hours.
- In some fields, rats were reported to damage the drip laterals. In some places, the drippers are getting clogged due to salts in the water. Some farmers also complained that in some cases water testing was not done by the system supplier/dealer before installation of the system. The field life of the lateral is usually found to be 4 to 5 years instead of 7 years as assured by the manufacturer.

#### Sprinkler irrigation

- Sprinkler irrigated area coverage is 40 to 80 per cent of the total irrigated area in the villages covered under POCRA. A portable sprinkler system is suitable for crops like soybean, and onion as it can be installed and used quickly for protective irrigation. A sprinkler system is also used for irrigating crops like gram. It does not affect the flowering of the plants.
- The mini sprinkler is becoming popular among farmers for crops like onion and coriander. Being a fixed system, minimum labour is required for its operation as also irrigation can be applied during night hours. In the case of onion, the mini-sprinkler system was reported to increase the yield by almost 25 per cent. Rain pipe sprinkler system is also popular in this area. The non-ISI set of a Rain Pipe (100-meter length) is affordable (Rs. 600 per set) without the grant. However, its life is short (lasts for one year). The pipe becomes hard during the winter season and becomes difficult in rewinding.

#### Pumps and Pipes

- The majority of the farmers demanded to restart of the scheme of pipelines and pump set for conveying irrigation water as it reduces the substantial amount of water waste in earthen field channels also the water can be conveyed to fields located at higher elevations thereby enhancing the irrigated area coverage. The grant is being released after a long waiting period, which is discouraging farmers to go for pressurized irrigation systems. There is a growing menace of wild swine who eat and damage the crop.
- The grant transferred to the farmers' account under DBT is adjusted by the bank against the crop loan and other dues, which are pending in the name of the farmers. Hence, permission may be given to keep this transferred money from the PoCRA project in a separate account or the suggestion may be transmitted to the competent authority of the bank to avoid such adjustment processes at the bank level.
- Ease in using the online application portal for availing the benefits under PoCRA. Almost all of the beneficiaries informed that they did not face difficulty in registering and applying for the matching grants on the online portal. Earlier, they faced difficulties, however, the ease in the online application process indicates that the PoCRA PMU and IT teams overcame the shortcomings.

### 2. Empowerment of Community-Based Organizations

- It has been observed that the project benefits are reaching the beneficiaries, however mostly these are for individuals. Therefore, the project should make efforts to involve and empower the CBOs, namely VCRMCs and FPCs, not only to facilitate releasing of matching grants but also to monitor and report the utilization of the assets.

### 3. More efforts towards women's empowerment

- PoCRA focused on increasing women's participation and empowerment since the design phase. To promote small-scale income-generating livestock activities for women and other selected beneficiaries

identified, the social assessment was carried out during the project preparation phase. As a result, in most of the villages, the participation of women was found high. Although there is a representation of women in the VCRMC and FPC board members, to make FPCs more inclusive, representation of women, differently abled persons, single women, and widows should be encouraged. It is suggested that VCRMCs and Krishi Tais should take initiatives to introduce various government welfare schemes like widow remarriage scheme, widow pension scheme, and mahila kisan yojana to needy women in the village and help them avail those benefits. This will strengthen their well-being and improve their participation in productive activities. It is further suggested that project-supported FPCs maintain a gender-sensitive approach and give priority to women's membership so that the participation of women in economic activities is increased.

#### 4. Linkage with financial and marketing institutions

- The majority of the project interventions are capital intensive which normally a small or medium-category farmer cannot afford. Also, most of the owners of the FPCs are large landholders. Small landholder farmers are keen to develop FPC, but they are not able to arrange the initial investment. Therefore, they normally approach private investors who take high charges. Efforts should be made to link them with formal financial institutions where they can get loans at a lower interest rate.

#### 5. Market Linkage

- This is one of the major challenges for FPCs. In the wholesale market, FPCs are not able to compete on pricing, whereas in the retail market brand image offers challenges. Demand creation for their core product is not being done. There is an urgent need to develop and strengthen the institutional arrangement for an efficient marketing system that can help in remunerative prices and minimise the cost of production. FPCs dealing with the same agricultural produce should aggregate their product and market as one brand. This will allow them to compete with competitors in a better way. FPCs should align themselves to create synergy and should not act as competitors.

#### 6. Institutionalizing Business Planning for FPCs

- It emerged during the discussion with FPC representatives that there is an absence of an effective business plan that may result in a missing future perspective. Therefore, it is deemed essential to ascertain an institutional framework that can be useful in a sustainable manner. It is also recommended to make effective provisions of visioning exercise and capacity building to the technical as well as management staff of the FPCs that may be useful for the efficient functioning of the FPCs.
- The SIYB (Start and Improve Your Business) training for Board members and management team is also recommended. The SIYB programme (conceptualized and implemented by ILO) is structured into four separate training packages, which are designed to respond to the progressive stages of business development. The details of SIYB programme are discussed in the Agribusiness expert section.

#### 7. Training for warehouse and CHCs operations:

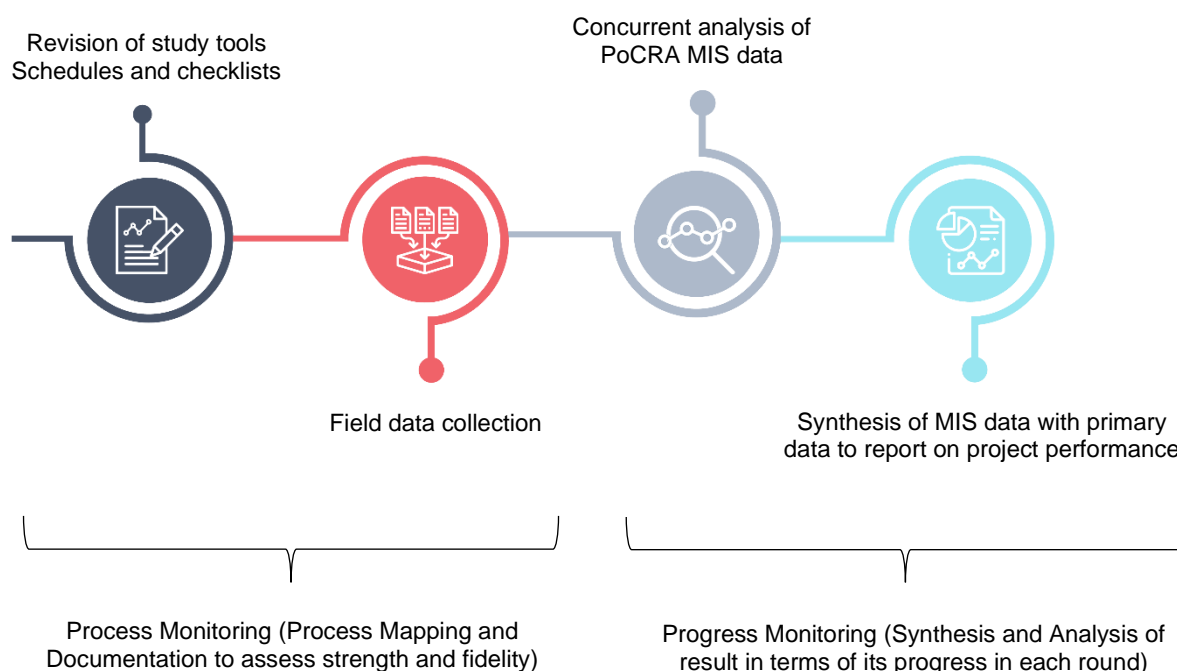
- Farmers use warehouses for taking advantage of future markets which is dependent on several factors beyond their control. Warehouse business with agricultural commodity processing capacities makes a good business proposition. Warehouse operators should be trained in Good Warehouse Management Practices (GWMP). The training can be given out by using small instructional contextualized videos and a few virtual sessions.
- Training on the repair and maintenance of machines shall be given to the members so that they may save money which is going to other vendors for repair and maintenance. Machines are operational only seasonally. Warehouse and CHCs should develop other business streams to keep staff and members engaged throughout the year.

#### 8. Convergence with NREGS for NRM works:

- The construction of NRM structures has been part of the PoCRA program. However, the achievement of the number of NRM structures constructed has been low across all districts. In this scenario, it is suggested that the convergence with government programs like National Rural Employment Guarantee Scheme (NREGS) can boost the production of NRM structure. The NRM works listed in PoCRA's village-level micro-plans can be included in the shelf of works maintained for the NREGS scheme. Further, based on the feedback received from PS Agriculture and PS procurement, it is also recommended that periodic refresher training related to NRM works to be given to all PS Agriculture.

## Annexure 1. Methodology for conducting concurrent monitoring

The methodological approach for conducting concurrent monitoring has the following steps illustrated in the figure below.



*Figure A1.1 Concurrent monitoring methodology steps*

### Revision of study tools – Schedules and checklists

Based on the list of processes to be monitored, learnings/experiences from previous CM rounds and the updates in the program, the study tools, i.e., schedules, and checklists were revised in Round VII in June 2022. The revised tools were shared with PMU and key experts for feedback. One-to-one key expert meetings were held to discuss the revisions in tools and expectations from expert field visits anticipated in the CM VII round. The study tools were finalized with post-incorporation of comments/suggestions from PMU as well as key experts.

### Primary data collection from the field

The primary data has been collected during August 2022, based on revised study tools which are categorized as shown in the table below. In addition to the structured surveys, interviews, and focus group discussions with key stakeholders, field visits by experts are also conducted as part of concurrent monitoring. The objective of the expert field visits is to provide insights about the ground realities of the situation in agriculture as well as project implementation and accordingly highlight the key challenges as well as suggest/recommend solutions for project improvement.

*Table A1.1 Category of study tools*

Structured Interview Schedule	An interview schedule was developed for the respondent survey and included questions relating to the access to intervention, processes, respondents' participation, perception, and feedback on activities. As part of the beneficiary survey, physical observation of the in-progress and completed activities have been done.
Key-informant Interview Schedule	Since the project activities are being carried out at various levels, including individuals, community (village and cluster) as well as the district level, key informant interviews have been conducted with key stakeholders (viz. Agriculture Assistant, Agriculture Supervisor, Cluster Assistant, DSAO, SDAO, TAO, FFS Coordinator & Facilitator, Krushi Tai, and FPC representatives) involved in the implementation of the project to get their feedback on project implementation and further improvement of the program.
Focus Group Discussion Schedule	Focus group discussions have been done with Village Climate Resilience Management Committee (VCRMC) members and Project specialists of districts to investigate the current status of implementation of the project and get feedback on project implementation and further improvement of the program.

## Concurrent analysis of PoCRA MIS data

For monitoring the progress of the project, the MIS data of activities and outputs are analyzed to see if the project implementation is progressing according to the plan. The project performance is assessed on the key performance indicators, including the results framework indicators, which need to be assessed on a semi-annual or annual basis. A consultative approach is adopted to resolve queries related to indicators on which data is required from the PMU MIS team and other relevant stakeholders. Project activities and geography-wise analysis has been done to identify the strengths and weaknesses in the project implementation.

## Synthesis of MIS data with primary data to report on project performance

The MIS data on the project progress, the primary data on the quality and feedback of implementation (from stakeholder interviews and beneficiary interviews) is synthesized to report on the status of implementation of the project for the period of concurrent monitoring round. The current concurrent monitoring report highlights the activities/processes for which the implementation quality needs to be improved. It also aims to identify the challenges or bottlenecks in implementation.

The quantitative estimates of the CM-VII report at the aggregate level for some indicators provide a broad indication of the status of those indicators. However, the estimation may not provide statistical precision at the aggregate level (e.g. project and comparison areawise or district-wise or category-wise) as the sample selection is not strictly random and also for some categories, the sample size is not adequate. The estimates of any indicator should not be compared with the estimates of that indicator available from secondary sources. Therefore a mix of quantitative estimates and qualitative insights have been used to draw conclusions from monitoring the project point of view, not from a typical point of view of the evaluation of the project.

## Common approach and methodology for both Marathwada and the Rest of the Project Areas (RoPA) region

A meeting was convened on 30<sup>th</sup> May 2022 by PMU with Sambodhi and Nabscon teams to discuss developing a common methodology and household beneficiary tool to be used for both regions from the current concurrent monitoring round. Based on suggestions provided by PMU, a common methodology along with household surveys and qualitative tools was developed in June 2022. The household survey tools were approved on the 6<sup>th</sup> of July by PMU. The data collection software program (CAPI) was developed in July 2022 and it was tested in the first week of August 2022 before starting the field team training on 6<sup>th</sup> August 2022.

## Annexure 2. Sampling Methodology

The sampling methodology remains the same which was adopted during the previous rounds of concurrent monitoring. Using the proposed sampling method in line with the ToR, concurrent monitoring has been conducted in both project and comparison areas. The ratio for the project to comparison remains at 2:1 (as given in the ToR). The concurrent monitoring exercise intends to cover all 347 clusters across eight districts over the period of six years. Twelve concurrent monitoring rounds would be conducted over six years, i.e., two in a year. Given the phased approach to implementation, the project has been implemented in 70 clusters in year I, 175 clusters in year II, and 102 clusters in year III. The sampling strategy for concurrent monitoring is proposed likewise. The number of clusters to be visited in each district in each round has been selected proportionately. The distribution of the beneficiary samples across districts and monitoring rounds is presented in the table below. Accordingly, a total of 30 project clusters and 15 comparison clusters have been covered in Concurrent monitoring Round VII. The list of sampled clusters and villages has been provided in the Annexure.

Table A2.1 Sample Distribution

Sl. No	Districts	Round wise clusters to be covered												Total
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Aurangabad	3	5	5	5	5	5	5	5	5	5	5	5	58
2	Bid	3	4	3	3	3	3	3	3	3	3	3	3	37
3	Jalna	2	2	5	5	5	5	5	5	5	5	5	5	54
4	Latur	3	3	4	4	4	4	4	4	3	3	3	3	42
5	Osmanabad	3	5	5	5	5	5	5	5	5	5	5	5	58
6	Nanded	2	2	3	3	3	3	3	3	3	3	3	3	34
7	Parbhani	2	3	3	3	3	3	3	3	4	4	4	4	39
8	Hingoli	2	3	2	2	2	2	2	2	2	2	2	2	25
<b>Total Project clusters</b>		20	27	30	30	30	30	30	30	30	30	30	30	347
<b>Total Comparison clusters</b>		10	14	15	15	15	15	15	15	15	15	15	15	174
<b>Total Project sample</b>		300	405	450	450	450	450	450	450	450	450	450	450	5205
<b>Total comparison sample</b>		150	210	225	225	225	225	225	225	225	225	225	225	2610
<b>Total beneficiary sample per round</b>		450	615	675	675	675	675	675	675	675	675	675	675	7815

The steps in sampling methodology that have been adopted for concurrent monitoring round VII have been detailed below:

### Selection of Project Clusters

30 clusters were sampled for concurrent monitoring round VII in project areas. These 30 clusters were sampled proportionately from the eight project districts, as presented above in the beneficiary sample distribution table 4.2. The clusters required to be sampled from each district were sampled randomly from the total clusters in the district, in which the project has been implemented in Phase I, II, and III (excluding the clusters which have already been covered in the previous CM Rounds). It is to be noted that based on the suggestions from PMU, five project clusters were purposively selected in the current concurrent monitoring round such that they belong to phase I and have NRM works implemented in them.

### Selection of Comparison Clusters

15 comparison clusters are selected for concurrent monitoring round VII. The non-PoCRA watershed clusters are selected after matching them with PoCRA clusters based on the climate vulnerability index score. It is ensured that a district-wise 2:1 proportion of project and comparison is maintained while selecting comparison clusters. The steps followed to identify the comparison clusters have been detailed below:

Step 1: The number of comparison clusters to be sampled per district is decided while maintaining a 2:1 ratio in project and comparison clusters per district.

Step 2: The comparison clusters in each district which had the closest climate vulnerability index score to the sampled project clusters in the corresponding district are selected.

Step 3: A comparable non-PoCRA cluster is identified for every sampled PoCRA cluster. It means a total of 30 non-PoCRA clusters are identified for the selection of comparison group for the concurrent monitoring.

Step 4: Finally, 15 non-PoCRA clusters are randomly selected from these 30 clusters while ensuring that the district-wise proportion of comparison clusters is maintained.

## Selection of Beneficiaries

In line with the ToR, a total of 15 beneficiaries were surveyed from each sampled cluster/village. In earlier rounds, out of these 15 beneficiaries, ten beneficiaries were under the individual beneficiary category and five were in the community beneficiary category. As decided during the meeting on 30<sup>th</sup> May 2022, in project clusters, the number of quantitative interviews in the FFS guest farmers category was reduced from three to one and adjusted in the beneficiaries with disbursement category. Hence, out of ten beneficiaries,

- a) two beneficiaries were applicants of Direct Benefit Transfer (DBT) who have at least received pre-sanction,
- b) six beneficiaries who have received DBT disbursement,
- c) one beneficiary was chosen from the list of host farmers from the farmer field school, and
- d) one beneficiary (either male or female) was chosen from the list of guest farmers who had participated in the farmer field schools.

These eight DBT beneficiaries and two Farmer Field Schools (FFS) beneficiaries were randomly chosen from the list of beneficiaries in the sampled villages. In the comparison villages, a list of beneficiaries (receiving benefits like that of PoCRA beneficiaries) was identified with the help of the local agriculture assistant or with the help of gram panchayat officials. Further, the beneficiaries of the survey are chosen randomly from this list. The table below summarizes the summary of selected beneficiary categories. In case a sampled beneficiary was not available on the day of the survey, a replacement for the corresponding sample was identified randomly to ensure adequate sample coverage.

Community beneficiaries are classified into four categories

- a) beneficiaries for natural resource management (NRM) activities
- b) beneficiaries of community farm pond
- c) members of the project-supported Farmer Producers Company/ Farmer Producers Organisations (FPCs/FPOs)
- d) members of project-supported Self Help Groups (SHGs)

The sample frames of NRM work implemented, community farm ponds developed, and project-supported FPCs and SHGs were taken from the PMU team. Beneficiaries or potential beneficiaries living in the catchment area of the NRM works community intervention was identified with the support of village-level functionaries including Cluster Assistant, Agriculture Assistant, and VCRMC members. The final coverage of the sample was based on the status of the execution of individual and community activities in the sampled villages. In case of unavailability of the required number of beneficiaries of the specific category, the beneficiaries available from other categories were surveyed to maintain the sample size.

Apart from the quantitative interviews, qualitative interviews were conducted with the key project stakeholders to get their feedback on the current situation of project implementation. The details of the qualitative interviews planned to be conducted are detailed in the table below.



Table A2.2 Planned quantitative samples

Activity Category	Activity	Sample per Village	Total Sample (Project)	Total Sample (Comparison)	Remarks
<b>Individual Beneficiaries</b>		<b>10</b>	<b>300</b>	<b>150</b>	Total of 450 individual beneficiaries proposed to be surveyed
	<b>DBT Matching Grant beneficiaries</b>				
	Pre-sanction received and following stages	2			
	Beneficiaries receiving disbursement	6			
	<b>FFS beneficiaries</b>				
	Host Farmer	1			
	Guest Farmer	1			
<b>Community Beneficiaries</b>		<b>5</b>	<b>150</b>	<b>75</b>	Total of 225 community beneficiaries planned to be surveyed
	Beneficiaries of NRM activities		50	25	NRM beneficiaries from sampled project and comparison villages having NRM works
	CFP beneficiaries		36	18	Randomly selected from project and comparison villages having CFP beneficiaries
	FPC members		48	24	3 members (2 board member+1 general member) from 16 project-supported FPCs and 8 FPCs in comparison or other villages
	SHG members		16	8	2 members each from 8 SHGs in project and 4 SHGs in comparison villages (one in each district)
<b>Target Sample</b>		<b>15</b>	<b>450</b>	<b>225</b>	Total of 675 beneficiaries planned to be surveyed

Table A2.3 Planned qualitative samples

Target Respondent	Sample and Approach	Enquiry Technique	Remarks
VCRMC Representatives	– 30	– Discussion with VCRMC Representatives	Investigation of all project activities implemented in their village (viz. capacity building, implementation, challenges, and suggestions for course correction)
Agriculture Assistant (AA)	– 30	– IDI with AA	Investigation of all project activities implemented at village level (viz. implementation, challenges, and suggestions for course correction)
Cluster Assistant (CA)	– 30	– IDI with CA	Investigation of all project activities implemented at village level (viz. implementation, challenges, and suggestions for course correction)
Farmer Producer Company/ Organisation (FPC/FPO) Representatives	– 16 Two FPO/FPC representative interviews per district	– IDI with FPC/FPO Representatives (Board of Directors)	Investigation on support from PoCRA (viz. support received, process bottlenecks, and suggestions for course correction)

Target Respondent	Sample and Approach	Enquiry Technique	Remarks
Project Specialists (PS Agriculture, PS Agribusiness, PS HRD) implementing PoCRA in districts	– 8  Discussion with PS in all eight project districts	– Discussions with Project Specialists	Investigation of all project activities implemented in their district (viz. implementation, challenges, and suggestions for course correction)
Sub-Divisional Agricultural Officer (SDAO)	– 8  One SDAO randomly selected from list of SDAOs of sampled sub-divisions in each district	– IDI with SDAO	Investigation of all project activities implemented in their district (viz. implementation, challenges, and suggestions for course correction). Feedback on the role of Agriculture Supervisor and Takula Officer
Krusha Tai (KT)	– 15  Randomly selected from the 30 sampled PoCRA villages	– IDI with KT	Feedback on project-related activities implemented by KT
Farmer Field School (FFS) Facilitator	– 15  Randomly selected from the 30 sampled PoCRA villages	– IDI with FFS Facilitator	Investigation on implementation of FFS at the village level (viz. implementation, challenges, and suggestions for course correction)
FFS Coordinator	– 8 One FFS co-ordinator randomly selected from list of FFS Coordinators of sampled villages in each district	– IDI with FFS Coordinator	Investigation on implementation of FFS in their district (viz. implementation, challenges, and suggestions for course correction)
Agriculture Supervisor (AS)	– 8 One AS randomly selected from list of ASs of sampled villages in each district	– IDI with AS	Investigation on project activities which are part of the scope of the AS (viz. implementation, challenges, and suggestions for course correction)
Taluka Agriculture Officer (TAO)	– 8 One TAO randomly selected from the list of TAOs of sampled villages in each district	– IDI with TAO	Investigation on project activities which are part of the scope of the TAO (viz. implementation, challenges, and suggestions for course correction)
District Superintendent Agriculture Officer (DSAO)/Project Director Agricultural Technology Management Agency (PD ATMA)	– 8  IDI with DSAO and PD ATMA in all eight project districts	– IDI with DSAO/ PD ATMA	Investigation of all project activities implemented in their district (viz. implementation, challenges, and suggestions for course correction)

## Annexure 3. Sampled Covered during CM VII Round

### Quantitative Data

The sample was targeted based on the above-mentioned sampling approach. However, as mentioned earlier, the actual sample covered depends on the implementation status of project interventions and the availability of beneficiaries in the sampled villages.

A total of 450 respondents in the project and 225 respondents in comparison villages were covered. Of the 450 respondents covered in the project area, 297 respondents were for individual interventions and 153 were for community interventions. In the comparison area, of the 225 respondents, 178 beneficiaries were from the category of individual benefits and 47 beneficiaries were from the category of community benefits.

*Table A3.1 District-wise quantitative sample coverage in project and comparison villages*

District	Project	Comparison	Total
Aurangabad	75	45	120
Beed	45	30	75
Hingoli	30	15	45
Jalna	75	30	105
Latur	65	30	95
Nanded	44	15	59
Osmanabad	68	30	98
Parbhani	48	30	78
<b>Total</b>	<b>450</b>	<b>225</b>	<b>675</b>

*Table A3.2 Category-wise quantitative sample coverage in project and comparison villages*

District	Project	Comparison	Total
<b>Individual</b>	<b>297</b>	<b>178</b>	<b>475</b>
DBT (pre-sanction approval not received)	60	7	67
DBT (pre sanction approval received)	180	171	351
FFS- Host Farmer	25	0	25
FFS- Guest Farmer	32	0	32
<b>Community</b>	<b>153</b>	<b>47</b>	<b>200</b>
NRM Community works/ Community Farm ponds	78	47	125
FPC Member	49	0	49
SHG Member	26	0	26
<b>Total</b>	<b>450</b>	<b>225</b>	<b>675</b>

## Qualitative Data

For collecting the qualitative data, key project stakeholders from the sampled project clusters were interviewed. A total of 162 samples (36 FGDs and 126 in-depth interviews) covering various key stakeholders of the PoCRA project were conducted under a qualitative survey. The table below presents the samples of various categories which were covered under CM-VII. The sample shortfall in a few cases was due to the unavailability of the stakeholders for the survey during the time of the visit especially due to their health reasons or personal emergency.

*Table A3.3 Qualitative respondents*

S.No.	Research Tool	Samples Covered
1	FGD with VCRMC Members	28
2	IDI with AA	26
3	IDI with CA	23
4	IDI with FPC representatives	17
5	IDI with TAO	9
6	IDI with AS	18
7	IDI with SDAO	4
8	FGDs with PS	8
9	IDI with DSAO/PD ATMA	5
10	IDI with FFS Facilitator	5
11	IDI with FFS Coordinator	1
12	IDI with Krushi Tai	18
Total		162

## Experts' Field Visits

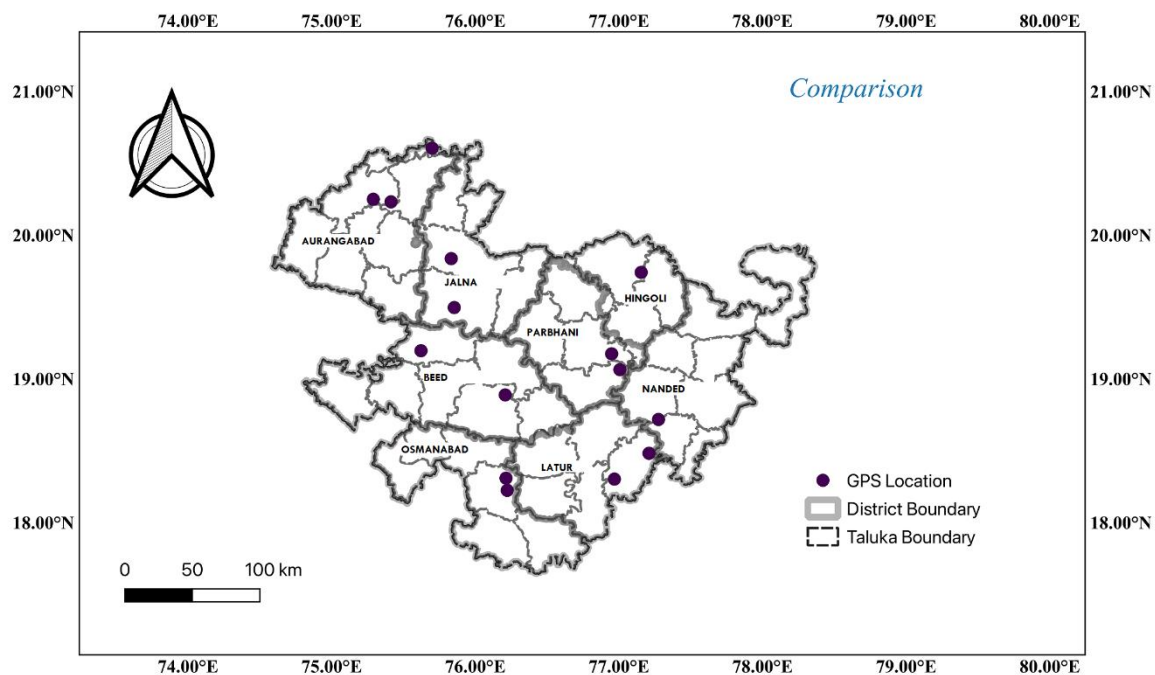
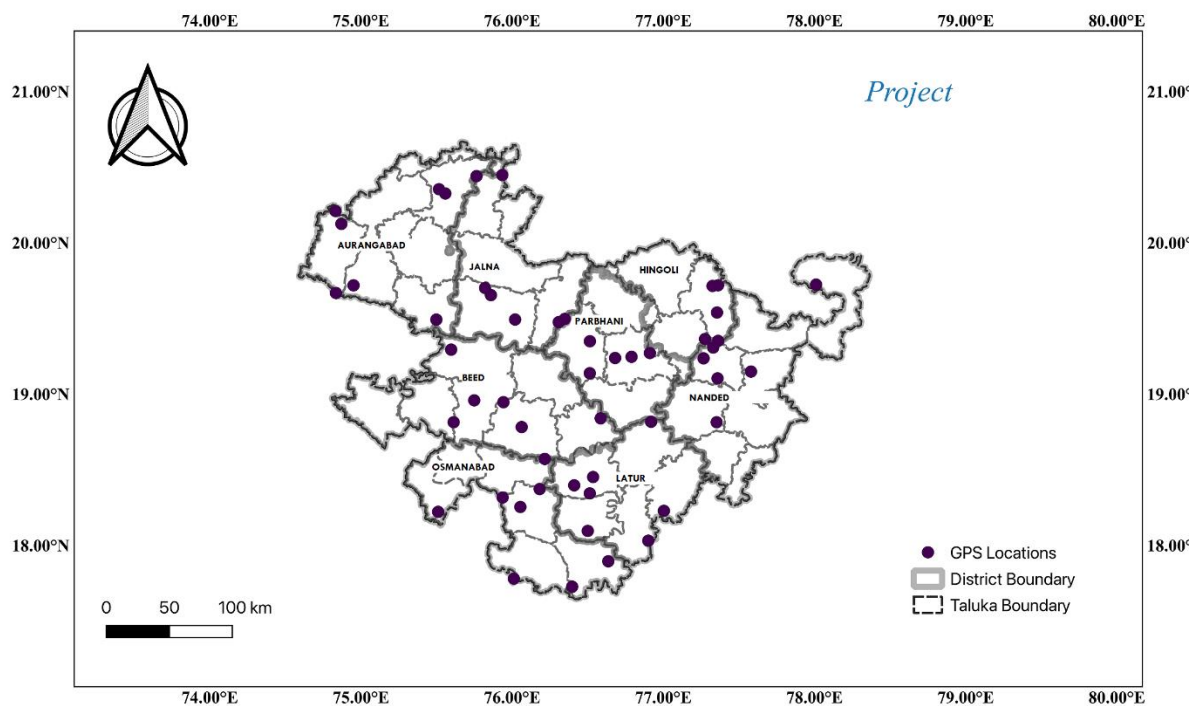
The experts' field visits were also conducted to get insights into project implementation. The team leader-cum-monitoring and evaluation expert, environment expert, sociology expert, agronomy expert, hydrology expert, agri-engineering expert, agri-economist, agribusiness and GIS expert visited the field as per the following schedule.

*Table A3.4 Key experts visit*

Key Expert	Domain	Date	Place of Visit
J. Sinha	Team Leader	11 <sup>th</sup> -13 <sup>th</sup> August	Project Villages & FPCs in Jalna & Aurangabad
S. Kulkarni	Hydrology	29 <sup>th</sup> -31 <sup>st</sup> August	Project Villages in Osmanabad & Latur
Arindam Datta	Environment	5th-6th September	Project Villages & FPCs in Jalna & Aurangabad
R. Singandhupe	Agronomy	7th-9th September	Project Villages in Nanded, Hingoli & Parbhani
Dalbir Singh	Agri Economy	8th-10th September	Project Villages & FPCs in Jalna & Aurangabad
Vijay Agarwal	Agri Engineering	8th-10th September	Project Villages in Jalna & Aurangabad
Deodatt Singh	Agribusiness	9th-10th September	Project Villages & FPCs in Jalna & Aurangabad
Mini Govindan	Sociology	13th-14th September	Project Villages/ tribal areas in Aurangabad & Beed
Santosh Muriqi	GIS	19 <sup>th</sup> -20 <sup>th</sup> October	Project Villages in Aurangabad

The field observations of all the experts are presented in the report.

The spatial distribution of sample villages in the project and comparison areas covered during the survey is presented below:





## Annexure 4: Respondent's Socio-Economic Profile

As beneficiaries were selected as per sampling design, by considering representation to different categories of beneficiaries, the proportion of different socio-economic categories mentioned in this section does not fully reflect the representation of the actual population of the area. Also, information about caste, educational status, and status of ration cards are based on the responses of respondents, and no detailed physical verification has been conducted. However, it provides an indication of current coverage of PoCRA benefits covering different socio-economic groups, and it would help in deciding the required steps to make the program more equity-oriented ensuring benefits reach all strata of the population, including women farmers and farmers from other backward castes, scheduled castes, scheduled tribes, nomadic tribes and the farmers who are illiterates or do not have formal education.

**Gender:** Nearly 86% of respondents in the project and 94% of respondents in comparison clusters were male beneficiaries. Around 76% and 84% of total interviews were given by beneficiaries themselves in the project and comparison clusters respectively.

**Social Category:** The majority of respondents belonged to the general category. The distribution of respondents based on social category is as follows:

*Table A4.1 Social category of respondents*

Social Category	Project (%)	Comparison (%)
	N=450	N=225
General/ Open	69	63
Scheduled Caste (SC)	6	9
Scheduled Tribe (ST)	5	6
Other backward class (OBC)	12	10
Nomadic Tribe (NT)	6	11
Others	2	1
Total (%)	100	100

**Education:** As can be seen from the following table, the educational attainment of respondents in project villages was slightly better than in comparison villages. Nearly, one-tenth of respondents in the project and slightly more than 15% of respondents in comparison villages were found to have not attended any school.

*Table A4.2 Educational background of respondents*

Education	Project (%)	Comparison (%)
	N=450	N=225
No schooling	9	16
Primary school (upto class 5th)	15	23
Middle school (upto class 8th)	12	16
Secondary school (upto class 10th)	22	20
Senior secondary school (upto class 12th)	19	13
Diploma but not graduate	6	3
Graduate	11	6
Post-graduate	6	3
Total	100	100

**Poverty status:** Around 72% of respondents in the project and 63% in comparison belonged to Above Poverty Line (APL) category as per their ration card status, whereas 28% in the project and 36% in comparison belonged to BPL, and the rest 1% in comparison clusters were not aware of their poverty level category.

**Marital Status:** Around 94% of respondents in both the project and comparison clusters were married. Approximately 5% of the respondents in both the project and comparison villages were unmarried. The sample also included two widows in the project and four in the comparison cluster.

**Household size and family type:** On average, the total number of members in a household in both project and comparison clusters were five. Nearly three-fourths of respondents in both the project and comparison clusters stayed in a joint family.

**Source of income:** Farming/agriculture is the primary source of income for nearly all respondents in both project as well as comparison clusters. Apart from agriculture, the other sources of income for sample households were livestock, unskilled wage labour, and contractual workers. This implies the dependence of sample households on agriculture as the primary source of income.

*Table A4.3 Source of income of respondents (multiple sources)*

Source of Income	Project (%)	Comparison (%)
	Valid N=450 (Multi response)	Valid N=225 (Multi response)
Farming/Agriculture	100	100
Livestock (goats, poultry, piggery, fishery & dairy)	12	7
Unskilled wage labor (agricultural labor, MGNREGA, labor, construction etc.)	8	13
Skilled worker (tailoring, masonry, electrician, plumbing, carpentry, etc.)	1	0
Salaried worker (teachers, anganwadi teacher etc.)	1	0
Contractual or task-based work	5	4

**Annual income:** The average annual income for respondent households from all sources in project and comparison clusters is Rs. 202,511/- and Rs. 146,394/- respectively.

*Table A4.4 Average annual income of respondents*

Cluster	N	Mean Income (INR)	Std. Dev	95% CI	
Project	450	202,511	267,657	177,715	227,308
Comparison	225	146,384	242,228	114,572	178,217

**Membership in community organizations:** Around 42% of respondents in project clusters and 36% of respondents in comparison clusters reported that at least one person from their households is a member of a self-help group (SHG). Further, at least one person from nearly 19% of respondents' households in project clusters had a membership in the Farmer Producer Company (FPC). Whereas in the case of comparison clusters, 2% of respondents' households had a member who was part of FPC. At least one person from nearly 4% of respondents' households in project clusters, was part of the VCRMC. Except for 1% of respondents' households in the project and comparison cluster, none of the respondents or members of their household was part of the district/block level marketing committee, or agriculture produces marketing committee. This reflects farmers in project clusters had better participation in community organizations than in comparison clusters. However, it is observed that still there is adequate scope to facilitate and motivate farmers to participate in community organizations, especially in SHGs, FPCs and value chain institutions.

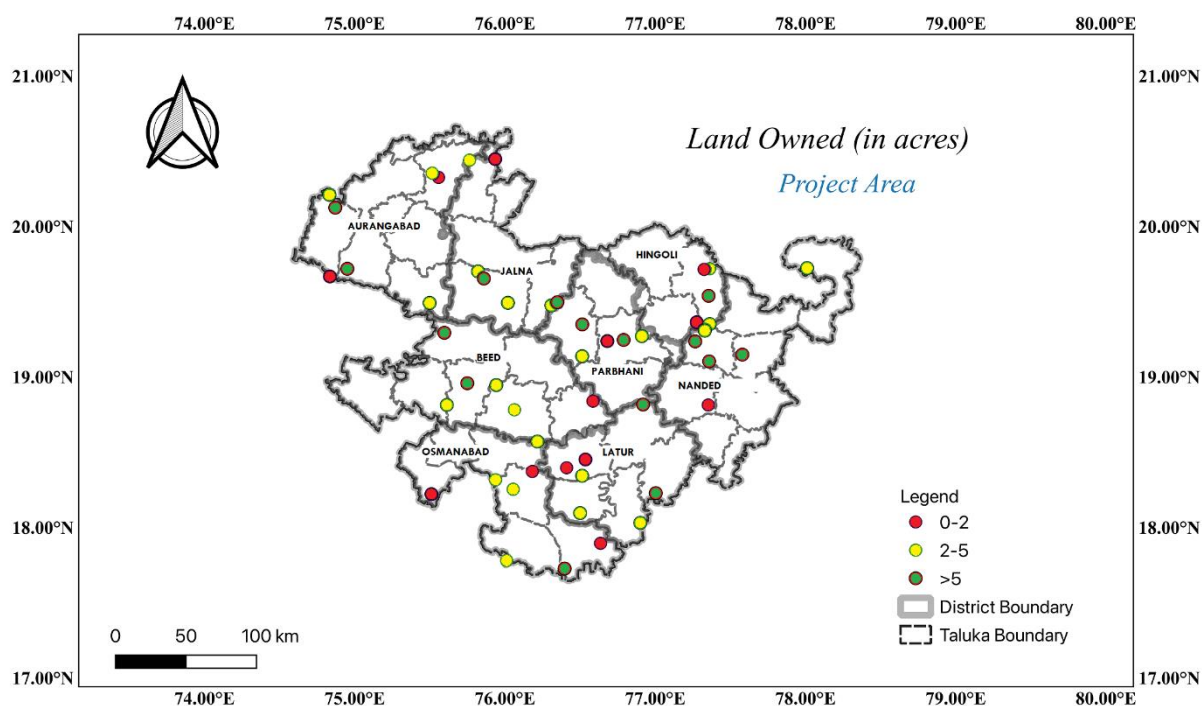
## Annexure 5: Land ownership and cultivation practices

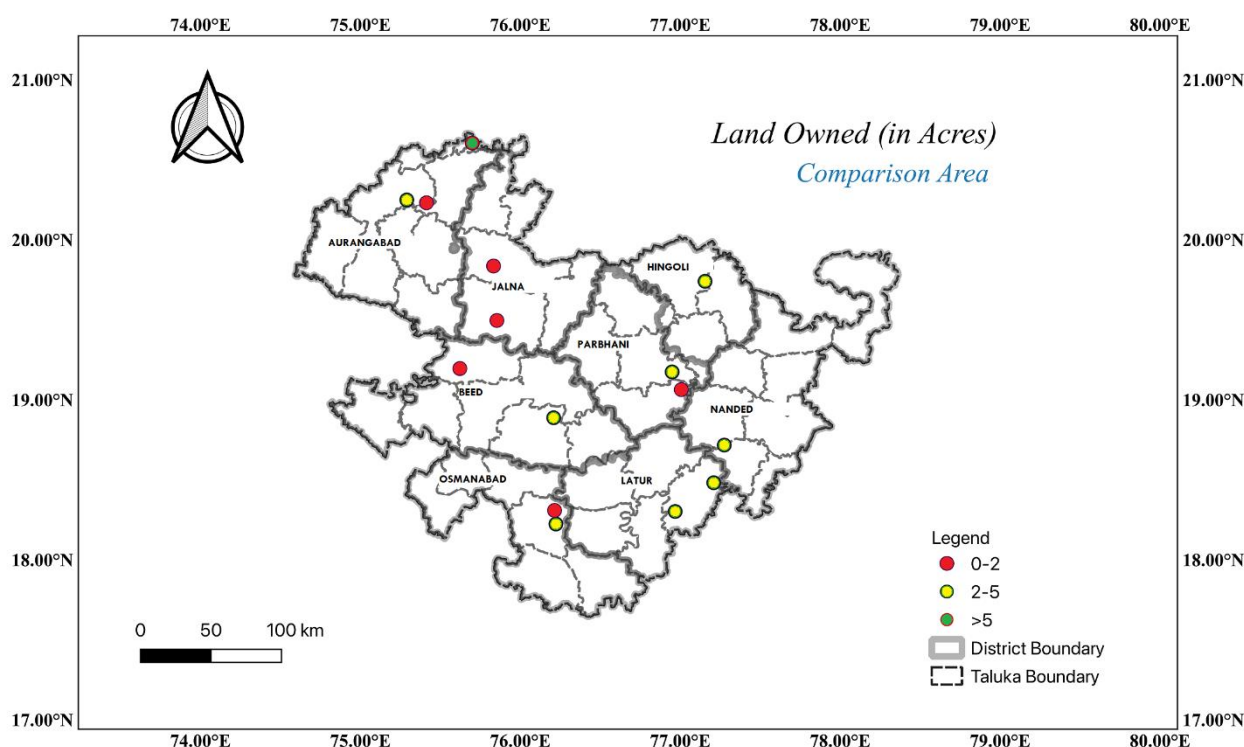
**Land ownership:** All respondents' households in the project and comparison clusters (except for one in each) owned agricultural land. Women in about 35% of respondents' households in project clusters owned agricultural land, while in comparison clusters, the proportion for the same was 19%. The average agriculture landholding in the project cluster is 4.3 acres, and that in comparison cluster is 3.6 acres. Of the average agricultural land holding in both types of clusters, nearly all lands are cultivable. Four respondent households in project clusters have leased in land with an average size of 4 acres of agricultural land, while in comparison clusters four respondent households have an average leased-in land size of 3 acres. One respondent household in both project and comparison clusters leased out 1 acre of agricultural land. As can be seen from the table below, nearly half of the respondent households in the project (65%) and comparison (78%) belonged to small and marginal farmers (those who owned less than 2 Ha of land).

*Table A5.1 Category of farmers covered in the household survey*

Category of farmers	Project (%) N = 449	Comparison (%) N = 224
Small & Marginal (less than 2 Ha)	65	78
Medium (between 2 to 5 Ha)	32	19
Large (more than 5 Ha)	3	3

The spatial distribution of land ownership in the project and comparison areas covered during the survey is presented below:





**Cultivation:** In the project clusters, in the Kharif season, nearly 91% of the total respondents cultivated their land with an average of 3.8 acres per household. Similarly, 73% of total respondents cultivated Rabi crops (an average of 3 acres per household), and 4% of respondents cultivated Summer crops (on an average of 2 acres per household) in the last 12 months. In the case of comparison clusters, around 99% of respondents cultivated Kharif crop (on an average of 3.4 acres per household), 66% of respondents cultivated Rabi crop (on an average of 2.5 acres per household), and only two farmers cultivated summer crop on 2.5 acres of land.

**Irrigation:** Nearly 94% (increased by 4% since the CM IV round) of respondents in project clusters had an irrigation source, while in comparison 89% had an irrigation facility. No change is observed when compared to CM VI round. In project clusters, the sources of irrigation in order of adoption by respondent households are open-dug well, borewells, farm ponds, canals/river, and earthen/check dams. While in comparison clusters, the order of adoption for the source irrigation is an open dug well, borewells, canal/river, earthen/check dam, and farm pond. Both in the project and comparison clusters, open-dug well and borewells were found to be a major source of irrigation. Farm ponds are more prominent in project clusters (15%) than in comparison clusters (5%). This may be attributed to project intervention. Also, nearly one-tenth of respondents in comparison areas reported canal/river as a major source of irrigation which was found to be less in project clusters (5%).

The spatial distribution of land under irrigation during the Rabi season in the project and comparison areas covered during the survey are presented below:

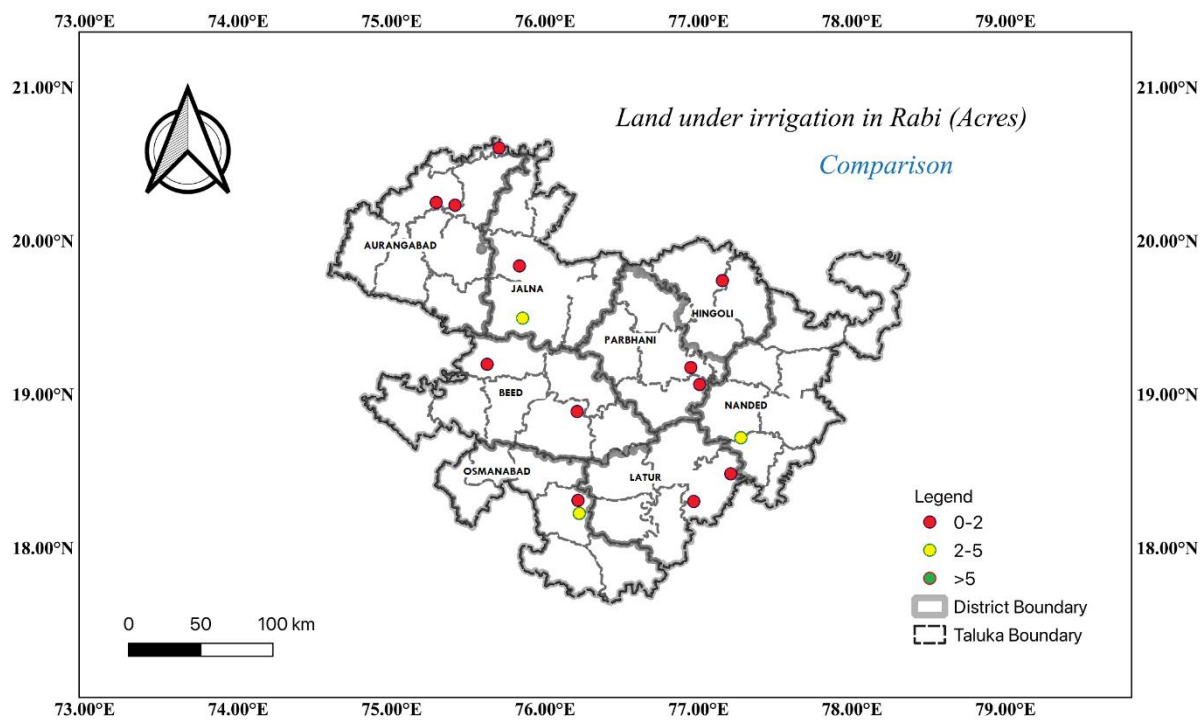
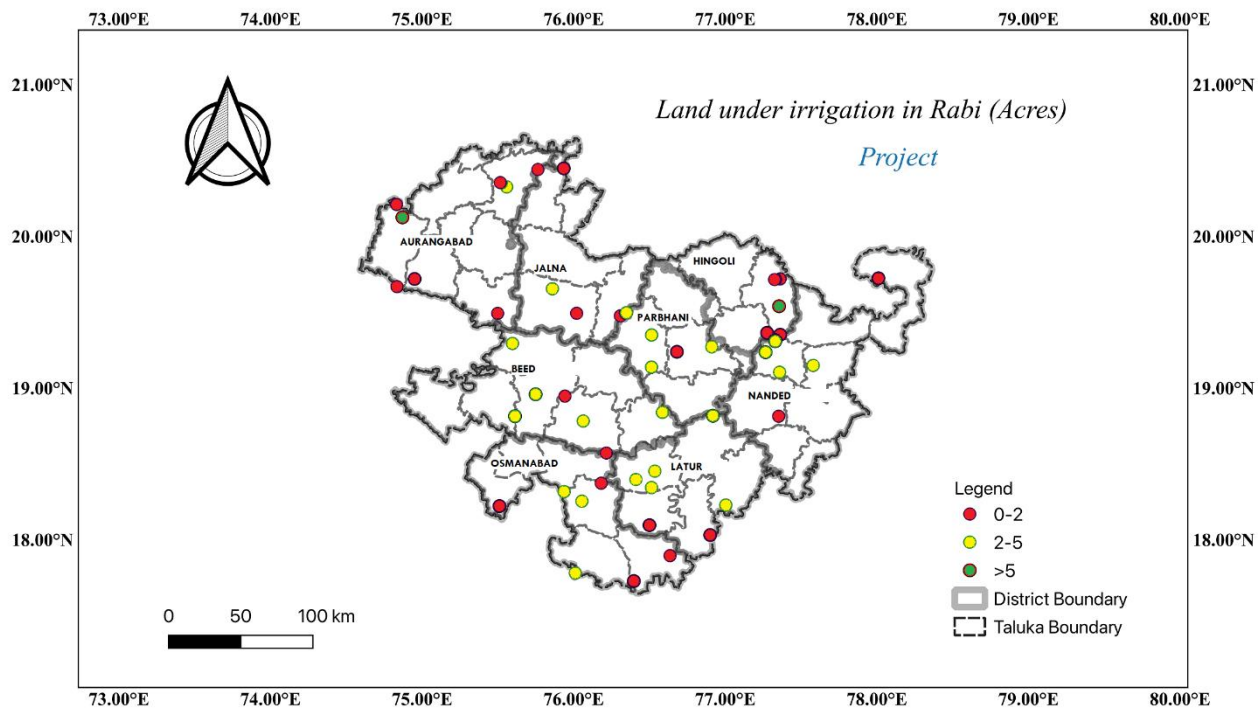


Table A5.2 Source of irrigation

Source of irrigation	Project (%)	Comparison (%)
	Valid N = 414 (Multi response)	Valid N = 193 (Multi response)
Open dug well	72	78
Borewell	38	17
Farm pond	15	5
Canal/river	5	9
Earthen/ check dam	1	6
Total (%)	100	100

**Average irrigated area under different cropping seasons:** In project clusters, on an average 3.7 acres of land with Kharif crop, 3 acres of land with Rabi crop, 2 acres of land with a summer crop, 2.8 acres of land with annual crops, and 2.3 acres of land with horticulture plantation was under irrigation in the past 12 months. Similarly, in comparison clusters, on average 3.3 acres of land with Kharif crop, 2.4 acres of land with Rabi crop, 2.5 acres of land with a summer crop, 1.6 acres of land with annual crops, and 1.7 acres of land with horticulture plantation was under irrigation in the past 12 months.

Around 12% (55 of 449) of respondents in project clusters and 5% (12 of 224) respondents in comparison had their land (on average of 2.3 and 1.7 acres respectively) under orchard plantation. The average age of orchards is 5 years in project and 7 years in comparison areas. Nearly 80% (44 of 55) of orchards in project areas are more recent as a result of PoCRA intervention since 2018-19, indicating that farmers in project areas are more confidently adopting the horticulture plantation.

#### Crops Grown in Various Seasons:

**Kharif Season:** The most common Kharif crops cultivated in both project and comparison clusters included Cotton, Pigeon pea and Soybean. Some of the other Kharif crops cultivated were Chickpea, Sorghum, Black gram, Green gram, Maize, Sugarcane, Turmeric, Ginger, Onion and Millet.

**Rabi Season:** The most common Rabi crops cultivated in both project and comparison clusters included Chickpea, Sorghum, and Wheat.

**Summer Season:** Vegetables like Onion and Groundnut are mostly grown in summer.

**Annual Crop:** Banana, Papaya, Guava, Sweet Lime, Lemon, and Orange are common crops sown annually.

**Crop damage:** Crop damage is an important issue faced by farmers in both project and comparison clusters. It was observed that nearly 76% of respondents in the project and 78% in comparison clusters faced crop damage. The crop-wise distribution of the crop damage response is presented in the table below.

Table A5.3 Crops grown and damage faced by respondents in various seasons

Season wise crops	Percentage of respondents growing crops		Percentage of respondents facing crop damage	
	Project (%)	Comparison (%)	Project (%)	Comparison (%)
	Valid N = 449 (Multi response)	Valid N = 224 (Multi response)	Valid N=316 (Multi response)	Valid N=164 (Multi response)
<b>KHARIF</b>				
Soyabean	57	57	60	55
Cotton	40	46	37	46
Pigeon pea	6	5	5	6



Season wise crops	Percentage of respondents growing crops		Percentage of respondents facing crop damage	
Maize	7	6	6	6
Black gram	3	-	2	-
Green gram	3	2	3	1
Sugarcane	12	5	11	4
Millet	2	2	3	2
Turmeric	4	1	3	1
<b>RABI</b>				
Chickpea	44	29	47	30
Sorghum	9	10	9	9
Wheat	15	17	14	15
<b>SUMMER</b>				
Onion	9	1.8	8	2
Groundnut	1	1.3	1	1
<b>ANNUAL</b>				
Mango	0.5	0.4	1	1
Guava	1	-	1	-
Sweet Lime	3.6	1.3	3	2
Lemon	0.2	-	1	-
Watermelon	0.5	-	1	-
Cucumber	0.2	-	1	-
Orange	1	-	1	-
Pomegranate	2	-	1	-
Lathyrus	1	-	1	-
Grapes	0.5	-	1	-

The primary reason for crop damage in both project and comparison clusters is excessive rain, pest/disease attack, and hailstorm. More than 80% of respondents in the project and comparison area both, faced crop loss due to excessive rain. Nearly 11% of respondents in both project and comparison clusters faced crop damage due to pest and disease attacks. The reasons for crop damage in project and comparison clusters are as follows:

*Table A5.4 Reasons for crop damage*

Reasons for crop damage	Project (%) N=333	Comparison (%) N=176
Excessive rain	87	81
Delayed onset of monsoon	13	10
Dry spell	13	13
Pest and disease attack	29	22
No germination of seed due to faulty seeds	5	6
Hailstorm	19	21

Most of the damage in Kharif crops in both clusters is experienced during the harvesting stage. Most of the respondents also shared that damage occurs in Kharif crops at the pod development and flowering stage as well.

*Table A5.5 Stage of Kharif crop damage*

Stage of damage for Kharif crop	Project (%) N=343	Comparison (%) N=176
At and after the sowing stage	15	15
At flowering stage	63	70
At the pod development stage	52	54
Harvesting stage	34	28

## Annexure 6: Respondents' Awareness of Project Activities

One of the key objectives of concurrent monitoring is to assess the level of awareness of the beneficiaries of the different benefits under PoCRA and other schemes, sources of information, and if they received and adopted any of the agricultural technologies being promoted.

**Source of information about PoCRA:** The most important source of information in project clusters was Gram Panchayat Members (79%), project staff (52%) - which includes the Agriculture Assistant, Cluster Assistant, FFS Facilitator, Project Specialist, Krushi Tai, and VCRMC members (40%). In the case of comparison villages, information was mostly gained from Gram Panchayat members (60%), through friends and relatives (42%), and project staff (29%). Other sources include village microplanning activity, advertisements on radio/television, hoardings, and project display boards.

*Table A6.1 Motivation for application*

Motivation for application	Project (%) N = 241	Comparison (%) N = 179
Self	66	80
Family members of the household	13	10
VCRMC members	11	1
Friends or neighbours	7	4
FFS facilitators/ Coordinators	2	1
Cluster Assistant	4	3
Agricultural Assistant.	17	11
Krushi Tai	1	0
CSC centre/ e-Seva	0	1
Gram panchayat members	5	4

*Table A6.2 Support for application*

Support for application	Project (%)	Comparison (%)
Self /family members	50	59
With help of cluster assistant	7	3
With help of friends/neighbours	5	1
With help of VCRMC member	10	7
With help of the Gram Panchayat operator/me	14	12
With help of e-Sewa Kendra	14	19

*Table A6.3 Arrangement of funds*

Arrangement of funds	Project (%)	Comparison (%)
Used own funds	84	83
Took loan from friends/extended family members/neighbours	10	7

Took loan from money lender	3	7
Took loan from bank/microfinance companies	3	2
Took loan from SHG	1	1

*Table A6.4 Reasons for not starting work*

Reasons for not starting work despite pre-sanction	Project (%) N = 24
Have other expenditure priorities currently	33
Do not have money to invest on this activity	13
Currently arranging funds to initiate activity	25
Post sanction unable to access raw material	25
Others reasons	4

On average it took about 75 days (2.5 months) to transfer the matching grant to the beneficiary. All 24 applicants are interested in procuring the material and plan to start the activity in an average of 45-50 days. Around 90% of applicants in project areas feel that the time duration for completing this activity is sufficient. Rest 10% feel that the time duration is insufficient to arrange funds. 82% of applicants do not face any challenge in accessing the project benefits. Rest 18% face issues in the following stages.

*Table A6.5 Issue faced stage wise*

Stage in which issue is faced	Project (%) N = 41 (Multiple response)
Registration	41
Application	44
On-Site Inspection	37
Pre-sanction process	17
Completing the work	10
Receiving subsidy	27
Utilization of benefit	12

## **Annexure 7: Feedback on Project Performance from concerned Stakeholders**

### **A7.1 Project Specialists (PS)**

All 8 Project Specialists (PSs) were interviewed in the FGD conducted at the District Office of the Agricultural Department. The feedback received from them is described below.

The project specialists shared that they are satisfied with the current status of the project implementation and the NRM works which are in progress. All the PSs were found to be aware of the environmental safeguards checklist specified in ESMF guidelines compiled as part of the project implementation through the village development plan. The knowledge of the checklist was found satisfactory as many project specialists mentioned the ban on the felling of trees during NRM works, and flood line checks during the construction of check dams. Also, the awareness was found adhering to working in forest areas as well UNESCO heritage sites such as Ajantha and Ellora. It was also reported that the guidelines of ESMF are followed in the villages during the implementation of individual and community works.

All the PSs mentioned that they have clarity about the guidelines of the project. It was suggested that some of the activities under PoCRA which were stopped (like pipes, and water pumps) should now be reinitiated since those were very popular among the farmers. There is a demand for restoring closed activities such as pipes and motors, and there is a demand for solar pumps and farm fencing to mitigate the menace due to wild animals. Also, to increase the participation of women in the project, it was observed that the FFS were conducted for women exclusively as well as guidance was provided to women and vulnerable groups for the formation of small teams in the village. The activities related to updating the portal with VCRMC details were found to be conducted regularly by the PD HRD.

#### **Feedback from PS Human Resource**

The awareness regarding the responsibility for updating the data of VCRMC was observed in all the project specialists HRD. The frequency of field visits of the PS HRD was found to be 4-10 days per month. The key task is to visit VCRMCs and support them. The maximum number of exposure visits (12) were conducted in Hingoli. Some districts reported having conducted the exposure visits only once in the last six months. Parbhani, Aurangabad and Jalna districts have not conducted any exposure visits yet. Each exposure visit covered around 20-50 farmers for capacity building.

The PS HRD mentioned that they attend the VCRMC meetings regularly and the frequency of VCRMC meetings attended in the last 6 months was found to be 5-10 in some cases while the online VCRMC meetings were 25. In some districts also the online VCRMC meetings are arranged by the PS HRD. As per the PS HRD, the women are enrolled and trained in PMG-DISHA program through the PMG Disha coordinator with help of CA in the guidance of PS HRD.

The challenges faced by the PS HRD were reported to be the allocation of funds for the training component failing to which the exposure visits are not conducted in districts like Nanded and Aurangabad. Also, the rejection from women farmers for exposure visits as well as training outside the village premise are challenges for the PS HRD. Also, the claim of the bill for expenditure from own pocket takes one year to settle as informed by the project specialists.

#### **Feedback from PS Agriculture**

The training related to NRM works was attended by all the PS Agriculture. However, they suggest revision in the training content by including training on the recharge shaft. The periodic refresher training related to NRM work was mostly demanded by all the PS Agriculture.

#### **Feedback from PS Agri-Business**

As per the PS AB, applications for Agribusiness activity are received in good amounts. The districts with tribal populations are getting less response for the AB proposals, and efforts are being made through counselling and arranging workshops to encourage them to AB proposals. The main challenge faced by PS AB as reported by them was found to be convincing a farmer to set up and purchase material for the proposed activity.

#### **Feedback from PS procurement**

All PS Procurement except Aurangabad district informed that they have received training to date. There is a demand for refresher training by all PSs who have received prior training.

## **A7.2 Agriculture Assistants (AA)**

For getting feedback on the project implementation, a total of 26 AAs were interviewed. The response received from the AAs is as follows.

It is observed that the activity of micro-irrigation was having the highest demand among the farmers, especially the drip and sprinkler because only these activities for water and irrigation are currently the most popular in the project as the region has very scarce rainfall and these assets help in using the water efficiently. It is followed by horticulture, the second most popular activity among the farmers. However, there was also major demand for restoring the closed activities, especially the community farm pond, from many AAs.

All the AAs opined that the guidelines are very clear and there is no need to change. As per the interviews of the AAs, all the AAs said that there was no irregularity in the work, as well as no fake cases, were reported in the villages assigned to them

### **Problem while working as a non-executive member**

Many AAs said that they did not face any problems while working as a non-executive member majorly in constituting the committee. Some AAs said that they faced problems in mobilizing the members of the committee of specific castes in the village as well as mobilizing the women in the village.

### **Monitoring of Krushi Tai Work**

It was reported that Krushi Tai's work was regularly monitored, and proper guidance was given to regularize the work. In one village the AA was not aware of the format prescribed for the KT evaluation.

### **Challenged faced**

The day-to-day expenses such as print-outs and photocopies are done by the AA from their pocket for the project work as many of the VCRMCs have not received any funds from the committee for miscellaneous expenses. All the AAs opined that the guidelines are very clear and there is no need to change.

### **Status of NRM work**

In many villages, the NRM work has not started because the small farmers are unwilling to take the compartment bunding activity in the field as well as due to COVID in 2021 summer. The works were not done as in some cases the tendering is delayed for starting the drain line treatment works. Among the sampled villages, only 4 villages were covered under the NRM works.

### **Environmental safeguards awareness**

The AAs had a good understanding of the Environmental safeguards of the project which included the importance of trees, control of banned pesticides and use of organic inputs in farming. Some said that they motivate and train people to safely dispose of pesticide bottles after use.

## **A7.3 Agriculture Supervisors (AS)**

The Agriculture supervisors were interviewed to give feedback on the project Implementation. The response received from the Agricultural supervisors is as below.

According to the Agriculture supervisors, the drip and sprinkler benefit given to farmers is the best activity in the project as it has increased the water use efficiency for irrigation. Some Supervisors feel that the farm pond component has also been useful to the farmers as it has helped in protective irrigation. Almost all the supervisors said that they do not face any major problems in project implementation. There was no problem in understanding the guidelines, and all guidelines are clear as reported by all the AS.

The best-integrated pest management (IPM) technique suggested by most agriculture supervisors was the use of neem extract formulation for spraying in the crop to avoid pest infestation. Almost all the agriculture supervisors (AS) mentioned that they do not have any issues in the monitoring of the works but one AS reported that there is a problem with the mobile network during the verification of works in the villages. All the supervisors expressed satisfaction with the digital applications and feel that they are easy to use.

## **A7.4 Cluster Assistants (CA)**

For getting feedback on the project implementation, a total of 23 CAs were interviewed. The response received from the Cluster Assistants is as below.



The most demanded activity was found to be the irrigation assets such as drip and sprinkler as farmers perceive that the water use efficiency will increase through these assets. The reason for the delay in the approval of the application was reported as workload, and in some cases, it was reported that the VCRMC meetings do not take place often and therefore the process is delayed. The delay in pre-sanction to the farmers was mainly due to the uploading of incorrect or incomplete documents by the farmer. The application is generally rejected mainly due to the unavailability of the water source for drip and sprinkler but the proportion of rejection is very low. All the CAs have received training on the projects, amongst them, many of them said that the Shade-net training was very useful for them followed by the zero tillage training. The main challenges faced by the CAs were found to be poor connectivity in the villages as well as the bad quality of roads for commuting between the villages.

## **A7.5 FFS Facilitator**

To know the feedback on the implementation of FFS activity in the project, a total of 5 FFS facilitators were interviewed for qualitative information, and the response received from them was as follows.

### **Roles and responsibilities**

The FFS Facilitators were involved in mobilizing farmers for FFS, giving farmers information about the new technologies as well as providing training in reducing the cost of cultivation and increasing their income.

### **Training to farmers**

The facilitators see their role in training the farmers on the new technologies in farming. The most popular activity as well as the activity which was most demonstrated was found to be the BBF, preparation of the Dashparni Ark followed by the Neem Ark. The other popular technologies were bird perches, seed treatment and extract preparation. Almost all the facilitators said that they train the farmers for the disposal of empty pesticides in the FFS. The most used disposal method was found to be the burying of bottles in the ground.

### **Participation of women in FFS:**

In most of the villages, the participation of women was found in the FFS but the proportion of women was comparatively less than men in the FFS as per the facilitators. This was due to the priority given to domestic work over FFS by women farmers. In some cases, it was also found that women find the morning time inconvenient to attend the FFS. In some cases, the time for FFS has kept the convenience of women in those villages. The FFS were also arranged in many villages exclusively for women.

### **Awareness related to climate change and organic farming:**

The traditional techniques used by the farmer to fight climate change are spraying intensively to avoid pests, intercropping and use of farm yard manure. There was variation in the use of organic farming and the use of organic fertiliser was found to be between 2- 50% in the villages. The awareness regarding the use of banned pesticides was found to be satisfactory in the villages, as reported by the facilitators.

## **A7.6 FFS Coordinators**

One FFS Coordinator was interviewed. The feedback is as follows:

The FFS coordinator helps in the facilitation of FFS activities in the project villages which included activities mainly related to noting down the observations from the FFS app, checking the attendance of guest farmers, preparing the timetable for the FFS well as coordination and skill development of the facilitators. The method adopted for improving the skills of the facilitator is by enhancing their knowledge during the meetings conducted twice a month. Demo sessions are also conducted exclusively for the facilitators. The monitoring method adopted by the coordinators for the evaluation of work is to review the observations communicated by the facilitator in the FFS sessions on every first and third Saturday of the month at the SDAO office. Other than the meeting, they are trained through webinars and WhatsApp and also they are given demonstrations on the field.

The efforts made by the FFS coordinator to promote improved agriculture practices were mainly motivating farmers the use climate-resilient seeds along with the BBF technologies. For increasing the participation of women, the help of SHG is taken so that the women will be motivated to attend the FFS. The most used technology adopted by farmers after the FFS session is IPM, in which formulation of Nimboli Ark was mostly used by farmers followed by BBF technology and intercropping. Coordinators also expressed the need for the training of the facilitators through KVK and retired scientists of the Agriculture stream. Other than a meeting, they are trained through webinars and WhatsApp as well as demonstrations on the field.

## A7.7 Krushi Tai (KT)

During the CM VII round of the project, a total of 18 Krushi Tai were interviewed for getting qualitative inputs concerning the roles and responsibilities performed by them. Out of the 18 Krushi Tais interviewed only one KT had previous work experience in any of the projects. Almost all the KTs were aware of the component of Goat rearing as well as poultry for the landless and they were also aware that this activity has been discontinued. The major motivation for Krushi Tai to work on the project comes from encouragement from Gram Panchayat and other Agri department officials. Most of the Krushi Tais perform the role of mobilizing farmers, attending the VCRMC meetings, following up with the farmers with pre-sanctions, disseminating information regarding the project, and guiding farmers regarding the project and farm-related activities.

Four of the 18 Krushi Tais said that they have got some sort of training. The KTs who received the training said that the training lasted for 4 days at Taluka. Almost all the KTs said that they have participated in the Microplanning of the project. Only three Krushi Tais interviewed knew about the beneficiary priority criteria in the DBT app. Out of the 18 Krushi Tais, 112 said that they own a separate phone for communication. Other KTs said that they use their husbands' phones for communication with farmers. The main challenges faced by the KTs were reported as the conflict of timing for domestic work as well as network issues for attending training. Also, all KTs said that they received help from family members, which was limited to pick up and drop at the farmer site as well as the meeting venue. Sometimes the husbands of Krushi Tais help them to complete their work.

### Training received by Krushi Tai

Only four of 18 Krushi Tais acknowledged that they had undergone any training under the project. One KT mentioned having attended the online webinar. No Krushi Tai has been part of an exposure visit under the PoCRA project.

### Past experience and motivation factors

2 of the Krushi Tais were working for the first time in the project. They received encouragement from Gram Panchayat and other officials. A few were self-motivated and wanted to help the SHG members.

### Support from family

All Krushi Tais received support from their family. Assistance was in the form of travel and help in arranging meetings. One of them reported the lack of cooperation at home in her role as Krushi Tai because she fails to bring any remuneration for the work she does. This indicates that non-payment of salaries is a serious concern.

### Awareness on project

Almost all of the KTs see their role in mobilizing women farmers, and SHG women, disseminating information regarding the project and guiding farmers regarding the project and farm-related activities. Almost all KTs acknowledged they participated in PoCRA Micro-Planning. Most of them (10 out of 15) were aware of the specific indicators on which their work is reviewed. Reported evaluation criteria included the number of meetings arranged (most common response). However, most of them are aware of social media and digital payment platforms and utilize the same when needed. They are also part of the administrative Whatsapp groups that facilitate coordination at the village, district and sub-division levels

### Operational aspects

**Mobilization activities undertaken by KTs:** Generally done through informal conversation and door-to-door meetings to share information about PoCRA and the potential benefits of the project.

**Challenges faced:** There were no major challenges faced by the KT while performing the duties. However, a few of them mentioned that it is challenging to convince prospective beneficiaries due to time and monetary constraints faced by them in their daily lives, as well as the lack of adequate support infrastructure to facilitate the transition.

Most of the interviewed KTs were unaware of the PMG DISHA digital literacy programme, and are therefore not enrolled on same.

**Payments of honorarium of KTs:** All Krushi Tais were aware that VCRMC is responsible for their monthly remuneration which is supposed to be paid quarterly.

## **A7.8 Taluka Agriculture Officers (TAO)**

A total of Eight of the Taluka Agriculture Officers (TAOs) were interviewed to get feedback on the project implemented in their respective taluka. The response received was as follows.

### **Challenges faced**

The challenges faced by the TAOs were mentioned as the low availability of manpower in the department resulting in the workload as well as the lack of an adequate number of computers and printers at the Taluka level is also creating the problem for giving pre-sanctions and the pendency of work has increased. In the DBT App, the applications which are previously done by the farmer are displayed last and the new applications are shown first, therefore the farmers are complaining about the same. Also, the farmers who have taken the benefit previously are not displayed in the dashboard while giving the pre-sanction, The other challenge is that farmers are applying for every activity without having the basic criteria as per guidelines, this is also putting an extra burden on the field staff. On asked about the capacity-building components one TAO said that the training centres are very far from the villages as well as the project area creating difficulty.

### **About clarity of guidelines**

All TAOs felt that the project guidelines are clear and needed no change.

## **A7.9 Sub Divisional Agriculture Officers (SDAO)**

A total of five SDAOs were interviewed to get feedback from the Sub Divisions on project implementation. The findings were as below

### **On project implementation**

All the SDAOs feel that the activities in the project are working well. One SDAO said that the activity of well recharge has very low demand as the number of wells is very less in the project area. All the SDAOs mentioned that there was clarity in the guidelines and there is no need to review or change any of the guidelines. The strategies adopted for increasing women's participation were found to be the women's FFS arrangement and the motivation of women with the help of village-level women SHG groups and the organisations like MAVIM and MSRLM.

### **Challenges faced**

The main challenge faced by the project is the shortage of staff for the implementation of activities. One of the SDAOs complained about the rates per cubic for the excavation work as the contractors are not ready to work on the rates of the agriculture department. This is because of the increase in the rate of diesel required for the excavator. It was also suggested to implement the activities with the DSR rates as done in other departments.

### **Status of NRM work**

The work of NRM was not completed the last summer because of COVID severity, this year all the SDAOs said that the NRM work will be implemented at full capacity.

### **Suggestions on capacity building component:**

SDAOs feel that there were problems in giving online training in many places and the training which is taken offline has a higher impact, so offline training must be conducted while taking all necessary precautions. Also, of the interviewed SDAOs, many shared that the training must be conducted at least at the taluka level instead of the district level which the farmers and staff can reach easily.

## **A7.10 District Superintendent Agricultural Officer (DSAO)**

Four DSAOs were interviewed to get feedback from the Sub Divisions on project implementation. The findings are as below:

### **On project implementation:**

DSAOs shared that the guidelines for all individual benefit activities of the project are clear. It seems that the activity of goat rearing and open dug well is difficult for them to implement.

Two DSAOs said that the guidelines for community activity like Godown needs specification certified from PMU. Also, the NRM works need clear guidelines for implementation.

### **Irregularities and Duplication in work:**

DSAOs shared that there is no duplication or irregularities in the activities of the project.

### **Implementation of NRM work:**

The most popular works for NRM as suggested by the VCRMC as per DSAO are Cement Nala Bund, Repairing of Defunct Cement Bunds, and Compartment Bunding works. DSAO also shared that the implementation of NRM work is difficult because the contractors are not getting paid on time after the completion of work as well as people are also complaining about the sustainability of work.

### **Challenges in project Implementation:**

The challenges according to DSAOs were the shortage of manpower at the field level due to which the monitoring of work is affected. Other challenges mentioned were the capability of FFS facilitators to impart training on technologies to the farmer. The reason for the delay of NRM works as mentioned by the DSAOs were because of the estimated preparation of NRM works. As per the DSAOs, the team for preparing estimates lack complete knowledge for preparing the estimates, therefore the estimates are to be prepared by external consultants which takes a lot of time, further delaying the implementation process.

*“The condition of compulsorily taking the bank loan for shade net and poly house construction must be reviewed in PoCRA guidelines and farmers who are ready to avail this benefit with their expenses must be allowed. Also, Additional Agriculture assistants should be recruited for expediting works related to the NRM.”- DSAO*

## Annexure 8: Key Expert's Field Visit Observations

### A8.1 Team Leader and M&E Expert

#### Key observations

The roles of Krishi Tai in the project have been found critical for a variety of reasons, namely (i) accessibility to the members; (ii) connection and familiarity with local communities; (iii) understanding of the local dynamics; (iv) being a woman, the other women can discuss their issues openly with her. Many times, the KT's are also involved in their household functions and celebration, thereby having a strong rapport with the local community.

The community assets have been created under the Project in Jalna, however, their utilization by the community is minimal. In several cases, these assets are being used by powerful individuals, who developed these assets with project support. These cases are much fewer in Aurangabad and other project districts as compared to Jalna.

The construction of community ponds has brought additional areas under cultivation. The farmers are also switching from rainfed crops (Jowar) to irrigated agriculture (maize and citrus). In many cases, they are emphasising the judicious use of water through micro irrigation (drip and sprinkler).



Ease in using the online application portal for availing the benefits under PoCRA. Almost all of the beneficiaries informed that they did not face difficulty in registering and applying for the matching grants on the online portal. Earlier, they faced difficulties, however, the ease in the online application process indicates that the PoCRA PMU and IT teams overcame the shortcomings.

#### Key suggestions

**Empowerment of Community-Based Organizations:** It has been observed that the project benefits are reaching the beneficiaries, however mostly these are for individuals. Therefore, the project should make efforts to involve and empower the CBOs, namely FPCs and VCRMCs, not only to facilitate releasing of matching grants but also to monitor and report the utilization of the assets.

**Linkage with financial institutions:** The majority of the project interventions are capital intensive which a small or medium-category farmer can not afford. Therefore, they normally approach private investors who take high charge. Efforts should be made to link them with formal financial institutions where they can get loans at a lower interest rate.

**Convergence with other Government schemes:** As the PoCRA project interventions, particularly the agriculture assets, cannot be made available to all the beneficiaries of the project, efforts should be made for convergence with other government schemes.





## Detailed Visit Report

### Horticulture, Nandar, Paithan

Dwarka Bhai Bhimrao has cultivated 4 acres of Custard Apple plantation with project support. He planted 1540 plants, with almost 100% survival in 2<sup>nd</sup> year. Earlier he was growing Pomegranates, therefore aware of the fruit plantation, taking proper care, fencing done. This year, he is expecting 5-7 kgs of fruit per plant which will gradually increase to 40-50 kgs per tree in 8-10 years.

He has been cultivating Pomegranates for the last 15 years. The market is at Sholapur, Pune or Paithan. Normally, the pick-up van takes Rs.8000/- to transport the produce to Sholapur (a big market). He also pays Rs.2000/- for harvesting and loading the pick-up van with a capacity of 25 quintals. There is no market fee, and the average market rate is Rs.40-Rs.50/- per kg. He gets 20-25 kgs of Pomegranate per tree.



### FGD with VCRMC

The participants were 13 members, 4 women, a woman Sarpanch and the head of VCRMC.

The VCRMC members informed that during 2016-17 and 2017-18, there was drought, and the farmers could not cultivate. However, due to PoCRA, water has come to the village, due to which farmers are not facing shortage and can cultivate during drought periods as well.

Regarding DBT, they expect the payment to be made in tranches based on the achievement of milestones rather than one time. This will help them to reduce borrowing from others to complete the work, and then get the payment of a matching grant/subsidy.



### Performance of Krishi Tai, Paithan

Vaishali Vaidya is Krishi Tai. When the women members in Nanded village were asked about her performance they were very satisfied. Specific questions were asked on how comfortable they could be if there was a male assistant instead. They said that it is easy to communicate with women (KT) than with men. Being a female, the KT can also visit their home without any restriction, sit down and talk on different matters, not limited to the project issues. This way, the rapport building and comfort level is high with KT which could not be possible with male staff.



### Benefits from Compartment Bunding

Sudhakar Jigaram Labade implemented Compartment Bunding on 14 acres with project support in the summer of 2019. Due to this intervention, the water in his 84 feet deep well is available throughout the year. This has enabled him to switch the cropping pattern from Jowar to cotton and moong along with citrus.

### Benefits from Drip Irrigation

Shri Kisan Bhagwan Bhote adopted drip irrigation in his 1-acre field. The total cost of drip irrigation was Rs.60,000/- out of which he got a subsidy/matching grant of Rs.38,000/-. He has also switched over from Pigeon pea cultivation to cotton crop due to a drip irrigation facility.





## Assets Verification

Table A8.1 Assets verified

S. No.	Beneficiary	Village	Taluka	District	Asset	Status
1	Mangal Bhai kale	Nandar	Paithan	Sambhaji Nagar	Pond	Well maintained
2	Sudhakar J. Lobade	Nandar	Paithan	Sambhaji Nagar	Compartment Bunding	Well maintained
3	Kishan B. Bhoite	Dera	Paithan	Sambhaji Nagar	Drip irrigation	Being utilized
4	Bhagwan B. Bhoite kale	Dera	Paithan	Sambhaji Nagar	Pond	Well maintained
5	Sakhram R. Bhoite	Dera	Paithan	Sambhaji Nagar	Pond	Well maintained
6	Vidya Sriram Bhoite	Dera	Paithan	Sambhaji Nagar	Pond	Well maintained
7	Ahmed Shaikh	Boregaon	Paithan	Sambhaji Nagar	Sericulture	Under construction
8	Dharmveer Shetkari Sangthan	Pirangaywadi	Paithan	Sambhaji Nagar	CHC	BBF, Rotovator, tractor, power spray being used by members
9	Asif Khan	Pirangaywadi	Paithan	Sambhaji Nagar	Sprinkler	Used for Bengal gram
10	Abhimanyu Jadhav	Bhalegaon	Ambad	Jalna	Warehouse	Personal use
11	Mauli Shetkari Sangthan	Bhalegaon	Ambad	Jalna	CHC	BBF, Rotovator, tractor, power spray being used by mainly by President
12	Tanu & Arnav FPC	Ambad	Ambad	Jalna	Warehouse	Personal Use

## Photo Documentary



## A8.2 Agriculture Economist

During the VII round of monitoring and evaluation of PoCRA, certain villages located in Aurangabad and Jalna were visited by the Agriculture Economist. The purpose of the visit was (i) to understand the cost structure of major crops after the intervention of project activities at the farm level, (ii) to examine the performance of the activity of goat rearing (iii) to study the value chain related activities and to find out the suggestive measures that can help in making the functioning of the project more efficient.

To meet the framed objectives, the participatory approach such as group discussion, and interaction with the project implementing staff at the field level and senior management staff was taken to collect the required information.

### Cost structure of major crops

An attempt has been made to work out the economics of different crop production to understand the linkages between crop production and policy implication and its impact on the household economy at the farm level.

**Cultivation of traditional crops:** The present section deals with the economic aspect of the cultivation of major crops grown during the Kharif season crops. These crops include soybean, Tuar, cotton, Jowar and maize. It is noted from the fact that cost structure varied across the different crops. The farmers were growing these crops keeping in view the requirement of food and fodder for both humans and animals. It can be noted from the fact that the cost structure in the case of Soybean, Tuar, cotton, Jowar and maize varies between about Rs. 39 thousand to about Rs. 65 thousand (Table 1) per hectare. Almost, a similar pattern can be noticed in the case of the cost incurred per quintal of farm produce. While the calculating cost of quantity produces 50 percent of the total cost has been added keeping in view the price policy of farm produce declared by the government of India. A pattern also is noted with a larger amount of value of the concerned product.

Similarly, an attempt has been made to understand how the price policy in terms of Minimum Support Price (MSP) is functioning in the prevailing market conditions and affecting the farmers' economy. It can be noted from the fact that there are only two crops like Tuar and cotton where farmers are getting positive returns with marginal differences. Further, it is found that there is a substantial difference between the price attained for the concerned farm product and the MSP of the same. There are two crops like Tuar and Cotton, where the farmers are getting prices higher than the MSP. Otherwise, in most cases, the farmers get a lower price than the prevailing MSP.

It can be inferred from the fact that there are substantial differences among the average cost per quintal of the farm, MSP and price attained by the farmers. Hence, farmers are in a worse off position in getting remunerative prices for farm products that they produced. To make the scenario farmer friendly, there is a need for certain institutional reforms at different levels. There is also a need to bring down the cost of cultivation on the one hand and make the marketing system more efficient in favour of resource-poor farmers.

*Table A8.2 Estimated Per Hectare Cost of Cultivation of Major Kharif Crops (INR)*

Particulars	Different Crops				
	Soybean	Tur	Cotton	Jowar	Maize
<b>Labour Cost</b>					
Family	5650	5250	8750	6250	4550
Hired	1375	2250	3138	8000	1550
Total	7025	7500	11888	14250	6100
Animal	1500	1500	1625	750	1260
Machinery	3750	6000	4625	3750	2500
<b>Material Cost</b>					
Seed	5975	1750	4188	2500	2000
Fertilizer	3375	3500	10000	3750	3560
FYM	3750	7500	2000	5000	2500
Insecticide & Pesticide	8750	3750	9938	625	2000
Irrigation	1500	375	625	1125	550
Post harvesting Cost	3005	2027	7725	1238	2230
cost of Production	38630	26402	52613	32988	22700

Land Rent	8625	16250	12553	13750	16600
Total Cost of Production	47255	42652	65165	46738	39300
Yield Per Hectare/ Qtls.	12	11.25	15	15	25
C2 (Cost/ Per Qtl.)	4109	3791	4494	3116	1572
C2 plus 50 percent	6162	6038	4494	4674	2358
Minimum Support Price (MSP)	3950	6300	5726	2738	1870
Price attained	4200	6000	7000	2000	1400
Margin to farmer with respect to MSP	-2212	262	1232	-1936	-488
Margin to farmer with respect to actual price attained by the farmers.	250	-300	1274	-738	-470

Note: information gathered during FGDs interactions with knowledgeable villagers

## Economy of goat rearing

Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the choicest meats and has huge domestic demand. Due to its good economic prospects, goat rearing under intensive and semi-intensive systems for commercial production has been gaining momentum for the past couple of years<sup>6</sup>. Goats are among the main meat-producing animals in India that is one of the most preferred meats and have potential domestic demand. Due to its good economic prospects, goat rearing under the intensive and semi-intensive system for commercial production has been gaining momentum for the past couple of years. In the Indian continent, goat keepers are the best in the world because of the adaptation of low-cost technology in goat rearing and following traditional goat breeding techniques and disease management practices through their traditional knowledge that is inherited from knowledgeable Ancestors and Elders<sup>7</sup>.

With this view, this activity was included in PoCRA, especially for resource-poor farmers in the project area. Therefore, an attempt has been made to understand the intervention and its impact on the economy of the households and explore the possibilities of future development of this enterprise through institutional reforms and initiatives.

In this context, two case studies have been done to understand the related issues.

### Case Study I



A beneficiary of goat rearing intervention under PoCRA named Mr. Suresh from Indegaon is associated with the scheme since the launching of the project for three years. He purchased 10 goats with a value of Rs. 40 thousand out of which Rs. 23.5 thousand (approx. 59% of the total value) was received through a grant. For constructing a shed for goats, he purchased a small piece of land for Rs. 90 thousand. A small shed was constructed for Rs. 7 thousand. Also, he reported that there were three family members in the workforce. Hence, they were able to save Rs. 90 thousand through wage earning for a couple of years.

At present, there are 23 additions to the present number of goats, out of which 5 were sold at Rs. 2000 each, meaning he earned Rs. 10000 during the reference period. He explained that one person remains engaged in grazing practices and tending goats during the whole day. Hence, it generated substantial employment to the available labour force within the household which is estimated at 340 man-days annually. The goat keeper was of the view that this enterprise was only viable as there is grazing land that the village is endowed, with grazing facilities. During summer, private land was also available for grazing which makes this enterprise more viable for resource-poor households in the rural setting.

<sup>6</sup> Kanta Ahuja and M.S Rathore (1987) Goat and Goat Keepers, Institute of Development studies.

<sup>7</sup> <https://www.pashudhanpraharee.com/> <https://icar.org.in>

Number of Goats	11 including 10 Females and 1 male
Change in Number of goats after three year	23 newborns out of which 5 sold 1 died
Available Animal Stock	28 including elder and newborn
Employment Generated	340 man-days annually
Rearing Cost (Rs.)	Concentrated in terms of grains and other= Rs. 4500/- Medicines= Rs. 5000/ Total Cost= Rs. 9500/-
Income received by the Goat Keeper Rs.	Sale live animals= Rs. 10,000/- Sale of dung= Rs. 6000/- Total Annual Income= Rs. 16000/-
Benefit-Cost Ratio	1:68

**Lessons learnt from the case studies:** The following lessons were learnt for future action for the effective implementation of the project with a view to the upliftment of resource-poor households in the project areas.

PoCRA intervention in terms of goatry can be one of the best interventions for providing livelihood opportunities to resource-poor households in general and landless ones in particular. This case study shows that it held importance in improving living conditions in terms of income and employment opportunities.

Goat rearing is a fast-growing and economically viable enterprise. There is multiple expansion in the goat population. It has easy and immediate access to the market. This case study reflects that for the household which owns resources, it certainly helps in sustaining the goat enterprise in the long run.

Being of grazing nature, goats have a low and negligible cost of rearing as it depends on village commons and grazing lands. Hence, it is important to give due attention to the improvement of feeding resources such as grazing/village common lands.

With a view of the technological improvement of this enterprise, the role of goat breeding centres at the village/ panchayat level can be crucial. Therefore, such centres should be promoted with certain reforms such as local goat keepers should be linked with such centres. Hence, there is a need for generating awareness among the goat keepers regarding such institutional linkages.



## Value Chain Activity (VCA)

The concept of value chain encompasses the issues of organization and coordination; the strategies and the power relationship (including gender concerns) of the different actors in the chain<sup>8</sup>. In the context of food production, these activities include farm production, trade and support to get food commodities to the end consumer (e.g. transport, processing). The VCA extends traditional supply chain analysis by identifying values at each stage of the chain. It is called a value chain because, at each stage of the supply chain, value is added to the product or service as it is being transformed. Under PoCRA, the concept of a value chain has been introduced through institutional formulation in terms of FPOs in the project areas. Some of the FPOs were visited in the Jalna district. These FPOs include Vitthala Farmer Producer Co. and Bhojne Agritech Farmer Producer Co. Ltd and Ltd, Goat Breeding Center. These companies were visited to observe the socio-economic implications, investment and returns in the framework of agribusiness, sustainability and climate resiliency of the project intervention. The field observations have been put into the conceptual framework of value chain analysis.

**Salient Features of Selected FPOs:** In the present sub-section deals with salient features of the selected organisations that can be helpful to certain conclusions.

### 1. Vitthala Farmer Producer Company

Five members of the board include four males and one female. These board members belonged to two families. There are regular meetings of the Directors to discuss the functioning of the company. This organization came into existence in 2020 and was registered as a company in 2021. There are 335 members of the company. There is a share of Rs. 1000/- for each member of the organisation. The share of the Director is Rs. 5000/- each. Total shares of the company are of the value of Rs. 50 thousand (priced at Rs. 10/- each share).

#### a) Construction of godown

The company was involved in selling the produce after the aggregation of produce before the support from PoCRA. The company has received support for the construction of Godown which functions according to the season. The company deals with the two main produce mainly, Soybean and Cotton. The company aims for cleaning and grading of the produce. But at present, no such activity is found as the purchase of machinery for cleaning and grading is awaited. It was also reported that only purchase and sale of two items followed by aggregation and selling was done by the FPC. The installation of infrastructure including building and machinery is on leased land. The leased amount is Rs. 5000. The total cost of the project is Rs. 78,38,760 which included the construction of the godown as well as the purchase of the vehicle for transportation, and the total grant received from the PoCRA was Rs. 41,50,575. A total of 59% of the grant was provided by the PoCRA for starting this Agribusiness activity. The company has taken a loan of Rs. 30 lakhs from the State Bank of India.

#### b) Transport vehicle

The company has also purchased the vehicle for the transportation of produce to the godown from farmers and transport it to the processing plant. Presently, the company is dealing with only two farm produce i.e. soybean and cotton. The representative of the company reported that the business was initiated with 150 qtls. of cotton and 125 qtls of soybean. The cotton was purchased at Rs. 6000/- and sold at Rs. 6300/- per quintal while the purchase price of soybean was at Rs. 6000/- and sold at the rate of Rs. 6400/-. The average packing and transportation cost was ranging from Rs. 120- Rs. 150/- per qtl. The packing and transportation costs include the loading and unloading of produce, filling the grains in gunny sacks, diesel and driver payment etc. The transportation is done till the oil extraction plant for Soybean and for cotton, the produce is supplied to the ginning mill. The company also stores the produce of the farmer in the godown at 8 Rs/qtl as rent.

### 2. Bhojne Agritech Farmer Producer Company

This FPO has multiple businesses of Custom Hiring Center, Onion Storage Structure, Godown, Dal Mill as well as a cleaning and grading centre for grains. All of the above activities were started through the grant received from the PoCRA. The total cost of all the above activities was Rs. 99,10,039 and the grant received

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<sup>8</sup> World Food Program & VAM: Food Security Analysis How to Conduct a Food Commodity Value Chain Analysis? September 2010.

from the poCRA was 60 % of the total cost. A total of Rs. 59,17,384 was received from the PoCRA. This organisation was established in 2020 with 10 members on the Board of Directors and nearly 500 member farmers. It has a CEO with a Post-Graduation background. The share capital was Rs. 2000 per member, while the Director's share was 2 lakhs. Hence, the total capital is around Rs. 28 lakhs.

#### **a) Pulses processing unit**

The company did the business of 300 qtls of pulses (Tuar). The company purchased Tuar at the rate of Rs. 6000 per qtl and sold it Rs. 7000 hundred per qtl. It is estimated that about Rs. 300 to 400 was spent on processing. The pulse was sold at varying prices with margins ranging from Rs. 50-60 to Rs. 100 according to the processing quality. Presently, there is Rs. 5 lakhs as authorised capital and share capital is 1 lakh and it is targeted at 27 lakhs in the time ahead. In processing activity company invested 15 lakhs and out of it 60 percent is as a grant from the project.

#### **b) Farm implements activity**

The entrepreneur has also made an investment of more than 30 lakhs on the purchase of tractor and tractor-driven implements. The organisation has framed certain provisions for the use of available implements for agricultural operations. Only first come first serve provision is there for access to farm implements. For the measurement of land, a geo-tagging system is used by the operators. Hence, a transparency system is followed that can be useful for maintaining the trust of members of the company as well as outsiders. Some of the staff was trained in the operation of sophisticated machines that were supposed to be used in value chain operations.

#### **c) Construction of godown**

The company has invested Rs. 20 lakhs with a grant facility of 60 percent of the total investment. This facility is accessible to all members at rational tariff rates. During the peak period of crop harvesting, the price of the onion remains at Rs. 5 per/kg. After the construction of the godown, the farmers get the remunerative price i.e. ranging from Rs. 12 to 15. The company and its structure have been constructed on leased-in land i.e. 22 years of the lease. The company pays Rs. 25 thousand annually. There are strong linkages between producer companies and markets available for different products processed, which are pre-conditions of agribusiness. It makes the situation more optimistic for the success of development in the agriculture sector.

### **3. Sumanaai Farmer Producer Company**

#### **a) Goat breeding centre**

Sumannai Farmer Producing Company was established in 2021 with a composition of ten members including the CEO and Directors. The purpose of this company was to develop goat breeding. As per the provision of the said company, it has a sound financial position due to financial contribution by the directors say about one lakh each. The total investment was about 15 Lakh with a grant amount of Rs. 7.15 lakh. This investment includes the value of animals and the construction of the shed. It is reported by a company representative that the company invested Rs. 5 lakhs for the animals. The value of the animal was as per the weight criterion.







The total cost of goat rearing is about Rs. 2.37 lakh during the year including expenses on grains and so on, medicines and the salary of the individuals deployed for the grazing and other rearing practices. As per the discussion with the representative of the company, during a year company earns an amount of Rs. 57,000 including income from the sale of goats and its dung as Farm Yard Manure (FYM). The value of the available stock is estimated at Rs. 7 lakhs. The company representative reported that animal health services are efficient and that veterinary workers remain available as required from time to time. Local markets are enough to absorb the food processing items. The company has plans to scale up the production.

### Concluding remarks

With certain exceptions, there is an institutional weakness in extending the benefits of project interventions in terms of the remunerative prices of farm products. There exist wide variations in the cost of cultivation of farm produce, MSP and price that is received by the farmers.

- It can be concluded from the fact that livestock intervention especially goat rearing for resource-poor households has been proven as one of the viable enterprises. Interest and trust of the beneficiaries on the one hand and the support of the public agencies on the other will help in improving the living conditions of the households.
- It emerged during the discussion with the company representative that there is the absence of an effective business plan that may result in a missing future perspective. It is found that the functioning of the company is only limited to preparing DPR and an effective business plan for the future is missing<sup>9</sup>. Therefore, it is essential to ascertain an institutional framework that can be useful in a sustainable manner.
- Experience reveals that the guidelines<sup>10</sup> regarding the formulation FPOs were followed. The participation of members was also found active. Most of the FPCs came into existence in recent years which caused the ineffective implementation of policy guidelines. It needs some time to be implemented properly.
- It emerged during the discussion with the representatives of certain companies that the sustainability of these agribusiness companies is commodity-based that is dictated by uncertain externalities. Hence, climatic variability/ change is a major threat.
- Similarly, inadequate infrastructure like road connectivity and institutional arrangement like agricultural marketing facilities as well as agricultural extension services are also the major challenges to the efficient functioning of FPCs.
- Participation of gender has been found inadequate. Therefore, it is essential to give due representation to gender. It is also noted that in exceptional cases the formulation of companies is family-centred and needs to be avoided<sup>11</sup>.
- It is also realized during interaction with the representatives that there are new and sophisticated machines to be used in value chain activities. The persons associated with the companies have limited training opportunities. This is one of the major problems that companies were facing. The issues relating to an effective business plan are also missing. The executives of the companies realized that they were facing such problems due to a lack of trained human resources with acceptable remuneration.

<sup>9</sup> It is emerged during the interaction with representative of Bojne Bhojne Agritech Farmer Producer Co. Ltd

<sup>10</sup> GoI (2013) Policy and Process Guidelines for Farmers Producer Companies, Department of agriculture and Cooperation, Ministry of Agriculture, New Delhi.

<sup>11</sup> Noted during the discussion with the representative of Vitthala Farmer Producer Co. Ltd

- Experience also highlights the exit healthy linkages among the producer groups and end users of the farm products. It is observed that companies have a healthy position in terms of financial availability. It is because of public support in terms of subsidies in a substantial proportion. Hence, there exists a threat to the sustainability aspect. Otherwise, there is a threat of damage to the whole project intervention.

### **Suggestions:**

- There is a need to develop and strengthen the institutional arrangement for an efficient marketing system that can help in remunerative prices of farm produce on the one hand and efforts should be made to minimise the cost of production. Experiences of the project intervention show that the technologies introduced and followed by the farmers have played an important role in minimizing the cost structure of crop production<sup>12</sup>.
- Sincere and effective measures should be followed in implementing and reconsidering this activity for resource-poor persons. Because of the nature and importance of the activity, it should be restarted with effective monitoring. This enterprise has no and low cost because it depends on common land for feed and fodder. Therefore, it is essential to give due attention to the development of the commons.
- There is a need to make effective provisions of capacity building in terms of training to the technical as well as management staff deployed in the companies that may be useful for the efficient functioning of the companies in both technical and management terms.
- To deal with the sustainability aspect, it is high time to focus on this issue. There is a need to constitute institutional set-up at various stages such as individual, community and management that can help make the system efficient and sustainable socially, economically and ecologically.

### **A8.3 Environment Expert**

A field visit was undertaken in different villages of Jalna and Aurangabad from 5<sup>th</sup> to 7<sup>th</sup> September 2022. During the visit, interaction and interviews were conducted with FPCs and farmers.

#### **Key observations**

1. Region-specific training in shade net management is required as the climatic conditions are different from one place to another.
2. Future climatic conditions of the area need to be taken into account before the establishment of a shade net, otherwise, there are chances of crop loss.
3. Farmers need to be trained on shade net-specific crop varieties.
4. Block-level shade net farmer groups need to be developed, to keep the diversity in the shade net crop as this is affecting the market price of the product.
5. There is an environmental concern related to the disposal of plastic mulch from the shade net.
6. There is not much environmental concern related to the FPCs presently as most of them are using grid electricity as the source of power and the average electricity consumption is 1000 units per month for the dal mills.
7. Most of the owners of the FPCs are large landholders. Small landholder farmers are keen to develop FPC, but they are not able to arrange the initial investment.

Energy use and environmental safeguards followed by different FPCs established under PoCRA and by the beneficiary farmers in the project villages were evaluated during the field visit in September 2022. Selected FPCs located in Ambad block of Jalna district and Khuldabad block of Aurangabad district were visited during the period. Beneficiary farmers at Bori village in Ambad block and Tajnapur and Dhamangaon villages of Aurangabad district were interviewed to understand the environmental safeguard practices followed by the farmers.

Six farmers who have established shade net under the PoCRA project were interviewed during the visit. In the Jalna district, farmers are doing better economically with the shade net compared to those in the Aurangabad district. In both districts, farmers have mostly taken capsicum as the main crop to grow under the shade net. All six shade nets visited during the period are spread on one acre of land. Farmers use about 15,000 litres of water at four-day intervals to irrigate the soil. In Ambad block, farmers harvest about 20 tons of capsicum in a season. However, farmers in the Aurangabad district harvest 15 to 17 tons in a season, mainly because of crop damage due to heavy rainfall. In both cases, farmers applied pesticides at every three-day interval. The farmers in Tajnapur village face pest attacks in the shade net due to the faulty structure of the entry area of

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<sup>12</sup> See Previous Monitoring and evaluation report of PoCRA that shows that the technologies like BBF and inter-cropping system and irrigation practices have played an important role in minimizing the cost of cultivation.

the shade net. The entry cabin was not properly developed by the contractor of the shade net and thus pests get easy access to the shade net. The shade nets at Tajnapur and Dhamangaon villages do not have temperature sensors and farmers generally apply the fogger based on their perception. The crop in the area also gets damaged due to high temperature, apart from rainfall. All farmers in these villages reported that the contractor did not install the temperature sensor in the shade net, although it was budgeted. In Tajnapur village, all farmers have crop failure in the shade net, mainly because of a lack of training to adopt the crop under the conditions of the village. Some farmers have tried tomato and brinjal in the shade net as the second crop after capsicum, their plant growth was exceptionally high, but the yield was low. Thus, they spent a lot of money on labour charges.

Farmers at Tajnapur village highlighted that they are getting a lesser grant for crop establishment in the shade net compared to the neighbouring block. It seems that the SDM office of the block in which Tajnapur is located is asking for a GST bill for the saplings used in the shade net, while the SDM office in the neighbouring block is not asking for it. Generally, the farmers do not get the GST bill for saplings and as a result, the farmers in Tajnapur village are getting lesser subsidy than their counterparts in the neighbouring village.

The market value of the product is another problem the farmers are facing in both districts. The market value of capsicum varies between INR 5 and 50 per kg and several times farmers are forced to sell the product at a lower price due to the high availability of the product in the area. Every farmer with shade net is growing capsicum in the same period, thus generally leading to overflowing of the market during the harvest period. This also leads to the problem of not getting profit out of the shade net.

During the discussion, farmers suggested having localized training in shade net operation. Some farmers feel that the training they have received on shade net operation from Pune FPS is not fully applicable to the climate of their block (particularly in Tajnapur and Dhamangaon). They need specific training on crop variety suitability in the shade net and dealing with excess rainfall under the shade net. They also want training on diverse crops under the shade net. It emerged that there is a need for block-wise shade net farmer groups, to stop the overflowing of the market during one time so that they can regulate the market price of the produce.

It was noted that the farmers do not know much about managing mulch after the season. Used mulch is dumped everywhere around the shade net and one of the farmers mentioned that mulch is disposed to nearby rivers. Farmers also do not know how to dispose the nets after use. The crop residues from the shade net are generally used for household cooking, some are also used as fodder and manure preparation. Few farmers stated that they just burn the crop residues and mulch. The drip irrigation pipes are generally recycled. It was noticed that all farmers in Dhamangaon village use drip irrigation. Almost 80% of the beneficiary farmers in Dhamangaon have taken drip irrigation under the PoCRA scheme.



Unfinished structure of shade net  
at Tajnapur village



Dumping of shade net mulch  
on the farm road

### **Jai Bhadra Shetkari Producers Company at Bori village**

This company processes tur and chana from nearby villages. There are 15 members in the company. They can process 85 Q of Dal per year at 4-5 Q per day. Before establishing the FPC, the farmers used to sell the raw tur and chana in the market at the price of INR 5000 to 7000 per quintal; however, after processing, now they can sell the product at the price of INR 12,000 per quintal. The processing of each quintal of dal required 7 to 8 units of electricity at a maximum rate of INR 13 per unit. Accordingly, for the calculation of the FPC, INR



5 is the cost for the processing of one kg of raw dal (Tuar or Chana). There is a 40% profit margin after meeting the expenditure related to the processing of the dal. The waste material after processing the dal is mainly sold as fodder and also used as fuel in boilers. The CEO of the farm producer company owns 80 acres of land and has taken other benefits like shade nets and drip systems from the PoCRA project. Presently, they are using processed dal for their consumption. However, the FPC has a plan to install a grading and sorting machine in future and launch their brand of dal in the market.

Aamhi Baliraja Farm Producer Company at Math Jalgaon and Munjal Brothers FPC at Mardi village of Ambadi block produces mustard oil and have received 65% of the project establishment cost from PoCRA as per the scheme. They have established a storeroom, two pressing machines and one mustard cleaning machine in each of the farm producer companies. Around 10 kg of mustard produces approximately 2 to 2.5 litres of oil. About INR 25/- is required towards the cost of electricity to run the press machine for producing 4 litres of oil. The mustard oil is sold at INR 350 per litre in Ambad and Aurangabad markets.

### **Aamhi Baliraja Farm Producer Company, at Math Jalgaon**

The spent biomass after extracting the oil is sold at INR 25/Kg and mainly used as fodder. The crop residue generated during the processing of mustard is sold at INR 3/Kg, these are used in the boilers. About 25 L of oil is produced from one quintal of mustard, which the companies generally purchase at INR 6000/quintal from farmers in different areas of Aurangabad and Jalna districts.



The Jain Bandhu FPC at Ambad was established in February 2022 under PoCRA. The farmer who has established the FPC owns around 75 acres of land. He grows cotton, dal, soybean, bamboo and different fruit crops. This FPC is established in a location outside the PoCRA project area. The company is processing all types of dal (Tur, Chana, Mug, Urad). At present, they are only processing the dal and giving it back to the farmers. They are not selling processed dal. About 70% dal and 30% residues are generated during the processing of dal. They are charging INR 700 to process each quintal of dal. However, if the farmer is willing to take the residues also, then the charge is INR 1000 per quintal. The company is selling the residues generated during the processing at INR 20 per quintal. During the last season, after establishment, they processed 300 quintals of dal in two months period. The farmer himself operates the FPC, there are two workers (part-time, seasonal) for loading-unloading and drying the dal. Around 700 ml of soy oil and about 2 litres of water are used during the processing of dal. The electricity of INR 100 is generally consumed to process each quintal of dal. The FPC is providing dal processing service to all villages in a 30 km radius, as there is no other dal processing unit nearby. The FPC is expecting decent profit during the upcoming dal harvesting season starting in October. At present, the major profit of the FPC is generated from the selling of the residues generated during the processing of dal. The FPC is planning to install a dal drying unit, which will be operated with coal or biomass. In addition, the FPC is planning to install a sorting and packaging machine to market complete processed products.

## Bhojne Agritech Producer Company Ltd., Shiradhon

The Bhojne Agritech FPC at Shiradhon village of Ambad is also a dal-producing company, but their processing unit has not yet been installed. However, they are expecting to start processing from the upcoming harvest season. The owner of the FPC is an entrepreneur, he has nearly 90 acres of land and around 500 farmers are attached to him. The FPC is planning to process all types of dal at a processing cost of INR 200 per quintal. However, the FPC is purchasing raw dal from the farmers (Tur INR 6000 to 7000 per quintal) and then they are selling the completely processed dal to the market under the Bhojne brand name. Presently, they are planning to sell the product in the local market, but gradually they will expand the business to Aurangabad. The processing of each quintal of Tur dal generates 72 Kg of Dal (market price INR 100 per Kg), 20 Kg of Tukda (market price INR 60 per Kg) and 8 Kg of Bhusa (Market price INR 25 per Kg). In

addition to the dal processing unit, the Bhojne Agritech Producer Company Ltd. has one oil production unit and one machinery bank funded under the PoCRA project. Presently, they are processing mustard oil in the oil production unit. However, they are planning to include other oil seeds like cotton and soyabean in the future. It is expected to produce 10 Kg of oil after processing one quintal of cotton seed which costs between INR 2000 to 5000 per quintal.

## Swaroop Shetkari Producer Company Limited

Swaroop Shetkari Producer Company Limited at Sultanpur and Shribhadra Agro Producer Company Limited at Devlana Khu villages in Aurangabad district were also visited. Both companies are owned by the same farmer. The family of the owner of the company has 60 acres of farming land. The Swaroop Shetkari Producer Company Limited is a dal processing unit. However, they are not fully processing the dal. They are removing the dal from the pod and selling it to NAFED after packaging. The transport cost from the processing unit to NAFED is borne by the NAFED. They are purchasing the dal with pods from the farmer at the same rate as NAFED (generally, INR 6200 per quintal for tur and INR 5230 per quintal for chana). The processing charge for shareholders is INR 60 per quintal and that for non-shareholder is INR 100 per quintal. The company has an agro-machinery bank in the area. The machinery bank consists of Rotavator, tractor, trolley, BBF, and plough. It was established in 2021-22 FY. There are different rents for different types of machinery for the members of the bank – i) Rotavator INR 1000 per acre; ii) Cultivator INR 750 per acre; BBF INR 1500 per acre. All rental cost includes the cost of diesel and the wage of the operator. The rental cost increases by INR 500/- for non-members. The demand for agro-machinery is high, and the company is not able to meet the demand in time due to a lack of machinery.



Farm Machinery bank of Swaroop Shetkari Producer Company Limited

## A8.4 Agri Business Expert

PoCRA supports about 21 types of agribusiness projects. 9 FPCs were visited during 9<sup>th</sup> -10<sup>th</sup> September 2022 in Aurandabad and Jalna districts.

The objective of the visit was to provide feedback on the below-mentioned parameters:

1. **Socio-economic impact** of an agribusiness project on members of FPC
2. **Investment in and return** from an agribusiness project undertaken by FPC
3. **Sustainability** of agribusiness undertaken by FPC
4. **Resilience** in agricultural system achieved agribusiness project undertaken by FPC

Visited a total of 9 FPCs belonging to four categories of their business.

**Category 1:** Establishment of custom hiring centres

- **RMJ Hitech Agro Farmers Producer Co. Ltd.**
- **MGBP Farmer Producer Co. Ltd**

**Category 2:** Construction of Godown/small warehouse

- **Padali Farmer Producer Co. Ltd**
- **Sambhaji Farmer Producer Co.Ltd**
- **Mogal Patil Shetkari Utpadak Co. Ltd**
- **Hood Patil Farmer Producer Co. Ltd**
- **Vitthala Farmer Producer Co. Ltd**

**Category 3:** Goat breeding centre

- **Sumanaai Farmer Producer Co. Ltd**

**Category 4:** Multiple businesses in the value chain

- **Bhojne Agritech Farmer Producer Co. Ltd**

**Observations:**

- Directors and members of all the FPCs are highly motivated as they have invested the seed money in the company.
- The trust between Directors and members is strong mainly because lot of business transparency is reflected in the minutes of the meetings.
- Directors have very clear short and long-term visions but clarity at the member level is a little low.
- The business plan is very basic and doesn't include a risk and mitigation strategy. Different business scenarios are also missing from the business plan.
- Availability of credit is the biggest pain point of the FPCs. Directors lack the capacity of building a bankable business proposal.
- FPCs see climate change as the biggest challenge of the future. Members are encouraged to adopt climate-resilient practices and technologies.
- With increased income farmers are in a position to take an informed decision on the adoption of improved agriculture practices.
- Farmers are taking responsible decisions for environmental protection and care of natural resources, especially soil and water. Eg. Farmers are willingly deciding to reduce chemical load and turning towards sustainable/organic farming.
- The overall quality of member's life has improved - with the improved income (mainly because of the reduction in the cost of cultivation and net realization of output marketing) they are able to invest more in the health, education and nutrition of the family.
- Although there is a representation of women on the board and members they did not have equitable representation. To make FPCs a more inclusive representation of women, differently able persons, single women and widows should be encouraged.
- Women's membership should be given priority and the environment of the FPC should be developed so that more and more women become part of the company.
- As per account statements, FPCs have started making profits.

**Observation specific to category 1 FPCs:**

- Machines are not enough in number to cater for the requirements of all the members.
- FPCs provide equipment/machines on a first come first basis and do not have a system of booking for the entire season.



- The machine operators use the geotagging system to measure the area they service. This enables a lot of transparency and builds trust among members.
- For maintenance of the machines, FPC is dependent on outside vendors.

#### **Suggestion:**

- Training on the repair and maintenance of machines shall be given to the members so that they may save money which is going to other vendors for repair and maintenance.
- Machines are operational only seasonally. FPC should develop other business streams to keep staff and members engaged throughout the year. A visioning exercise of board members is recommended here. This will help directors to visualize their future and motivate them to take action to achieve goals.

#### **Observation specific to category 2 FPCs:**

- With limited capacity, warehouses are not able to cater storage requirements of all the members of the FPC.
- Warehouse operators lack the technical/operational capacity of warehouse management.
- The pest control system is not in place.
- Vitthala Farmer Producer Co. Ltd has recently constructed a big warehouse with additional support from the bank loan and has a processing unit. There he will be able to store large quantities.

#### **Suggestion:**

- Farmers use the warehouse for taking advantage of future markets which is dependent on several factors beyond their control. Warehouse business with processing makes a good business proposition.
- Board members and office bearers should be trained to make bankable business proposals and add a business to their FPCs.
- Warehouse operators should be trained in Good Warehouse Management Practices (GWMP). The training can be given out by using small instructional contextualized videos and a few virtual sessions.

#### **Observation specific to category 3 FPCs:**

- This category of FPC is doing very well as they have ready-to-sell stock almost all the time.
- FPC is dependent on a Veterinary doctor on call.
- The high mortality rate of goats is also a problem.
- Market linkage is not well established, still selling to local vendors which is not very remunerative.

#### **Suggestion:**

- The designated operator should be trained as a para-vet service provider so that he/she may cater for the veterinary service requirements of the FPCs.

#### **Observation specific to category 4 FPCs:**

- Bhojne Agritech Farmer Producer Co. Ltd has established four business streams and work is in progress for the fifth stream.
- Bhojne Agritech Farmer Producer Co. Ltd has a Custom hiring centre, godown/small warehouse, grading and sorting facility and Dal processing mill. They are building onion storage facility as well.
- Having diversified services the FPC can cater service requirements of most of the members.

#### **Suggestion:**

- Setting up business in a value chain approach is the way to go for the FPCs. An FPC leadership program and organization development should be run to develop the leadership of the PoCRA-supported FPCs.

#### **Overall key observations and Recommendations:**

- **Lack of capacity of Board members:** The board and Director/CEO lack the capacity for business development. Directors are not very clear on their five-year plans.

**Suggestion:** This suggestion was given in the first-year report as well. The suggestion is still valid and hence being given again.

- The SIYB (Start and Improve Your Business) training for Board and top management team is recommended.
  - The SIYB programme (conceptualized and implemented by ILO) is structured into four separate training packages, which are designed to respond to the progressive stages of business development.
  - Generate Your Business Idea (GYB) is intended for people who would like to start a business, and who, through training, develop a concrete business idea ready for implementation. Start Your Business (SYB) is for potential entrepreneurs who want to start a small business and already have a concrete business idea. The programme is a combination of training, fieldwork and after-training support, and helps participants assess their readiness to start a business and prepare a business plan and evaluate its viability.
  - Improve Your Business (IYB) introduces already practising entrepreneurs to good principles of business management. Its six modules (marketing, costing, buying and stock control, record keeping, planning for your business, and people and productivity) can be taught individually or all combined in a full course.
  - Expand Your Business (EYB) enables growth-oriented small enterprises to develop a business growth strategy through training interventions.
  - The SYB and IYB packages also include the SIYB Business Game, a practical simulation tool to help participants understand the realities of starting and running a business. The EYB Business Game simulates an expanding business during training to help participants experience the impact of strategic decisions on their business operations.
- **Business plan:** The interviewed FPC lack the capacity on making a detailed business plan which is very much required for business planning and growth of the company over the years. Directors do not have or have limited capacity to develop a business plan. The understanding of break even and the timeline for its achievement is not very clear.

**Suggestion** – A visioning exercise with the board and selected members should be organised so that core members are very clear on their vision and mission of the FPC. PoCRA should help FPC management develop a business plan. This can be done by taking services from expert organisations that do business planning for small businesses and FPCs.

- **Market linkages** – The interviewed FPCs rated Market linkage as one of the major challenges. Wholesale and retail both markets offer a challenge. In the wholesale market, FPCs are not able to compete with their competitors on pricing whereas in the retail market brand image offers a challenge. The market strategy is mainly focused on demand-driven. Demand creation for their core product is not being done.

**Suggestion** – FPCs dealing with the same produce should aggregate their product and market as one brand. This will allow them to compete with competitors in a better way. FPCs should align themselves to create synergy and should not act as a competitor for each other.

- **Legal Compliance** – FPCs reported that they are dependent on the legal consultant for filing taxes and meeting compliance which is a costly affair for them. If FPC misses the deadline of the compliance that has penalty/ late fee implications.

**Suggestion** - Board members or key members of the FPCs should be trained on tax compliances so they may file taxes themselves and their dependency on legal advisors is comparatively less.

- **Working capital** - FPCs lack working capital. FPC directors cannot make bankable proposals and hence keep on struggling with the problem of low cash flow.

**Suggestion** - The capacity of FPC management should be built in a way that they make a bankable proposal and get loans from the bank or other financial institution.

All the above FPCs were also graded during the field visit using the grading tool developed by NABARD. The parameters used for grading included Governance, Management, Membership, percent of members availing services, training of Board members and turnover are important for the sustainable development of FPCs. Except for Bhojne Agritech FPC which got a score of 61%, the rest of all FPC scored less than 50% indicating the need for detailed assessment for further capacity building. Bhojne FPC can be explored for a credit linkage facility after a little more capacity building.

## A8.5 Agri-Engineering Expert

### VISIT 1

**Date of visit:** 8 Sep 2022

**Visit to:** Manjari Village, Tehsil: Gangapur, District: Aurangabad

**Meeting with:** Cluster Asst. & Farmers Community

**Work Done:** NRM – Compartment bunding completed in some locations in the project area

**Interaction with Cluster Assistant and farmer:** Compartment bunding is in progress and farmers reported its benefit in terms of better surface drainage of their fields to avoid water logging, along with safe disposal of water from their fields for optimum growth of crops. The compartment bunding infrastructure has resulted in optimum cultivation of crops compared to the previous situation.

**Agroforestry:** Agroforestry comprising fruit crops like *annar* (pomegranate) and field crops like soybean are successfully grown in the area using a drip irrigation system.

### VISIT 2

**Date of visit:** 9 Sep 2022

**Visit to:** Indeo Gaon, Tehsil: Paithan, District: Aurangabad

**Meeting with:** Cluster Asst. & Farmers Community

**Work Done:** NRM – Compartment bunding constraints

In the last 2 years, compartment bunding has been done only covering approximately 25 acres of land in one place, serving about 20 farmers' fields. Further, the farmer community in the area is not willing to adopt compartment bunding infrastructure due to black cotton soil. However, they reported compartment bunding can help the safe disposal of surface drainage water during the rainy season to avoid water logging of their fields. Irrigation is from the canal system from Nath Sagar dam through Express Canal. The area is heavily covered by black cotton soil. The farmers mainly grow sugarcane.

### Field observations of the research team during the visit to Latur and Osmanabad

Two days visit was arranged in the Latur and Osmanabad districts for the assessment of agri-engineering and hydrological aspects of the NRM structures in the Nilanga block of Latur district and Osmanabad block in Osmanabad district. The various structures in both blocks were visited for physical assessments, along with the measurement book verification was also carried out for the completed structures

Following are the summary and critical observations as noticed during the physical verification as well as verifying the records as mentioned in the measurement book.

**1. Payment of royalty mentioned in the measurement book for the CNB constructed in Shelagi village of Nilanga Block in Latur district**

Sl. No	Items	Qty	Rate	Unit	Amount
1	Sand	68.85	141.35	Cum	9731.66
2	metal	136.17	141.35	-u	19247.05
3	stone	6.00	141.35	-u	848.10
4	Soil	135.09	141.35	-u	19194.99
					<u>48921.80</u>

Sl. No	परिमाण	दर	एकक	राशि
5	0.254	4044605	MT	1027330
6	153.00	4663.95	Cum	713562.93
				<u>723936.23</u>
				+ Royalty 48921.80
				+ GST 12% 86860.32
				<u>7238.00</u>
				<u>866855.32</u>

3 अंश जाय

During the verification of the measurement book, it was observed that the royalty for soil was paid which was utilized during the ramming to avoid leakages in the structures. But the cost of soil was not mentioned in the measurements. It was observed that no work related to the black soil was done in the structures as per the measurement book. But as seen in point number 4 of the royalty charges it is seen that the royalty was paid without any work for the soil component. It was also observed that the sand was procured from the lead 100 km from the site which has increased the cost of construction of the Cement Nala Bund.

CNB MB mentioning payment of royalty

Village- Shelgi		CNB Nala Deepening & filling Black Soil				Gat No 1/1
Item	Quantity	Description	Rate	Unit	Amount	Remark
A1	73	Excavation	31.75	per cum	2317.75	
A2	125	Excavation	40.9	per cum	5112.50	
A3	121	Excavation	52.9	per cum	6400.90	
A4	0	Excavation	250.3	per cum	0.00	
A7	135.09	Filling of Black Soil	109.35	per cum	14772.09	
		GST @12%			28603.24	
		Insurance @ 1%			3432.39	
					286.03	
		Deduction			32321.66	
		GST @2%	2	%	572.06	
		TDS	0.15	%	572.06	429.00
		Labour Welfare Fund	1	%	286.03	
		Insurance	1	%	286.03	
		Security Deposit	4	%	1144.13	
		Total Deduction			2860.32	2431.00
		Net Payable			29461.34	29461.34

In Words Rupees Fifty-Six Thousand Eight-Hundred & Fifteen-Only

Measurement recorded by (Name With Designation) M B No 70854 Pages 6 11-12 Checked % by In

Dated Signature of the officer preparing bill *[Signature]*

Paid by Cash/Cheque Rs ( Passed for Payment for Rs. 32322.00 Rupees (In words Rs. Thirty-two Thousand Two Hundred and Twenty-two Only) )

Dated Signature of the officer Authorising payment *[Signature]*

Signature is necessary only when the officer preparing bill is not the officer authorising payment

Received Rs ( 32322.00 ) Rupees In full settlement of all demands on account of this work

witness vide cheque no paid by me By Cash Dated initials of the person making the payment

payee's Dated Signature Dated

*[Signature]* तालुका फी अफिकारी निलंगा

Royalty paid for the black soil as per the Royalty slip



**2. Payment done for the display boards in the measurement books without erecting them at the Recharge Shaft site**

Out of a total of 28 constructed recharge shafts, 8 sites were visited physically, as other sites were submerged in the drainage basin due to the rainy season. It was observed that the payment for the display board was done every 28 structures constructed of recharge shafts. During the physical verification and submerged sited visit also it was found that only one display board was erected in Ghuggi village. The visiting team came to know from the VCRMC members that only two display boards have been erected out of the total structures but the payment has been done for all 28 structures of the recharge shafts to the contractor. The cost of one display board is mentioned as Rs. 8078 in the estimate, thus the cost of 26 display boards sums to Rs. 210028 which has been paid in excess to the contractor.

[illegible]

### Item Number 23 for Display Boards

### 3. Maintenance of Recharge Shafts and Site Selection



*Damaged Cap and missing welded mesh of the recharge Hole in Ghuggi Village and siltation as well as debris of plants covering the structure*



Structure seems to be above the nala bed with debris accumulated around it





*Stone pitching for the Recharge Shaft with Excavation*

It was observed that the periodic maintenance of the structures must be done periodically to achieve the purpose of the structure i.e recharging the aquifers below the ground. The accumulation of debris from plants and waste obstructs the percolation of water in the casing of the shaft making the structure less efficient. The recharge shaft in Ghuggi in Praful Limbraj Jawale was much above the nala bed. It was also observed that the quality of stones used for the dry pitching was not satisfactory. In the estimates too, the size of the stone to be used was not mentioned. Generally, the dry pitching stone to be used for dry pitching is a minimum 9 cm in width.

#### 4. Photograph of charges paid to Contractor

क्र	सुपाने	परिमाण	दर	एकक	रक्कम
20	20	2.10	1801.00	बे.मि.	3782.10
21	21	4.00	5.80	म.मि.	2320.00
22	22	6.40	2825.00	बे.मि.	18080.00
23	23	1	808.00	म.मि.	808.00
24	24	1	504.00	काम	504.00
महामुद्रा					77993.00
वना निविदा रक्कम 13.90%					10841.00
सुसुखेव-1% - 672.00					672.00
T.O.S-2% - 1540.00					1540.00
C.A.T-2% - 1540.00					1540.00
का.क.स-1% - 672.00					672.00
कुल					10841.00

23	Item No. 23- Providing and fixing board displaying information, such as' Name of work, Tender cost, Name of Contractor, Work completion and liability period etc', having rectangular shape of 1.20 m x 0.90 m size made out 18 gauge (1.25mm) thick mild steel sheet painted with one coat of Zinc chromate stove primer and two coats of enamel paint on front side and grey stove enamel on back side and border/messages/symbols etc. with approved colour shade paint complete, on M.S. angle of size 35 x 35 x 3 mm frame with properly crossbraced M.S. angles of size 35 mm x 35 mm x 3 mm duly painted including Two M.S. angle iron posts of size 65 mm x 65 mm x 6mm, 3.65 m long painted with alternate black and white bands of 25cm width including all fixtures etc. and fixing the boards in 1:4:8 concrete block of size 60cm x 60cm x 75cm including, excavation, refilling, transportation, and labour etc complete. (Ref. P.W.D. Schedule rates 2019-20, Road Works Sr. No. 288, Page no.73).	28.00	8078	No.
24	Item No. 24 -Photography & Video shooting etc complete per Recharge Shaft (min 3 photo i.e initial stage, work in progress stage and completion stage) basic rate Rs. 150 (per photo & video shooting)*3 Photos=Rs. 504.00	28	504	Job
		Total - A		

*Item No. 24 for Payment of charges of photography and video shooting*

It was found that the payment of item number 24 in the estimate was paid to the contractor for photography and video charges. But the field staff team was unaware of the photo availability taken of the structure. This payment was done for all the structures.



## A8.6 Agronomy Expert

As suggested by PMU, the following agenda was decided to generate /collect information from the farmers of the PoCRA adopted villages of three districts viz. Hingoli, Parbhani and Nanded in Aurangabad districts.

1. To assess enhancement in the adoption of technologies promoted through FFS supported by Agriculture Assistants along with Krishi Tai acting as technology disseminator

2. Through farmer interactions:

- Collect and analyse irrigation data for key crops (Soybean, Cotton, Pigeon Pea, Green Gram and Black Gram) for the last Kharif season and estimate the water productivity using the methodology proposed by IIT Bombay.
- Identify reasons for using drip irrigation for the cultivation of Soybean which is a rainfed crop.
- Reasons for adoption and non-adoption, contribution to enhancing the quality of produce and yield, and willingness to continue using CR technologies.
- Negative factor which affects coping and whether it has been controlled by the adoption of CR technology.

### 1) Detailed field visit report for Hingoli district

#### Village Adgaon (Visited on 7.9.2022)

During the visit to Adgaon village, Taluka Basmat, district Hingoli, the team discussed with more than 18 farmers about the impact of the PoCRA project on various climate resilient activities as well as visited demonstration fields where cotton, soybean, and other horticultural fruit crops with intercropping of seasonal crops particularly, soybean, turmeric are grown by the farmers.

In the Hingoli district, the rainfall pattern during Kharif 2021 was quite good (858.1mm) during the monsoon period (2<sup>nd</sup> June -29th September), except during the period from 27.7.2021 to 11.8.2021, it was as low as 6.8 mm. During this rainless period, the farmers adopted irrigation scheduling based on the severity of the crop water stress. From October onwards, the farmers irrigated cotton crops through drip systems and surface irrigation as the rainfall amount was very meagre and the residual soil moisture was also not enough to be prolonged up to the end of the crop.

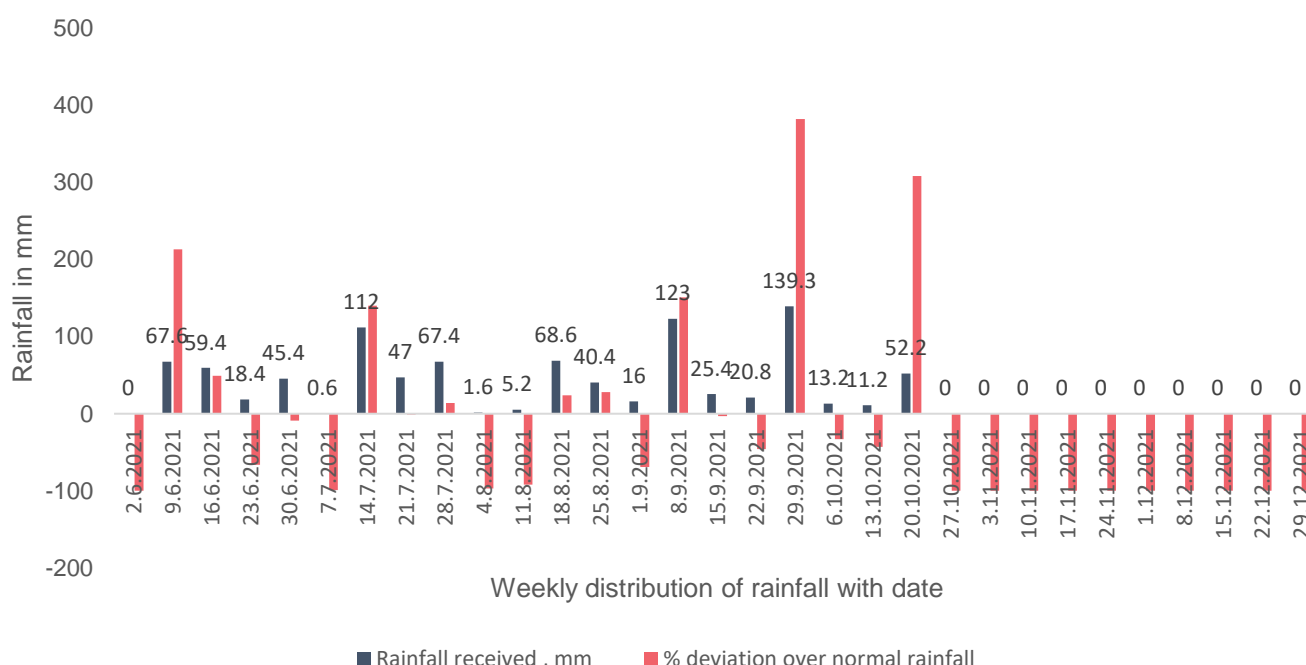


Figure A8.1 Rainfall distribution pattern and irrigation scheduling to Kharif crop during Kharif 2021 in Hingoli district

## Cotton crop:

Amount of irrigation water delivered in cotton crop as per the farmer's experience: The following information was collected from the farmers through discussion

### a) Surface irrigation method

- Capacity of pump: 5 Hp
- Depth of open well :30-40 ft
- Time of operation of pump for irrigation in one acre area: 10 hours
- Days interval of Irrigation through drip is 5-6 days and in surface irrigation method they apply only once in October and November at an interval of 20-25 days only and during long dry spell periods in rainy season.
- Discharge rate of Pump: 450 litre per minute (7.5 litre per second)
- Total amount of irrigation water delivered in 10 hours (average running period of pump)
- = 450 litre per minute x 60 minutes x 10hours =270000 litre or 270 m<sup>3</sup> water was delivered in one acre area.
- Applied Irrigation water in-depth unit is 6.75 cm or 67.5 mm per irrigation

### b) Drip irrigation

Visited the farmer's field (Mr Anant Diliprao Chauhan and Prahlad Panditrao Savant) where drip irrigation was installed in a field with the cotton crop. Through interaction with the farmer, details of the irrigation schedule were collected. The cotton yield through a drip is to the tune of 15-16 q/acre. Thereafter the farmer harvested Bengal gram to the extent of 10-12 q/acre. Based on the observations of irrigation scheduling patterns in cotton crops, the irrigation water, applied to the cotton crop has been calculated as below.

- Irrigation at two days interval
- Total time of operation of pump (5Hp): 4 hours for irrigating one-acre area
- Discharge rate of emitters (design discharge rate): 2 litre per hour
- Lateral spacing: 1.20 m
- Drippers spacing: 0.45 m
- Total number of emitters per acre:7407.
- Total irrigation water delivered in one acre area:59256 litre or 59.256 m<sup>3</sup> water
- Depth of irrigation water applied at 2 days interval: 1.48 cm or 14.81 mm (7.41 mm per day )

During the growth period, the ET for cotton crops also comes to about 5-6 mm per day.

For scheduling irrigation for cotton crops, the best and most effective means is to consider different crop geometry, lateral and emitter spacing, ET<sub>crop</sub> (reference ET \*crop coefficient ) at 2 days interval and discharge rate of the emitters, and the number of emitters per acre area.

$$\text{Litre of water per plant} = \frac{(\text{Lateral spacing} * \text{drippers spacing}) * \text{ET}_c \text{ for two days}}{\text{uniformity coefficients (90\%)}}$$

If the derived value is multiplied by the number of emitters per acre, then one can get the values of irrigation water delivered in a one-acre area.

ET crop= Reference ET \* crop coefficients at different crop growth stages.

For delivering the actual amount of irrigation water to the cotton crop the following crop coefficient has been calibrated through field data for the medium type of soils by using values through the CROP WAT model of FAO. So, in future, the following K<sub>c</sub> value may be used instead of only the four K<sub>c</sub> values proposed in FAO. Accordingly, the irrigation water may be applied in October and in November months. In other field crops like Soybean, Red gram, a similar type of crop coefficient calibration may be made and used for irrigation scheduling purposes as per the above equation.

Following is an example where the irrigation requirement per plant has been derived for the cotton crop by using long-term weather data of the identified area.

Table A8. 3 Irrigation requirement per plant for cotton crop

Growth stage / DAS	Crop coefficient and (ET mm per day)	Crop geometry and irrigation water in litre per day.				
		1.50m x 0.60m	1.20m x 0.6m	1.20m x 0.45 m	0.90m x 0.45m	0.60x0.60x1.20m paired row (Two plants per emitter)
Sowing (from the first week of June)						
0- 10	0.35(1.65)	1.65	1.3	0.99	0.74	2.64
10-20	0.35(1.61)	1.61	1.3	0.97	0.72	2.58
20-30	0.35(1.45)	1.45	1.2	0.87	0.65	2.32
30-40	0.38(1.35)	1.35	1.1	0.81	0.61	2.16
40-50	0.51(1.58)	1.58	1.3	0.95	0.71	2.53
50-60	0.66(2.01)	2.01	1.6	1.20	0.91	3.22
60-70	0.76(2.46)	2.46	2.0	1.48	1.11	3.94
70-80	0.81(2.82)	2.82	2.3	1.69	1.27	4.51
80-90	0.95(3.27)	3.87	2.6	1.96	1.47	5.23
90-100	1.05(3.44)	3.44	2.8	2.06	1.55	5.50
100-110	1.05(3.59)	3.59	2.9	2.15	1.62	5.74
110-120	1.05(3.61)	3.61	2.9	2.17	1.62	5.78
120-130	1.05(3.62)	3.62	2.9	2.17	1.63	5.79
130-140	1.05(3.62)	3.62	2.9	2.17	1.63	5.79
140-150	0.96(3.11)	3.11	2.5	1.87	1.40	4.98
150-160	0.86(2.57)	2.57	2.1	1.54	1.16	4.11
160-170	0.76(2.1)	2.1	1.7	1.26	0.95	3.36
170-180	0.66(1.7)	1.7	1.4	1.02	0.77	2.72

Note: Figures in brackets are ET crops in mm per day.

### Soybean crop:

In the case of the soybean crop, the farmers have used a sprinkler irrigation system and irrigated their crops in August only once. They used 8 sprinkler systems and operated with 5 Hp pumps. The depth of the open well was about 40-50 ft. The time of operation for irrigating a one-acre area ranged from 6-8 hours. According to the discharge rate of the electric pump with 450 litres per minute as narrated by them, the irrigation water delivered during the operation period was 162000-216000 litre in a one-acre area and the depth of water was 4.05 to 5.4 cm (40.5 to 54.0 mm). During the dry spell period, (27.7.2021 -11.8.2021), they irrigated their soybean crop with an actual depth of 40.5 to 54.0 mm and saved the soybean crop by using the sprinkler method. In this way, the irrigated farmers harvested the soybean yield to the extent of 8-10 q/acre, but under rainfed conditions, the farmers could harvest only 5-6 q/acre.

### **Red gram:**

The farmers are irrigating their red gram crop through ridge and furrow irrigation methods. The farmers applied irrigation water once in October and then in November 2021 at 25-30 days intervals and not during the dry spell period in the first-second week of August 2021. In irrigated conditions, they harvested 5-6 q/acre yield and in rainfed conditions, only a 3 q/acre yield was recorded. The red gram was grown as an intercrop with Cotton and soybean, hence the exact amount of irrigation water used by red gram could not be assessed, unlike the sole crop of red gram.

### **Green gram and Black gram:**

These two crops are short-duration and mature within 75-80 days period after sowing. Thus, irrigation water was not provided during the growing period. The yield obtained by them was 2-3 q/acres but in very light soil the yield was considerably low as 1.5 to 2.0 q/acre. This crop is not dominated in this area and is only grown under an intercropping system with cotton, tur and soybean.

### **Reason for the adoption of pressurised irrigation (drip and sprinkler irrigation)**

1. Since these two components of irrigation saving techniques are being used in agricultural field crops in adopted villages and found very much effective in terms of water and fertiliser saving to the extent of 25 to 30%, it is highly essential to extend it to non-adopted villages. In the case of vegetable crops, the saving of irrigation water even goes up to 50-60%. In this method, the desired quantity of water and fertiliser are placed near the effective crop root zone and no further water and fertiliser loss occur, unlike the surface irrigation method where a large amount of water and fertilisers are lost through deep percolation. The quality of farm produce is very good and fetches a good market rate.
2. The farmers are using these two components in the Kharif and rabi seasons and exploiting groundwater which is available to them and increasing the area under irrigation and harvesting more yield as compared to the flood irrigation method.
3. While implementing the pressurised irrigation system (drip and surface method), the farmers are not aware of the quantity of irrigation water to be applied through these two irrigation methods. The amount of irrigation water to be applied is computed by using meteorological data of the districts/ taluka.
4. If the irrigation scheduling software is developed and the information on irrigation scheduling is transmitted to the farmers, the utilisation of irrigation water in the field will be very much effective and the crops will not enter into moisture stress or excess irrigation water will not be delivered by the farmers in future.
5. It has been observed that the farmers are not following drip irrigation systems in soybean crops, but they are using sprinkler irrigation systems during a long dry spells and saving their field crops from severe moisture stress.

### **Requirement of additional inputs and suggestions by the farmers**

1. The cost of constructing an open well has increased substantially due to increasing input costs like cement, sand, iron, labour, etc. Hence, the subsidy amount may be enhanced.
2. Solar operation pump may be provided since the electric supply at the village level is not properly regulated.
3. The net banking facility is very poor due to poor (low speed) internet connection.
4. Krishi Tais are contributing substantially to the overall development and dissemination of CR technologies at the village level, however, financial help is needed to establish small-scale industries like dal milling machine, packing machine, turmeric powder preparation and packing and marketing through FPC / or other registered marketing set-up is needed to generate more income.
5. Goat shed enterprises may be re-established for landless labours.
6. In Adgaon village about 100-150 ha area is saline soil and needs proper ameliorative measures (chemical, biological and physical) to reclaim such soil and bring it under cultivation. It is suggested to adopt chemical measures (use of Gypsum) as well as physical measures (raising bed planting technique and draining of saline solution through furrow during the rainy season). The use of salt-tolerant crops/varieties is also quite effective.



*Crop photo (Drip irrigation for Cotton) at Adgaon village (Hingoli district)*



*Adopted intercropping system in horticultural crop (custard apple) with soybean and turmeric in Adgaon village (Hingoli district ) under the PoCRA project*

### **Village Khaperkheda (Visited on 7.9.2022)**

This village is located at the base of the hill and the majority of the soil is light in texture. The major field crop of this area is Soybean during the Kharif season and Bengal gram, wheat during the Rabi season and summer ground nut during the summer season. Due to the mountainous and hilly terrain, sufficient water is available through subsurface flow and the well is continuously recharged for exploiting groundwater during the rabi and summer seasons. Hence the farmers are very much interested to exploit groundwater by using open wells.

The adopted CR technologies are:

- **Horticultural fruit crops like Orange**
- **Drip irrigation:** 12-15 farmers are still waiting to receive benefits.
- **Sprinkler irrigation:** 10 farmers benefitted

- **Open wells:** Privately-owned open wells are 40-45 in number with a moderate depth of the open well of 35-40 ft. The well water is available during the Kharif season in ample quantity, and it is extended up to February month, thereafter the well water is available only for 3-4 hours. Considering the availability of well water, the farmers are planning for irrigating their field crops during the rabi and summer seasons.
- **Seed production:** Nil
- **Farm Pond:** Nil
- **Well recharge:** Nil
- **BBF technology in Soybean:** 25 acres have been covered this year, however, providing a subsidy of Rs 1000 per acre for the adoption of this method is not enough. Besides, the BBF equipment is also not available during peak sowing time due to the large-scale demand for BBF equipment. The farmers are preparing furrows with the help of a tractor and on the raised bed they are sowing by dibbling methods or by the bullock-drawn seed drilling machine. In the case of normal planting, the farmers are harvesting 3 q/acre soybean yield but in the BBF technique, they are harvesting 5-6 q/acre which is also low due to the light texture soils.
- **Cement and Nala Bandhara system** have been done in the last 7 years back, but a lot of silt has been deposited. Those are now non-functional and need Nala excavation to increase the water storage capacity of Nala for irrigating their field crops during the rabi and summer seasons.

The role of Krishi Tai in CR technologies is limited as they narrated due to non-receipt of the financial benefits. However, Agricultural Assistants and Cluster Assistants played a significant role in the implementation of CR activities at the village level.

For effective initiation and implementation of CR technologies through Krishi Tai, the installation of stall processing units like Turmeric powder, soybean powder, and dal mill is highly essential. In this village, the Mahila group members are collecting neem seeds, prepare neem powder and using in their field for controlling insect pests. This type of self-preparation on the biopesticides programme is working effectively as the Joint Director of Agriculture advocated this group thrice during the year 2021 on plant protection issues and control measures to be adopted.

### **Irrigation requirement of Soybean crop:**

During Kharif 2021, the farmers applied irrigation water only once in the second week of August and protected their field crop from severe moisture stress as the rainfall was not received for more than 15 days period. The sprinkler set of 8 risers was used and the irrigation pump was operated for 8 hours. The discharge rate of the pump was considered 450 litres per minute and the open well depth was 35 ft. The amount of water delivered through this pump was 216 m<sup>3</sup> per acre and the depth of the irrigation water which was applied to the soybean crop was 5.4 cm (54 mm). This depth of applied water has been to be correlated with Crop evapotranspiration demand by FAO 56 or any standard ET method, derived through meteorological data of the station for accuracy.

Note: Some of the farmers in Mursud village have taken soybean under drip irrigation and are irrigating their crops through this system but they have not elaborated in detail on irrigation scheduling followed

## **Detailed field visit report for Parbhani district**

### **Village Panhera (Visited on 8.9.2022)**

To assess the impact of various CR technologies, adopted by the farmers with financial help from POCRA and technical help from the State Agriculture Department, visited village Panhera, Taluka Manvat, district Parbhani and villages Nagar Jawala and Pedgaon, Taluka Parbhani, district Parbhani.

Initially in presence of Sarpanch, Agric. Assistant, Cluster Assistant, interacted with about 24 farmers and collected information from the farmers about the PoCRA project activities, being implemented and the constraints if any while implementing at the farmers' field. Further collected irrigation scheduling details, which were adopted during Kharif 2021, particularly during the dry spell period and in October and November months as the irrigation was given to cotton and Tur crops due to the long duration nature of the crop.

The weekly rainfall distribution pattern of the Parbhani district reveals that from 27.7.2021 to 11.8.2021, the rainfall was hardly 4.5 mm, which was quite low and the soybean and other short duration crop suffered from severe moisture stress but in the rest of the Kharif season period, rainfall amount was quite good. The receipt of rainfall was again extended up to 20.10.2021. This rainfall amount saved one irrigation of cotton and tur crops. Additional irrigation was provided in November 2021.



Irrigation schedule in Cotton under surface irrigation and drip irrigation: It is calculated based on the information collected from the cotton growers of the selected villages.

- Electric motor cap. 5 Hp
- Discharge rate of the pump: 400 litres per minute
- Cotton crop geometry: 1.20 m x 0.45 m (lateral spacing 1.2 m, emitter spacing 0.45 m). So, the wetted area is 0.54 m<sup>2</sup>.
- Total number of emitters in the one-acre area: 7407
- Irrigation interval: 5-6 days
- Pump operation period: 3 and half hours- 4 hours
- Depth of the open well: 30-40 ft during the Kharif season
- Total irrigation waters pumped: 84000 to 96000 litre in 3 and half hours- 4 hours period.
- Depth of irrigation water applied at 5-6 days intervals was 2.1cm- 2.4 cm (21 mm -24 mm with per day irrigation requirement was 4.0 mm to 4.2 mm)

The farmers used irrigation scheduling till 15 days before the final picking of the cotton crop. They harvested seed cotton yield up to 13-14 q/acre from the irrigated field and hardly 5.0 q/acre from the rainfed field.

#### **Village Nagal Jawala Village (Visited on 8.9.2022)**

In Nagal Jawala village, irrigation through a drip system was given in October and November 2021 as per the above schedule.



Cotton crop under drip irrigation. Discussing with female farmer about irrigation scheduling, adopted in October and November months

#### **Surface irrigation method**

In the case of the surface irrigation method, some of the farmers applied irrigation water twice in November 2021 due to the receipt of a good amount of rainfall up to the third week of October 2021. They never applied irrigation water in August 2021 when the long dry spell prevailed. The depth of each irrigation in the surface method was found to be 64 mm to 70 mm as it was applied at 20-25 days intervals. The yield of seed cotton under surface irrigation was 9-10 q/acre.

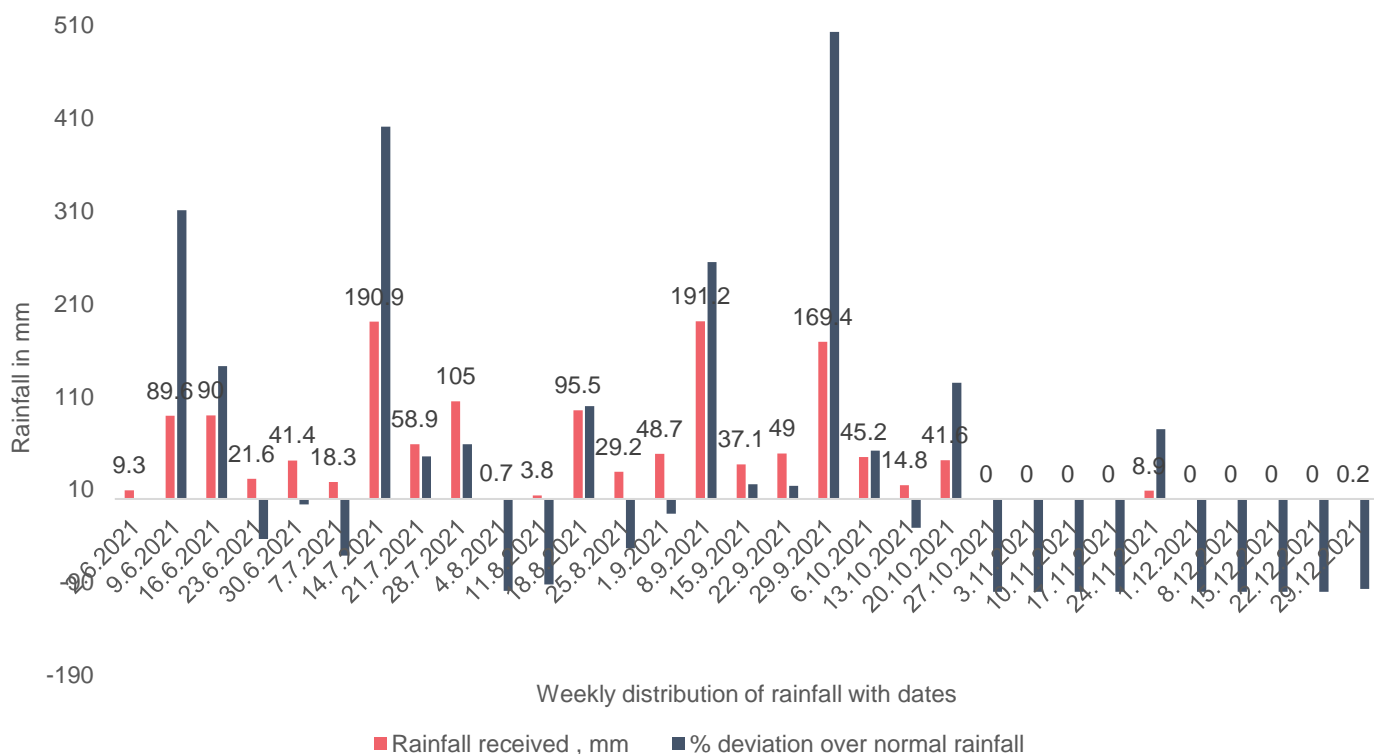


Figure A8.2 Rainfall distribution pattern and irrigation scheduling in Kharif season crops during Kharif 2021 at Parbhani

### Other climate-resilient technologies adopted in the sample villages

In village Panhera, the role of FFS is highly effective as narrated by the Sarpanch and other members who were present in the discussion. They were involved in each CR technological activity and the Agricultural Assistant and Cluster Assistant helped with the implementation of the PoCRA activities on a large-scale basis.

In Village Panhera, the third phase is being implemented effectively on :

- BBF technology in soybean followed by Bengal gram without disturbing BBF layout. The BBF in soybean has occupied 225 ha area in this village (about 30 % of the cultivated area). The same BBF set-up will be used for Bengal gram and will be irrigated by sprinkler methods
- Zero Tillage in Cotton
- Sprinkler
- Drip
- Horticultural crops
- Shade net / Polyhouse unit
- FFS: Providing knowledge from sowing to harvest on various crop production technologies of Kharif and rabi crops as well as marketing activities.
- Proposed shade net unit: 8 in number
- No Krishi Tai group is available, one person is looking after processing the farm produce on a micro-level basis.

### Constraints

- For the construction of a shade net unit, a sanction may be given for half acre area instead of a one-acre area as the marginal/ small farmer may not afford to invest a large amount of money in construction and wait for the money to get released by the department.
- The money transferred to the farmer's account is adjusted by the bank against the crop loan and other dues, which are pending in the name of the farmers. Hence permission may be given to keep this transferred money from the PoCRA project in a separate account or the suggestion may be transmitted to the competent authority of the bank to avoid such adjustment processes at the bank level.
- The money for the sprinkler sets is not received in time. It is being delayed substantially.
- In this area, the construction of an open well is highly required and, the provision for this asset may be regularised to increase more area under irrigation.
- The water availability is to be increased through the creation of a Farm Pond, construction of cement and nala bandhara and excavation of silted Nala for increasing water storage capacity for irrigation.

## Field visit report on BBF technology adopted in Pedgaon village, Parbhani

The progressive farmer Mangesh P. Deshmukh has grown soybean crops on 11 acres of land under BBF methods of planting by keeping 4 crop rows (30 cm row spacing), 3 crop rows (40 cm row spacing), 2 crop rows (45 cm crop row spacing) on a raised bed. He used 10-12 kg of seeds in a one-acre area and sowed by dibbling methods of sowing. Between two paired rows, about 60 cm of space was provided for draining excess rainwater/conserving more rainwater during the dry spell period. He is expecting soybean yield to the extent of 12 q/acre from 4 crop rows geometry, 12-13 q/acre from 3 crop rows geometry and 16 q/acre from 2 crop rows geometry. However, in the case of the traditional method of sowing (flatbed method), the same farmer used to harvest a 6 q/acre yield by using a 30 kg /acre seed rate. The same farmer is also taking summer soybean crops for the last 3 years for seed production and harvesting about 7 q/acre seed yield. He is supplying all the good quality seed material to Mahabeej and earning about 30% more income than the market rate. During the dry spell in the rainy season, he provided one irrigation and during the summer season, he applied ten irrigations through sprinkler sets. The details on the quantity of the irrigation schedule have not been given by him.

In Nagal Jawala village (Manwat tehsil) also, a lot of areas are available in BBF planting technique. One of the Soybean plots of Mrs Minakshi Viswanath Dahe was observed where she has grown soybean with paired row planting (2 crop rows). In this village about a 36-acre area is under BBF plantings. In this village, various CR technologies are also being implemented effectively. They are

- Drip and Sprinkler (60 % cultivated area is under a drip and sprinkler system).
- Open wells: 3 open wells sanctioned and completed including well recharge
- Horticulture: 8 farmers got benefitted
- Veimi-compost: demanded by the farmers
- Farm pond
- FFS roles in CR technologies: There is a significant contribution to various activities, made by FFS.
- Krishi Tai's role and Krishi Mitra's role in CR technologies: Very limited role is there due to financial constraints

**Demand of the farmer:** Due to an irregular supply of electric power for operating electric Solar operated pump is urgently required through another govt. project if it is not provided through PoCRA project.



*Soybean crop photo under BBF planting technique with 2 crop rows*



### 3) Detailed field report for Nanded District

**Sugam Budruk Khurd** and **Naleswar** villages were visited. The team discussed with the group of farmers (13 and 9 farmers in respective villages) the impact of the PoCRA project activities and future programmes to be implemented for the overall benefit of the farmers.

The major activities in these villages are

- Drip
- Sprinkler
- Foundation seed
- Horticulture
- Seed production (Soybean and Bengal gram)

Additional requirement

- Provision of open wells
- PVC pipes
- Solar-operated electric pump
- Sprinkler
- Drip
- Goat-shed unit
- Farm machinery
- More Implements for BBF planting
- Dairy farming should be initiated as the Nanded city demands more milk and milk products

#### Rainfall pattern and irrigation requirement of crops during Kharif 2021

During Kharif 2021, the rainfall pattern was quite satisfactory. From June-September 2021, the total amount of rainfall received was 997.4 mm. Thereafter in October, November and up to 8th December 2021, about 136.6 mm of rainfall was received which helped to reduce a good amount of irrigation water to the Kharif crop, particularly cotton and Tuar. Hence during the long dry spell period in August, the farmers never applied irrigation water. As per their version, the rainfall distribution is very good for the last four years and the farmers have been harvesting very good Kharif crop yield. During this Kharif season in 2022, one of the farmers applied irrigation water as much as 92,493 litres of water in a one-acre area (depth of water was 23.1 mm) with a 5 Hp solar pump which was operated for 7 hours to deliver this much quantity of water in last week of August 2022 where there was a long dry spell.

**Suggestion:** As the water pumps are of different capacities, therefore the provision should be made to measure the amount of water pumped from the open well/borewell for quantifying the amount of irrigation water used by the crops for computing irrigation Water Productivity.

**In the case of the soybean crop,** the farmers have not given any irrigation. But for Tuar (Arhar), they have given two times during October and November months. During the rabi season, in the case of Bengal gram, the farmers are providing irrigation four times through sprinkler irrigation. They are applying irrigation water through a sprinkler with 8 risers intestinally for two hours. In the subsequent three irrigations, they are operating a 5 Hp pump for 3-4 hours each time and fulfilling crop water demand. They are harvesting 10-11 q/acre Bengal gram yield by using a sprinkler irrigation system. The depth of the first irrigation comes to about (48000 litres of water delivered in 2 hours) 12 mm and the subsequent irrigation depth comes to (96000 litres per irrigation) 24 mm. So the total depth of irrigation water comes to about (12+24+24+24 mm=84 mm), besides pre-sowing heavy irrigation water of 60 mm depth. In the surface irrigation method, 2 irrigations with 60 mm depth each is given to this crop and about 5-6 q/acre Bengal gram seed yield is obtained.

**In the case of the cotton crop,** irrigation water is provided in October and November month only. In the case of surface irrigation, it is provided at 20-25 days intervals and in the drip system it is applied at 5-6 days intervals. Generally, a 2-3 days interval is quite satisfactory concerning the degree of moisture stress. It is a mild one, but in the case of 5-6 days, the moisture is increased significantly. Hence irrigation should be adopted at 2-3 days intervals. The details of the irrigation schedule have not been given by the farmers as the area in cotton is very much limited.

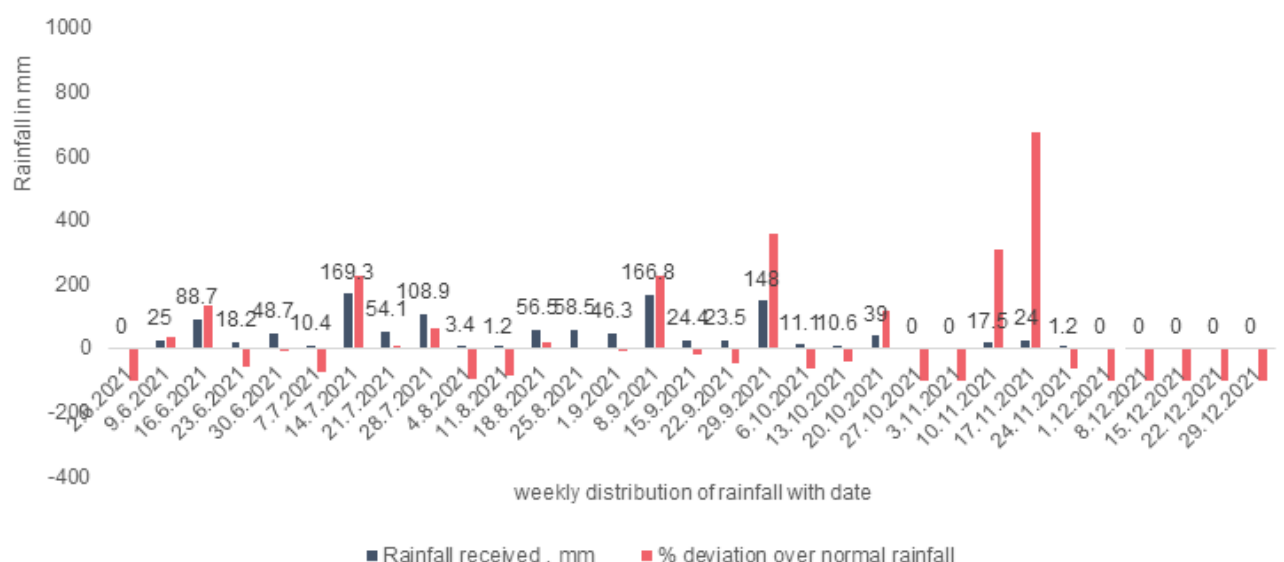


Figure A8.3 Rainfall distribution pattern and irrigation scheduling in kharif crops during kharif 2021 in Nanded district.

In the village Sugav Budruk Khurd, the major Kharif crop is soybean during Kharif and Bengal gram during the rabi season. The farmers are involved actively in the seed production programme of soybean and Bengal gram on a large-scale basis. The major CR activities of the PoCRA project in this area are seed production, sprinklers, and horticulture. The farmer's demand for CR activities is on the construction of open wells, supply of PVC pipes, electric motors, solar pumps, sprinkler units, and goat-shed units shed ned unit, particularly for floriculture, farm machinery, farm implements, rain gun, mini-tractor in case of BBF techniques. In this village, about 50% are landless labour and 40% are in ST/SC category, provision of a goat shed unit in this village may be highly beneficial to improve their livelihood.

**Project support to SHGs:** In this village, about 22 self-help groups each of 10 female members are actively involved enterprise activities. While they wish to expand their activities through the support from PoCRA, they feel that a 100% grant at the initial stage will help them establish commodity processing units like soybean powder processing, and dal mill unit at the village level.

**Role of FFS:** Through this organisation, the farmers are being trained on various farm activities starting from seed treatment to seed processing and marketing. The training was imparted 6 times on soybean and red gram before the onset of the monsoon. In this village, seed production has been initiated in two crops on a large scale basis and their earnings improved by supplying their produce to MAHABEEJ.

Visited **Naleswar** Village, Nanded district in the afternoon of 9.9.2022 and collected data from the farmers on PoCRA activities. In this village, about 8-9 farmers were present in the meeting along with Agricultural Assistant, Cluster Assistant, Sarpanch and progressive farmers. In this village, the following CR technologies are being implemented for the benefit of the farmers. They are Horticultural fruit crops – Mosambi (50-acre area has been occupied), Banana, seed multiplication programme on soybean and Bengal gram, Farm machinery, farm implements, PVC pipes, sprinklers, drip, Sericulture, Fish farming( 34 mx34 mx4.5 m dimension), open well structures. One FPC is operating in this village. Besides these components, Krishi Tai, through the small saving scheme and FFS, is also playing a major role in disseminating recent/modern crop production technologies to the farmers for their benefit and the overall increase of farm income. In each group, about 25 farmers are being trained in various activities which are related to CR technologies. Due to Yeldhar (storage dam) and Sidheswar a delivery system reservoir on the Godawari river, the farmers are growing Sugarcane, Banana and Turmeric crops under a drip irrigation system. In this village, the irrigated area is quite good and there is a lack of knowledge about the irrigation scheduling in sugarcane and banana crops, both being water and nutrient-exhaustive, sufficient technical support on irrigation scheduling through FFS is needed as they are not technically sound to follow irrigation scheduling in these crops as well as in other field crops.

## Rainfall distribution pattern during Kharif 2022 (up to September) in all districts of the Marathwada region

The general trend of the rainfall of all districts of Aurangabad division reveals that the rainfall distribution was normal to above normal except from 11.8.2022 to 31.8.2022 where it was below normal rainfall, and the magnitude was in the range of -57 % to -98 %. During this period, the farmers irrigated soybean crops with sprinklers and the cotton crop with the drip irrigation method. In some of the areas, the farmers have irrigated Tuar crops as well as avoided severe moisture stress.

Table A8.4 Weekly rainfall pattern in the Marathwada region

Total Weekly rainfall (mm)	Aurangabad	Beed	Name of the district of Marathwada region					
			Hingoli	Jalna	Latur	Nanded	Osmanabad	Parbhani
25.5.2022 to 1.6.2022	0 (-100)	0 (-100)	1.8 (-87)	0 (-100)	7 (-11)	2.5 (29)	18.3 (66)	0 (-99)
2.6.2022 to 8.6.2022	0.2 (-99)	0.7 (-97)	0.6 (-97)	1 (-94)	1.4 (-94)	0 (-100)	2.2 (-92)	0.8 (-95)
9.6.2022 to 15.6.2022	35.6 (7)	59.5 (65)	23.8 (-45)	18 (-52)	31.4 (-18)	32.8 (-7)	29.4 (-19)	60.1 (61)
16.6.2022 to 22.6.2022	21.6 (-21)	33.4 (12)	34.5 (-39)	22.8 (-31)	55.2 (64)	49.1 (14)	11.5 (-54)	46.6 (21)
23.6.2022 to 29.6.2022	96 (182)	74.6 (158)	26.7 (-40)	58 (71)	78.1 (146)	50.7 (6)	54.6 (135)	78.1 (101)
30.6.2022 to 6.7.2022	14.8 (-55)	40.1 (47)	35.4 (-24)	38.8 (7)	39 (22)	96.6 (135)	38.2 (39)	40 (5)
7.7.2022 to 13.7.2022	94.7 (223)	96.2 (225)	175.4 (240)	100.5 (191)	156.4(2 82)	321.9 (501)	120.5 (263)	169.4 (299)
14.7.2022 to 20.7.2022	68 (136)	50.7 (107)	108.4 (127)	52.7 (64)	90 (154)	148.6 (213)	70.4 (212)	74 (82)
21.7.2022 to 27.7.2022	42.4 (16)	14.9 (-59)	35.8 (-36)	39.8 (-5)	62.4 (-47)	106.7 (69)	40.4 (25)	39 (-21)
28.7.2022 to 3.8.2022	21.8 (-35)	19.5 (-30)	24.0 (-51)	37.3 (7)	26.6 (-40)	24.2 (-59)	39.9 (19)	28.8 (-40)
4.8.2022 to 10.8.2022	63.8 (67)	57 (100)	72.2 (18)	47.2 (15)	55.6 (43)	90.2 (53)	63.4 (107)	46.8 (6)
11.8.2022 to 17.8.2022	12.3 (-57)	6.1 (-76)	9.4 (-79)	9.8 (-67)	4.9 (-86)	18 (-64)	12.6 (-56)	8.2 (-78)
18.8.2022 to 24.8.2022	7.2 (-76)	5.6 (-82)	1.4 (-97)	2.3 (-93)	2.3 (-93)	1.3 (-97)	3.2 (-94)	1.9 (-96)
25.8.2022 to 31.8.2022	5.7 (-85)	1.4 (-97)	1 (-98)	4.5 (-89)	2.6 (-94)	6.1 (-88)	24.8 (-35)	4.7 (-92)
1.9.2022 to 7.9.2022	94 (165)	70.1 (104)	40.4 (-5)	94.1 (155)	94.2 (126)	21.5 (-53)	65.3 (76)	48.9 (11)
8.9.2022 to 14.9.2022	69.5 (113)	83.8 (117)	38.6 (45)	62.8 (114)	84.1 (97)	123.8 (249)	75.5 (65)	73.8 (95)
15.9.2022 to 21.9.2022	79.9 (130)	26.1 (-38)	32.5 (-11)	44.4 (30)	23.6 (-48)	33.2 (-13)	20.4 (-55)	18.5 (-60)
22.9.2022 to 28.9.2022	20.9 (-48)	39.9 (-10)	8.8 (-73)	29.6 (-16)	22.6 (-42)	25 (-26)	37.4 (-16)	14.2 (-58)

Figures in brackets are the departure (%) from normal rainfall value.



## A8.7 Sociology Expert

### Villages visited

Project village - Sillod Block, Aurangabad district

- Khullod
- Undangaon
- Liha
- Pishor
- Rampur wadi
- Aurala

Control village - Sillod Block, Aurangabad district

- Nadarpur
- Pimparkheda

### Case Study - 1 - Shade Net

#### Improving sustainable vegetable production and income

*"It took some time for me to understand vegetable cultivation in Shade Net. However, it was surprising at the first instance that a modern method like a controlled environment resulted in higher productivity of my capsicum and cucumber. My crops were protected from high temperatures, erratic rainfall, pests and diseases. I thank POCRA for providing me training on innovative concepts of high-value crop cultivation, management of shade net, crop production practices, new ways of insect and disease handling, soil fertility and water management. After the introduction of shade net, I get a steady source of income",* says Muktha Valmiki Jadav with a tear of joy in her eyes. A resident of Pishor village of Kannad district in the Marathwada region, the 45-year-old Mukta could complete only her high school education before she was married off at the age of 20. She lives with her agriculturist/farmer husband and two children.

Ms Muktha had heard about the introduction of POCRA project in her village from her husband. She persuaded her husband to understand the benefits that can be availed for the project as she was keen to supplement the family income. After understanding the eligibility criteria and the process and procedures, she applied for the activity of shade net in her name in the year 2019. She got pre-sanction within a month of her application and immediately started working on the shade net with the support of her husband and son. Since the initial cost of investment was quite high, she had to borrow an interest-free loan of eight lakhs from friends and relatives. The family had a savings of two lakhs, so in total, she invested ten lakhs for erecting shade net.

The work was assigned to a contractor and it took almost ten days to complete the work on 0.5 acres which was registered in her name. After satisfactory post-work verification by the agricultural assistant and other officers, a grant of Rs.8.5 lakhs was sanctioned by POCRA. It took nearly six months for the disbursement of funds after the completion of work. She promptly cleared all the loans borrowed from her friends and relatives.

Now equipped with the techniques of shade net cultivation after an intensive training of five days at the National Institute of Post-Harvest Management (NIPHT), Talegaon, Pune, Muktha decided to undertake capsicum and cucumber cultivation. She had access to irrigation sources such as wells and borewells. She first tried capsicum on her 0.5-acre land and was quite happy with the profits she made in one season. She invested 1.5 lakhs and made a profit of Rs.3 lakhs. The main expense incurred was for labour, since the crop is labour-intensive and she had to employ five full-time labourers for the entire duration of the crop cycle. They were paid (both men and women) Rs 200 per day and two crops are harvested in a year. However, she could save time and money on the transportation cost, since she attracted traders/merchants from Nagpur who collected her high-quality agricultural produce from the farm gate. She also tried cucumber but feels that capsicum is more lucrative. She further expressed her desire to undertake commercial floriculture and wanted to seek training on the 'package of practice' and marketing of produce from POCRA. She believes that floriculture has a huge market in Maharashtra and she even wants to explore the market outside the state if she is given support and training. She also wants to try seed production and nursery development.

Ms Mukta has become popular in her village as she is solely managing all the major activities with only some minimal support from her son. Apart from becoming popular in the village as a progressive farmer, it has also boosted her self-esteem. She proudly stated that "I used my profits from capsicum farming to conduct my son's wedding, I could buy gifts for my daughter-in-law and also my relatives".

Shade net has demonstrated the benefits of cultivating high-value crops under a controlled environment as compared to open-field cultivation through relevant training and marketing support.

## Case Study 2 - Apiculture

### Supporting marginalized through beekeeping

Under the integrated farming system, to create self-sustaining livelihood opportunities for the landless, vulnerable women farmers, widows and SC/SC communities, POCRA provides financial assistance and support for activities like apiculture. This activity also meets the inclusion criteria of the project. Interested and eligible applicants can choose this activity and submit their application form.

Ms Mangal Bai Nanadodu, a mother of three and a beneficiary of apiculture support from POCRA could not contain her excitement while talking to us. She gleamed as she stated that *"I have always been fascinated by honey bees and their ability to produce honey. The moment I got to know about this initiative, I wasted no time mobilizing money and availing of this benefit. I am happy to say that I never had any bee-sting phobia and manage all activities and business individually with minimum support from family members. This has helped me to build an alternate sustainable income source"*.

Mangal Bai is one of the many vulnerable women beneficiaries who has availed of this benefit in the Kannad district of the Marathwada region. After understanding the eligibility criteria, she applied for this activity in 2020 and her application was approved in two months by VCRMC for pre-sanction. She got fifty hive boxes and due to floral abundance in and around her farm, there was rapid development in the colonies. These colonies approximately produce 60 kg of honey per month during the flowering season. The whole package cost her Rs.2.5 lakhs and after successful verification by the agriculture assistant and others, a grant of Rs.1.5 lakh was offered under POCRA. She underwent extensive training in Nashik for three days regarding the management and maintenance of beekeeping. Mangal Bai never wanted to avail any institutional or non-institutional credit due to the fear of interest rates and hence depended on her relatives and friends to raise Rs.1.5 lakh.

Although there are no takers for fresh honey in the village, she is selling honey for four hundred rupees per kg in the nearby town and markets (mainly in Kannad town). However, Mangala Bai observed that *"selling and marketing of honey remains a big challenge for apiculturists like me in this region due to the high transaction costs involved. Moreover, it is important to undertake honey processing to increase the shelf-life"*. Another important benefit realized from beekeeping is its usage in pollination. She rented hive colonies (boxes) to onion, cucumber, sunflower and melons cultivating farmers and charged one thousand rupees per month for one box. The farmers reported increased yields due to the presence of bee hives. For instance, it was reported that the seed yield of onions increased by 25 to 30%. Her bee hive colony has become popular in the village and there is a huge demand during vegetable cultivation seasons.

In the last two years, in addition to paying back the loans borrowed from friends and family, she made a profit of two lakhs. She intends to increase her bee hive colony and wants further training and support for the effective use of by-products such as pollen, bee wax, comb foundation sheets, royal jelly and bee venom.

### Custom Hiring Centre - Inclusivity in strengthening emerging value chains for climate-resilient commodities

One of the main objectives of POCRA component – 'Climate Smart Post Harvest Management and Value Chain Promotion' is to establish Custom Hiring Centres (CHC) through FPCs and SHGs to promote farm mechanization for coping with climate variability in the project areas. CHCs rent various tools and equipment for harvest and post-harvest operations in the villages in the project area. It is also intended to benefit small, marginal and vulnerable women farmers by renting costly machines to improve farm productivity and promote soil health and water use efficiency. Hence this activity is supposed to support timely agricultural operations aided by farm mechanization services to all categories of farmers.

In Aurali village of Kannad district in the Marathwada region, one CHC – Sri Sai Sahayatu Shetkari Gat has been established which is managed by men Self Help Group (SHG). This SHG comprises 15 male farmers and was formed in early 2021 with the facilitation and support from POCRA and agricultural officials in the area. The members were keen to avail CHC benefits and approached POCRA to understand application and documentation procedures, procurement processes, cost estimation and design of CHC among other things. It took three months for the SHG to get pre-sanction and immediately they started working on CHC and procuring material. The total expenditure incurred was Rs.19 lakhs of which Rs.11 lakhs was granted by POCRA (60% of the project cost). The balance amount was raised by self-contribution from all the members. The CHC shed belonged to one of the members and hence contribution was not sought from that member. CHCs procured one tractor and tractor-mounted equipment such as a rotavator, cultivator and hydraulic plough. It also procured a trolley, thrasher, weeder and chaff cutter. All the procedures were completed by December 2021 and it became fully operational in January 2022. The hiring rates of the equipment for group

members and non-group members were decided and disseminated and a rent register was maintained to keep accountability.

Shri Chandrakant Athole, an enthusiastic member of the SHG was quite candid in explaining the practical challenges encountered while managing CHC. He stated that “*CHC has benefitted all of us the most, we fully utilize tractor and all other tools and equipment. For non-members, there are several challenges when it comes to renting due to affordability issues. For instance, we charge Rs.1500 for the usage of the tractor on one acre of land, since we have to meet the driver and diesel costs. However, some farmers who individually own tractors rent them out for Rs.1200 per acre, even though it is not economically feasible. They charge such low rent since they have to pay timely loans taken for their tractors to banks. So, such distress renting by other farmers is harming the business prospects of our CHC*”.

Other practical challenges stated by the members include the utility of power tillers for the crops. It is mainly useful for sugarcane which is not the dominant crop of the area. Moreover, sugarcane in the area is cultivated by large farmers. Small and marginal farmers primarily depend on maize and cotton which does not require a power tiller. Furthermore, vulnerable groups including women farmers often find it difficult to rent other equipment such as trolleys, weeders and chaff cutters.

The SHG members are also reluctant to offer subsidized rents to vulnerable groups. They commented that “we understand we have not rented any of our equipment to women farmers till now. The maintenance cost of the tractor and equipment is quite high, we cannot give for lower rent and incur losses. Till now we could make a profit of only Rs.40000. Moreover, we are scared that the tools and equipment may not be handled carefully by the farmers. The cost of spare parts is very high and sometimes not even easily available. So, we exercise caution while renting and mostly it is rented only to known farmers.”

The CHC, which is initiated with key objectives such as inclusiveness of marginalized communities and access to gender-sensitive farm machinery and equipment that will reduce the drudgery of women and enhance climate-resilient agriculture does not seem to have taken place in the region, especially in this particular village.

### **Effectiveness of presence of Krishi Tai in project villages vis-a-vis non-presence of dedicated female mobilizer for women farmers**

The project has adopted a gender-sensitive approach to prioritize the needs of women stakeholders in planning and implementation through ‘Krishi Tai’ (women mobilizers) at the village level. Krishi Tai is nominated by VCRMC and acts as an interface between project officials and the village community and helps in mobilization efforts. She is expected to work in close coordination with VCRMC members, agriculture assistants, cluster assistants and the village community. She is responsible to ensure the active participation of women in all meetings and project activities. Capacity building of Krishi Tai is undertaken through training and exposure visits.

In the Marathwada region, the overall effectiveness of the presence and performance of Krishi Tai generated mixed responses. Only in a few villages (where VCRMC retained earlier Krishi Tais) they were well aware of their roles and responsibilities and promptly participated in all VCRMC meetings. They raised awareness about the project benefits through home visits and motivated small/ marginal/ women farmers and landless to avail various benefits. They also facilitated the application processes and procedures. Although some of them had attended training for aspects related to community mobilization, account maintenance and agricultural practice, none of them was aware of FFS as a vehicle for the extension of climate-resilient farming practices. Hence, they could not impart any information to women farmers.

However, in most of the villages, their performance was found to be unsatisfactory. In some of the villages, Krishi Tai was not even aware of the name of the project and hardly understood their roles and responsibilities. They barely attended any VCRMC meetings and often their husbands/ men in the family represented them. The token attendance of men did not serve any purpose since they were not keen on any project-related activities. The VCRMC members were also indifferent to the absence of Krishi Tai in their meetings.

The reasons for the poor performance of Krishi Tai were found to be multidimensional. In most of the villages, Krishi Tai has not received any virtual or in-person training. Some virtual training was organized which was deemed to be unsatisfactory due to various reasons. Participants were unable to clear their doubts since they did not get any opportunity to speak during the training sessions. Poor network connectivity further dampened their spirits and many had to disconnect before their training session got over. Krishi Tais who did not have access to android phones or uninterpreted network connectivity decided not to attend virtual training programs. Most of the Krishi Tais need to be provided in-person training on project objectives, components, roles and responsibilities and their performance evaluation criteria.

In some villages, Krishi Tais have been appointed for nearly two years but have been remunerated for only six to eight months. They are entitled to a monthly salary of Rs.500. Lack of remuneration is making Krishi Tais

less motivated and many expressed their displeasure to continue work if they are not remunerated on time. In a few cases, VCRMCS have nominated Krishi Tais just to meet the administrative requirement of the project and hence did not seek any participation from them.

In control villages, in the absence of the Krishi Tai or a dedicated female mobiliser for women, the role of Krishi Mitra was explored to understand their influence in community mobilization. Krishi Mitras (men) act as agriculture extension representatives and spread information regarding government programs/ projects/ schemes to make appropriate decisions. In the control villages, it was found that the Krishi Mitras did not particularly target women farmers, but helped all farmers (irrespective of gender) to get benefits from schemes. They also helped farmers to make an online application through the website of the department. The village communities, in general, found their services to be helpful, especially in clearing their doubts and providing information regarding credit, market, agricultural practices and guidance on grievances redressal. The communities also relied on the traditional wisdom of their neighbours. Although Krishi Mitra played an important role in mobilizing and awareness generation in control villages, the role of Krishi Tai cannot be undermined since they are expected to exclusively mobilize small and marginal women farmers and the landless. With proper training and timely remuneration, they can become effective agents in mobilizing women and transferring relevant knowledge and helping translate POCRA policy objectives into action.

### **New activities that may be introduced for small /marginal/ tribal farmers and the landless (including women) in PESA villages**

The project promotes a gender-sensitive and inclusive approach to support small/ marginal/ tribal/ vulnerable women farmers, physically challenged, landless and socially excluded groups by providing an institutional platform for their participation and to ensure they can derive the maximum benefits from project interventions. Some of the new activities suggested by the community during discussions/ interactions to make the project supply-driven instead of demand include –

1. Traditional tribal agriculture is close to organic farming and this opportunity needs to be leveraged through marketing support for organically grown crops/ products to boost organic practices in tribal areas.
2. Technical and market support to undertake floriculture/ sericulture for women and tribal farmers. Subsidy for construction of silkworm rearing house.
3. Safeguarding critical inputs like institutional credit and risk analysis and mitigation plan as part of the project support through dedicated funds. Rules for a bank loan to the FPOs/FPCs/SHGs can be reassessed wherever possible.
4. Warehouse/ storage facility for perishable fruits and vegetables (especially onions) at the block level
5. Due to lack of storage, many times small and marginal farmers are forced to sell their produce to local vendors/middle people for a lower price.
6. Introduction of decentralized solar energy solutions to augment farm income. Support for solar pumps (especially for sprinklers) – central/ state government schemes can be dovetailed with POCRA. Solar fencing to protect from wild animals (wild boar/ monkeys/pigs), especially in the tribal areas
7. Training, credit and market support for landless women on papad, pickle and masala making. Tailoring and beauty parlour courses are also in demand.
8. Support for alternative livelihoods such as fisheries, goat rearing and poultry. Though some of these activities were stopped, there is a huge demand for these assets by the landless and the marginalized. The provision of a cattle shed may also be considered under this project.
9. Dairy-related activities may be promoted under the project. Initiative for the development of veterinary services or para-vets - convergence with line departments and dairy development board. Processing units of milk and milk products.
10. Promotion of local skilled-based activities – handicrafts, handlooms.
11. Support for landless/ marginalized to establish government-approved nurseries to supply quality saplings/seeds/ planting materials – this will act as a source of livelihood
12. Training, technical and market support for making localized bio-fertilizers, compost/ manure, nutrient culture and pesticides/ insecticides. Since a lot of farm waste and animal dung is available this can be promoted as a livelihood opportunity.
13. Facilitate small-scale processing industries in the horticultural belt of the project area.
14. Promote agroforestry in uncultivable and barren lands to meet fodder and fuel wood demands - Promote forest plantations such as bamboo and teak.
15. Encourage dryland fruit crops/ horticulture plantation based on agro-climatic conditions – tamarind, custard apple, fig, jack fruit, Chiku, papaya, dragon fruit.
16. There is a popular demand to extend the POCRA project period to avail of all kinds of benefits since no major activities were undertaken during the COVID lockdown.

## A8.8 Hydrology Expert

Access to an adequate and timely supply of water for irrigation is a major factor in creating resilience to climate change vagaries in the drought-prone Marathwada region. It was observed during the field visits that the adaptive capacity of farmers has been strengthened due to the provision of structural measures like sprinklers and drip sets, especially to smallholders in the project area. The construction of water conservation and recharge structures has further enhanced the water availability during crucial crop growth stages to a large number of farmers. The key benefits and challenges of the structural interventions as observed during the field visit areas as follows:

### Benefits

- Groundwater irrigation is expanding rapidly in the three project villages.
- Compared to the Kharif season, the Rabi irrigated area is rapidly increasing. The irrigated area under sugarcane is also increasing steadily.
- Farmers could expand their area under irrigation and cultivate cash crops due to the provision of sprinkler/ drip irrigation sets.
- The pressurized irrigation systems have reduced the labour requirement, and convenience of operation during night hours, and enabled the application of a variable amount of water depending upon crop growth stages.
- There has been a steady increase in crop yields. However, the average yield levels are still below the potential.
- A structure like Cement Nala Bund (CNB) and recharge shaft is found to be effective in recharging groundwater thereby expanding the irrigated area, especially in summer.
- Farmers are demanding to resume the programme of pipeline and pump set provision, as it has helped in bringing distantly located and highly elevated areas under irrigation quickly.

### Challenges

- Drip irrigation is primarily used for sugarcane crops. Few farmers were using the same system for soybean when the sugarcane was not cultivated.
- There is a complete lack of guidance to farmers both farm system suppliers and Agricultural Department personnel as regards the operation and maintenance of sprinkler and drip systems. Most systems were operating below the optimal pressure leading to non-uniform and inadequate irrigation. Training farmers in proper operation and maintenance of the pressurized systems is therefore necessary to fully exploit the potential benefits of these systems.
- Erratic power supply hampers the operation of the sprinkler/ drip systems. Even if there is water in the well, due to frequent load shading the systems can not be operated as required.
- There is a neglect of maintenance of water conservation structures leading to their slow deterioration. The structures have been handed over to respective Gram Panchayats for maintenance. There seems to be a lack of accountability. This needs to be streamlined.

### Details of project villages, farmers, crops and irrigation method

A field survey of CM VII round in PoCRA in three project villages i.e., Shelgi (Tal. Nilanga, Dist Latur), Ghugi and Lasona (Tal & Distt. Osmanabad) was done during the period 29 to 31 August 2022. The purpose of the field survey/ visit was to assess the irrigation cropping pattern adopted by farmers, especially in the last Kharif season, identify reasons for using drip irrigation for crops like soybean, and assess the functioning of NRM structures in the project area. The local field officers and staff of the State Agriculture Department facilitated the field visits and interactions with farmers. Interactions were held with the beneficiary farmers in each of the three villages as well as with representatives of the respective Gram Panchayat. The input/ information provided by the farmers was recorded in a proforma to know the field-level cropping and irrigation situation and the data required to work out crop water productivity. This was followed by field visits to see the NRM structures and the functioning of the sprinkler and drip irrigation systems on as many fields as possible.

The major crops cultivated in these three villages were soybean, sugarcane, onion, gram and coriander. All 15 farmers received the drip/ sprinkler irrigation sets through POCRA and are using them. It was found that the drip system is mainly used for sugarcane irrigation, while portable sprinkler sets are used for irrigating seasonal crops like soybean and onion. A few farmers are using semi-portable mini-sprinkler systems for coriander crops. It is becoming popular as the labour required to operate the system has minimized as also the water drops created through its sprinkler heads are suitable (do not damage) for tender crops like coriander. An attempt was made to collect the data required for computing the water productivity (yield of crop/ total water consumed by the crop) during farmers' interaction.



*Table A8.5 Details of the project villages, no. of farmers interacted and irrigation methods adopted*

Date	Village	No. of farmers interacted	Name of the crop (No. of farmers)	Irrigation method
29 August 2022	Shelgi, Tal: Nilanga	8	Sugarcane (3)	Drip
	Distt: Osmanabad		Soybean (4); Onion (1)	Portable sprinkler; mini-sprinkler
30 August 2022	Ghugi,	5	Sugarcane (4)	Drip
	Tal. & Distt: Osmanabad		Onion (1)	Portable sprinkler
31 August 2022	Lasona, Tal. & Distt. Osmanabad	2	Sugarcane (1)	Drip
			Soybean (1)	Portable sprinkler

### Status of water harvesting structures and their benefits

Water conservation and recharge structures like cement nala bud (CNB) and groundwater recharge shafts have been constructed at a few places in these villages. A series of groundwater recharge shafts have been constructed in Ghugi village catchment area, while one CNB was constructed in May 2020 in the Shelgi village area. As per the measurement book (MB), the dimensions of the CNB wall length, width and height were 6m, 2.39 m and 2.36 m, respectively, while the foundation height has been recorded as 1.2 meters. These dimensions are required to be checked as per the actual. The CNB structures could not be visited due to the occurrence of heavy rains on that day. It was told that due to CNB, the groundwater has been recharged and about 25 farmers within the influence area of about 500 ft have benefitted. Before the construction of the CNB, the groundwater was available until March only. However, post-construction the groundwater was available up to June. This has encouraged farmers to take one more additional crop in the summer. An important issue was brought out during interaction with farmers of Gugi village about the maintenance of the CNB. It was told that the structure has been handed over to Gram Panchayat, however, due to a lack of accountability its maintenance has been negligent. As regards the recharge shaft structures, these have been constructed along a nala in the village area. It was told that due to the structure, the groundwater availability in the nearby borewells has increased. However, again like CNB, there was a maintenance issue. Some of the components of the structure have been lost or found in damaged condition.

### Key observations, issues, and suggestions emerged from interaction with the farmers

#### Drip irrigation

Most farmers said that the use of drip irrigation for sugarcane is much more complex. The laterals are required to be rolled back at least three times during its growing period, viz., at the time of interculture and the harvest. The laterals get entangled in sugarcane plants and it becomes a very laborious and time-consuming task while retrieving them.

Farmers are unaware of the importance of pressure in drip irrigation system operation. Although pressure gauges have been installed, they become non-functional within one or two years. So, there is a need to ascertain that pressure gauges are properly installed and that their functioning is clearly explained to the farmer.

- Farmers said that the Sugarcane is irrigated as and when required from July to October, while from October to December irrigation is done at an interval of 15 days. From January to June (during summer) drip system is operated twice a week. As sugarcane is grown on deep black cotton soil, the irrigation interval even by drip irrigation is kept at 15 days. So proper advice to farmers as regards irrigation scheduling is required.
- Some farmers use sprinklers during the early/ initial months of sugarcane as the crop height is low (4 to 5 ft). It helps to decompose sugarcane leaves trash properly. The trash not only acts as a mulch, which suppresses weed growth but also reduces evaporation losses.
- Few farmers also apply the last two irrigations by surface/furrow method before harvesting as ample water was available in the well. Also, some farmers said that it is not possible to check in the field whether irrigation is being done properly through drip as the sugarcane crop becomes too dense.

- Most of the time electricity is not available for operating the pump. So, it is not possible to operate the drip system on regular basis. Load shading has become a common feature in the villages. Thus, the drip system can only be operated whenever electricity is available including at night hours.
- In Shelgi village, in the Kharif season, the maximum area (about 95 percent) is under soybean. For soybean crops, farmers prefer to use portable sprinkler system drip system and not drip. However, a drip system is used for soybean by those farmers who already have the drip set with them.
- In some fields, rats were reported to damage the drip laterals.
- Some farmers grow onion as an inter-crop in the drip-irrigated sugarcane field in the first year.
- In some places, the drippers are getting clogged due to salts in the water. Some farmers also complained that in some cases water testing was not done by the system supplier/ dealer before installation of the system.
- The field life of the lateral is usually found to be 4 to 5 years instead of 7 years as assured by the manufacturer.

### **Sprinkler irrigation**

- Sprinkler irrigated area coverage is 40 to 80 percent of the total irrigated area in the villages covered under POCRA.
- A portable sprinkler system is suitable for crops like soybean, onion and gram as the set is portable and can be installed and used quickly for protective irrigation.
- Sprinkler system is also used for irrigating crops like gram. It does not affect the flowering of the plants.
- Mini sprinkler is becoming popular among farmers for crops like onion and coriander. Being a fixed system, minimum labour is required for its operation as also irrigation can be applied during night hour. In the case of onion, the mini-sprinkler system was reported to increase the yield by almost 25 percent.
- One farmer said that in the case of onions if irrigation is applied by a portable sprinkler system after the bulbs are fully developed, they get damaged. So, the last 2 to 3 irrigations are applied through the surface method.
- An erratic power supply causes disturbances in the continuous operation of the sprinkler system.
- During day time, of the 8 hours, normally power is available for 3 to 4 hours that too intermittently.

### **Other**

- The majority of the farmers demanded to restart of the scheme of pipelines and pump set for conveying irrigation water as it reduces the substantial amount of water waste in earthen field channels also the water can be conveyed to fields located at higher elevations thereby enhancing the irrigated area coverage.
- Rain pipe sprinkler system is also popular in this area. The non-ISI set of a Rain Pipe (100-meter-length) is affordable (Rs.600 per set) without subsidy. However, its life is short (lasts for one year). The pipe becomes hard during the winter season and becomes difficult in rewinding.
- The subsidy is being released after a long waiting period, which is discouraging farmers to go for pressurized irrigation systems.
- There is a growing menace of wild swine who eat and damage the crop.

### **Observations on computing water productivity**

Under POCRA, the project development objectives are measured through a framework of 14 indicators. The foremost is the increase in water productivity at the farm level. The indicator measures the annual increase in water productivity at the sub-district (Taluka) level and is expressed as the ratio of agricultural production and evapotranspiration. It is measured from 3<sup>rd</sup> year of the project onwards and for the Kharif season only. It is expressed as a percentage change relative to the baseline value of 0.23 kg per cubic meter of water. A farm-level methodology for computing/modelling water productivity has been developed by IIT, Bombay as follows:

#### **Where;**

$$\text{Water productivity} = \frac{\text{yield (kg)}}{\text{Total water taken up by crop (Rainfall AET + watering AET)(m}^3\text{)}}$$

Yield = Weight of the harvested grain in kilograms in one acre of land.

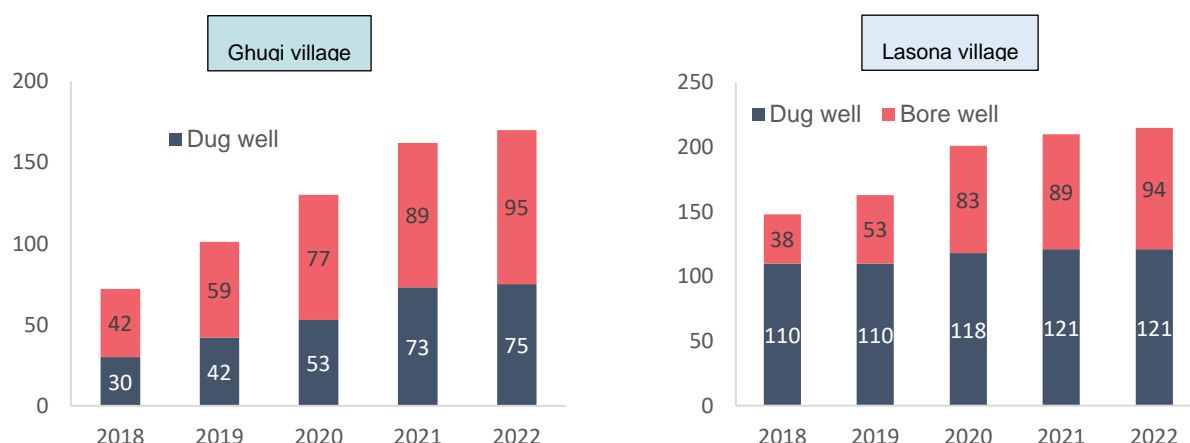
Rainfall AET= Water taken up by crop/ water available to the plant as Actual Evapotranspiration due to rainfall, m<sup>3</sup>

Watering AET = Extra watering provided to the plant as per irrigation method and the consequent Actual Evapotranspiration, m<sup>3</sup>.

The computation of the water productivity indicator is complex as it depends on several field parameters. Besides water, other factors like fertilizer and plant protection management, crop varieties and irrigation management may have a significant impact on the yield, hence on the utility of the indicator. The weaknesses in the collection of water productivity-related field data/ information can make this indicator vulnerable to errors. It is therefore proposed to revisit the utility of this indicator in assessing the project outcomes. Instead, other simple and robust indicators like the expansion of the irrigated area over the pre-project, and crop diversification may be used to monitor and evaluate the progress in achieving project objectives. The strength of the indicator is dependent on the correctness of various field-level parameters. The data collected during the farmer's interaction may not be factual. Water productivity calculations based on uncertain field parameters may lead to absurd results. In some instances, the farmer has taken intercrop in the main crop or uses different methods of irrigation during the crop growth. For the proper computation of the water productivity indicator, the data like actual sowing and harvesting dates, crop yield, number of irrigations and duration of each irrigation, and an average depth of water application should be collected and compiled at the farmer's end. 'Focal Farmers' may be identified and trained in select villages who will be able to keep the proper record of the required soil, crop and irrigation-related parameters. It is therefore proposed to revisit the water productivity indicator. An alternate robust indicator like expansion in the irrigated area compared to the pre-project could be a better indicator.

### Irrigation development in the villages.

Post-field visit, details of irrigation sources, season-wise irrigated area, crops grown in different seasons and methods of irrigation were compiled for two villages viz., Ghugi and Lasona. The figure below shows the year-wise growth of dug wells and bore wells, season-wise area irrigated and irrigation methods used.



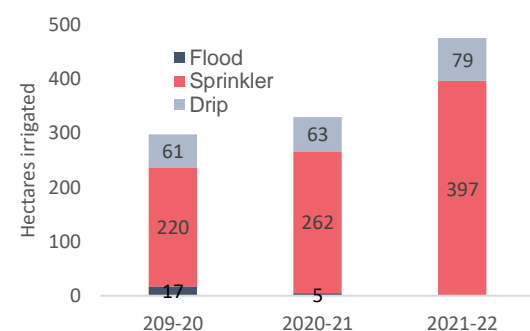
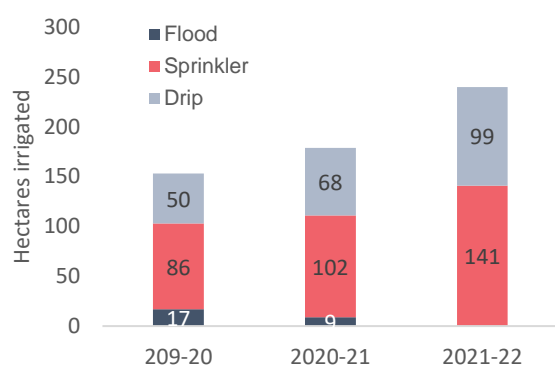
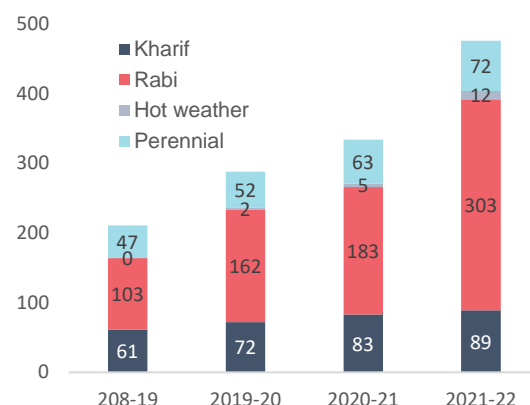
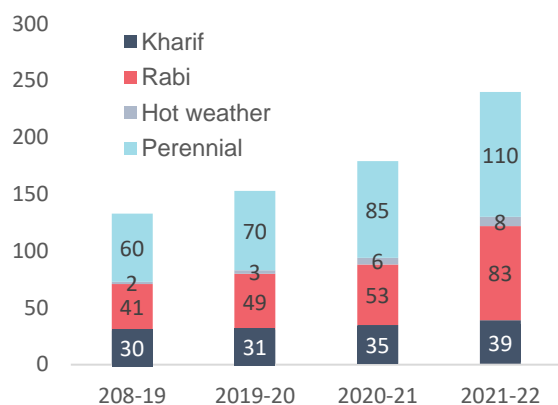


Figure A8.4 Year-wise growth of dug wells and bore wells, season-wise area irrigated, irrigation methods used

## Picture gallery





Mini-sprinkler irrigation for coriander



Portable sprinkler irrigation system for soybean



Drip irrigation for sugarcane



Defunct pressure gauge of a drip irrigation



Portable sprinkler system



Groundwater recharge shaft covered with grass



A lined farm pond



A dug well having abundant water



The tables below show the data/information collected from 15 farmers.

**(Field Visit on 29 August 2022)**

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Atul Govindrao Patil**

1.	Crops	Soybean, Pigeon Pea, Onion, Sugarcane Total land: 50 acres; total 8 holdings, 5 holdings are beneficiaries of POCRA
2.	Crop area (Acres)	Sugarcane (10 acres)
3.	Crop sowing date	November- December
4.	Crop harvesting date	January -February
5.	Crop yield	40 tons / acre
6.	Source of water for irrigation	Open well (2 nos); Bore wells (2 nos.)
7.	Dripper flow rate (LPH)	4LPH
8.	Spacing between two laterals and drippers (ft X ft)	6 ft X 1.25 ft.
9.	Sprinkler flow rate (LPS)	
10.	Sprinkler and lateral spacing (ft X ft)	
11.	Number of irrigations	As and when required
12.	Irrigation no:	No of days total no of hours
13.	Month:	4 hous
14.	Depth of soil	Wide from 4 ft 50 ft
15.	Type of soil	Deep black cotton soil
16.	Gat no / Survey no	13, 14, 15, and 16
17.	Reasons for using drip/ sprinkler irrigation	

**Comments:**

- When asked at what pressure his drip system operates, Shri Patil replied that although pressure gauge installation is necessary, it becomes non-functional within one or two years. So there is a need to see that the pressure gauge is properly installed and its functioning is clearly explained to the farmer.
- Sugarcane is irrigated from July to October period as and when required, while from October to December irrigation is done at an interval of 15 days. From January to June (during summer) drip

system is operated twice per week. As sugarcane is grown on deep black cotton soil, the irrigation interval even by drip irrigation is kept at 15 days.

- When asked why drip irrigation is not used by most farmers, Shri Patil said that the use of drip irrigation for sugarcane is much more complex. In the case of sugarcane, the laterals are required to be rolled back at least three times during its growing period, viz., twice at the time of intercultural and at harvest. The laterals get entangled in sugarcane plants and it becomes a very laborious and time-consuming task while retrieve laterals.
- A conventional (impact) sprinkler system is suitable for crops like soybean, onion and gram as the set is portable and can be installed and used quickly for protective irrigation. It does not affect the flowering and acidity of the plants. That period can be easily avoided for sprinkling.
- There is a need to restart the provision of pipelines and plumpest for conveying irrigation water as this saves a substantial amount of water waste as also the water can be conveyed to fields located at higher elevations.

(Field Visit on 29 August 2022)

## CROP WATER PRODUCTIVITY DATA / INFORMATION

Village: Shelgi

Taluka: Nilanga

District: Latur

Name of the Farmer: Bankat Bhujang Biradar

1.	Crops	Soybean, Green gram, Black gram, Sugarcane
2.	Crop area (Acres)	2.17 ha
3.	Crop sowing date	Soybean (June)
4.	Crop harvesting date	Soybean (October)
5.	Crop yield	10 quintals/ha
6.	Source of irrigation	Bore well
7.	Irrigation method	PVC pipes got under POCRA are used for water conveyance and rain pipes (perforated canvas pipe) which were purchased by the farmer himself were used for irrigation
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	As and when required (2nos)
13.	Irrigation no: Month:	
14.	Depth of soil	30 cm
15.	Type of soil	Light and coarse soil (Sandy loam)
16.	Gat no / Survey no	92
17.	Reasons for using drip/ sprinkler irrigation	As his fields are scattered, the pipeline got under POCRA is very useful to carry water from the source (bore well) to the distantly located at another field and also situated at higher elevation.

### Comments:

Rain pipe sprinkler system is also popular in this area. The non-ISI set of Rain Pipe (100-meter-long pipe) is cheap (Rs.600 per set). However, its life is less (lasts for one year) as also it is cumbersome to retrieve. The pipe becomes hard during the winter season and therefore poses a challenge in recollecting and storing. PoCRA should restart the scheme of pipeline and pump sets provision as there is great demand by farmers.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Bhagyashri Shankarrao Patil**

1.	Crops	Sugarcane (Variety: 86032)
2.	Crop area (Acres)	5.0 acres
3.	Crop sowing date	January 2018
4.	Crop harvesting date	First Crop: January 2019; 1 <sup>st</sup> ratoon: January 2020; <b>2<sup>nd</sup> ratoon: January 2021</b> , (present information pertains to this crop) 3 <sup>rd</sup> ratoon: January 22
5.	Crop yield	60 tons/acre
6.	Source of irrigation	Dug well,
7.	Irrigation method	Drip method
8.	Dripper flow rate (LPH)	4 LPH
9.	Spacing between two laterals and drippers (ft X ft)	5 ft X 1.25 ft.
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	30 nos. Kharip: As and when required, Rabi : at 15 days interval Summer: 10 days interval
13.	Depth of soil	3 to 4 ft
14.	Type of soil	Medium
15.	Gat no / Survey no	107
16.	Reasons for using drip/ sprinkler irrigation	The sugarcane yield without drip system was 40 ton/acre, while with drip it increased to 60 tone/ acre. Fertilizer application became much easier.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Ram Pandharinath Gundere**

1.	Crops	Soybean, Pigeon Pea
2.	Crop area (Acres)	1.35 ha
3.	Crop sowing date	June (soybean); June (Pigeon pea)
4.	Crop harvesting date	October (Soybean); January (Pigeon pea)
5.	Crop yield	Soybean (13 to 14 quintals/ ha); Pigeon pea (20 quintals/ha)
6.	Irrigation method	Dug well and Borewell (1); Sprinkler and drip
7.	Dripper flow rate (LPH)	
8.	Spacing between two laterals and drippers (ft X ft)	
9.	Sprinkler flow rate (LPS)	Standard provided in the set (Nagarjuna Company)
10.	Sprinkler and lateral spacing (ft X ft)	20ft X40 ft
11.	Number of irrigations	2 nos (as and when required)
12.	Irrigation no: Month:	No of days Total no of hours 16-20 hours
13.	Depth of soil	Vary from 2 ft to 6 ft
14.	Type of soil	Sandy loam and clay loam
15.	Gat no / Survey no	35 A
16.	Reasons for using drip/ sprinkler irrigation	Shortage of water, labour saving

**Comments:**

Ram is a young farmer and owns a "Krishi Sewa Kendra". He also works for "AFARM", an NGO which provides funds through CSR (presently by L&T) towards implementing agricultural water management activities. He also prepares a Village Water Budget and has his low-cost rainfall recorder. He recently purchased a soil moisture sensor to know the depth of soil moisture and the time to irrigate.



(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Rutvik Mohan Jadhav**

1.	Crops	Sugarcane
2.	Crop area (Acres)	2.5 acres
3.	Crop sowing/ planting date	First planting in 2019 (Suru), Variety: 86032
4.	Crop harvesting date	3 <sup>rd</sup> ratoon
5.	Crop yield	2 <sup>nd</sup> ratoon (2021-22); Total yield : 170 tonnes
6.	Source of irrigation	Dug well (2); Bore wells (2): 600 ft and 400 ft deep
7.	Irrigation method	On line drip
8.	Dripper flow rate (LPH)	Not known ( 4LPH?)
9.	Spacing between two laterals and drippers (ft X ft)	4 ft X 1.25 ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	As practiced in this area
13.	Irrigation no: And duration per irrigation	8 hours per ha
14.	Depth of soil	5 to 6 ft.
15.	Type of soil	Black cotton soil
16.	Gat no / Survey no	104
17.	Reasons for using drip/ sprinkler irrigation	Three times increase in irrigated area. One acre without drip and 3 acres with drip.

**Comments:**

- In Shelgi village, in the Kharif season, the maximum area (about 95 percent) is under soybean. For soybean, a drip system is used by those farmers who already have the drip set with them.
- Onion is the 2<sup>nd</sup> most popular crop and is mostly irrigated by a mini-sprinkler permanent system.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Mrs. Sangita Nilkanth Patil**

1.	Crops	Onion
2.	Crop area (Acres)	2.5 acres
3.	Crop sowing date	October 2021
4.	Crop harvesting date	March 2022
5.	Crop yield	20 tonnes /acre
6.	Source of irrigation	Water is lifted from Terna River by 10 HP pump for a distance of 10 km and delivered in a dug well. From there it is lifted by 7.5 HP pump set
7.	Irrigation method	Mini sprinkler
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate	600 LPH
11.	Sprinkler and lateral spacing (ft X ft)	8 m X 8 m
12.	Number of irrigations	As practiced in this area
13.	Irrigation no	8 hours per rotation
14.	Depth of soil	3 to 4 ft
15.	Type of soil	Medium
16.	Gat no / Survey no	107
17.	Reasons for using drip/sprinkler irrigation	Mini sprinkler has become popular among farmers as it is a fixed system and minimum labour is required for its operation. With this system, there was an increase in yield of onion by 25 percent. It is labour saving as irrigation can be run during night hours.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilanga**

**District: Latur**

**Name of the Farmer: Shivraj Shankar Rao Patil**

1.	Crops	Soybean
2.	Crop area (Acres)	5 acres
3.	Crop sowing date	June
4.	Crop harvesting date	October (duration 90 to 115 days)
5.	Crop yield	15 quintal/ acre
6.	Source of irrigation	Dug well
7.	Irrigation method	Conventional fully portable sprinkler system. (8 nozzles and 30 pipes of 75 mm HDPE)
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate (LPS)	Jain irrigation model
11.	Sprinkler and lateral spacing (ft X ft)	12 m X 12 m
12.	Number of irrigations	2 nos
13.	Irrigation no: Month:	For 3 to 5 days and 8 hours per day
14.	Depth of soil	3ft to 4 ft
15.	Type of soil	Medium
16.	Gat no / Survey no	28/1/A
17.	Reasons for using drip/ sprinkler irrigation	Water saving, labour saving, increase in yield, can be shifted from one field to another field

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Shelgi**

**Taluka: Nilianga**

**District: Osmanabad**

**Name of the Farmer: Venkatrao Bhimrao Biradar**

1.	Crops	Soybean
2.	Crop area (Acres)	10 acres
3.	Crop sowing date	15 June 2021
4.	Crop harvesting date	30 October 2021
5.	Crop yield	4 quintals / acre,
6.	Source of irrigation	Dug well (1), 50 ft deep
7.	Irrigation method	Fully portable sprinkler system, 70 pipes of HDPE and eight sprinklers. Purchased through POCRA in 2019-20
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate (LPS)	Not known
11.	Sprinkler and lateral spacing (ft X ft)	12 m X 12 m
12.	Number of irrigations	Two to three ( as and when required)
13.	Irrigation no: Month:	
14.	Depth of soil	One foot
15.	Type of soil	Medium
16.	Gat no / Survey no	21 A
17.	Reasons for using drip/ sprinkler irrigation	Sprinkler is suitable for soybean crop irrigation as it is portable and can be operated during night time.

**Comments:**

- The Farmer has applied for drip and mini-sprinkler systems for his remaining area. Mini-sprinkler is good for onion and coriander crops.
- The farmer said that the cost of the mini-sprinkler system is Rs. 80,000/- and has to be paid in advance. There should be an assurance of getting the subsidy amount from POCRA within 2 to 3 months so that a farmer can borrow the amount from a moneylender or a friend and return it within a maximum of 3 months. Since the subsidy is being released after a long duration, it has become difficult to get the money from the lenders.

(Field Visit on 30 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Ghugi**

**Taluka: Osmanabad**

**District: Osmanabad**

**Name of the Farmer: Balaji Bapurao Jawale**

1.	Crops	Sugarcane
2.	Crop area (Acres)	0.82 ha
3.	Crop sowing/ planting date	September 2020
4.	Crop harvesting date	January 2022
5.	Crop yield	75 tones (on 0.82 ha)
6.	Source of irrigation	Dug well, Bore well
7.	Irrigation method	Drip (paras Company)
8.	Dripper flow rate (LPH)	4LPH
9.	Spacing between two laterals and drippers (ft X ft)	4ft X 1.25ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	About 10
13.	Irrigation no: Month:	Sept.2020 to July 21 to November 21 June 2021: At 15 days interval October 2021: As required to Dec.21: At 15 days interval
14.	Depth of soil	10 ft
15.	Type of soil	Deep black cotton soil
16.	Gat no / Survey no	201
17.	Reasons for using drip/ sprinkler irrigation	It is not necessary to enter the field and inspect the irrigation while using drip/ sprinkler irrigation.

**Comments:**

- The farmer uses sprinklers during the early/initial months of sugarcane as the crop height is low (4 to 5 ft). It helps to decompose sugarcane leaves trash properly.
- The farmer has also applied two irrigations by surface/furrow before harvesting as ample water was available in the well. Also, it is not possible to check whether irrigation is being done properly through drip as the sugarcane crop becomes too dense.
- There is a growing menace of wild swine who eat and damage the crop.



(Field Visit on 30 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Ghugi**

**Taluka: Osmanabad**

**District: Osmanabad**

**Name of the Farmer: Dattu Laxman Jawale;**

1.	Crops	Sugarcane
2.	Crop area (Acres)	1.68 ha
3.	Crop sowing/ planting date	November 2020
4.	Crop harvesting date	January 2022
5.	Crop yield	Total 230 tonnes (Variety: 86032)
6.	Source of irrigation	Dugwell; Borewell (300 ft deep)
7.	Irrigation method	Drip (Kothari company)
8.	Dripper flow rate (LPH)	4 LPH
9.	Spacing between two laterals and drippers (ft X ft)	4 ft x 1,25 ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	
13.	Irrigation no: Month:	As per the prevailing practice in the village
14.	Depth of soil	3 ft
15.	Type of soil	medium
16.	Gat no / Survey no	88
17.	Reasons for using drip/ sprinkler irrigation	Area irrigated can be doubled

**Comments:**

- Most of the time electricity is not available for operating the pump. So it is not possible to operate the drip system on regular basis. This happens mainly due to frequent damage in the transformer (DP).
- The farmer requested to restart the earlier Pipe & Pump set scheme by POCRA as it has great potential to enhance the irrigated area coverage.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Ghugi**

**Taluka: Osmanabad**

**District: Osmanabad**

**Name of the Farmer: Govind Dadarao Jawale**

1.	Crops	Sugarcane
2.	Crop area (Acres)	0.4 ha
3.	Crop sowing date	November 2020
4.	Crop harvesting date	March 2022
5.	Crop yield	40 tons/acre (surface irrigated)
6.	Source of irrigation	Dug well
7.	Irrigation method	Until February 2022, Sugarcane was irrigated by surface method and since February 2022, through drip system
8.	Dripper flow rate (LPH)	4 LPH
9.	Spacing between two laterals and drippers (ft X ft)	4ft X 1.25ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	
13.	Irrigation no:	As required
	Month:	June to October
14.	Depth of soil	10 to 15 ft
15.	Type of soil	Deep black cotton
16.	Gat no / Survey no	137, 127
17.	Reasons for using drip/sprinkler irrigation	Sugarcane cultivation was possible due to drip as it uses less water. Fertilizer application has become easier and less labour is required.

**Comments:**

- The farmer has a total of 3.6 ha land (0.6 ha in Ghugi and 3.0 ha in Jaifal)
- Drip system (Kothari company) was installed in February 2022. Earlier it was irrigated by the surface (furrow) method,
- Rats damage the drip laterals,
- Load shedding is common in this area. Thus, the drip system can be operated whenever electricity is available including at night hours.

(Field Visit on 29 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

Village: **Ghugi**

Taluka: Osmanabad

District: Osmanabad

Name of the Farmer: Praful Limbraj Jawale

1.	Crops	Sugarcane
2.	Crop area (Acres)	10 acres
3.	Crop sowing date	October-November
4.	Crop harvesting date	October-November
5.	Crop yield	50 – 60 tons/ha
6.	Source of irrigation	Dugwell (50 ft deep); Borewell (500ft deep)
7.	Irrigation method	Drip
8.	Dripper flow rate (LPH)	4 LPH, Lateral dis: 20mm
9.	Spacing between two laterals and drippers (ft X ft)	6ft X 1.25 ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	As required
13.	Irrigation no: Month:	8 days interval June to October
		4 days interval October to June
14.	Depth of soil	10 ft deep
15.	Type of soil	Deep black cotton
16.	Gat no / Survey no	223
17.	Reasons for using drip/ sprinkler irrigation	

1.	Crops	Onion
2.	Crop area (Acres)	2 acres
3.	Crop sowing date	September
4.	Crop harvesting date	December
5.	Crop yield	10 tones / ha
6.	Source of irrigation	Dug well (50 ft deep); Borewell (500ft deep)
7.	Irrigation method	Portable Sprinkler system
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	40 ft X40 ft
12.	Number of irrigations	3 to 4 irrigations
13.	Irrigation no: Month:	Operating hours per set varies from 2 to 3 hours
14.	Depth of soil	7 to 10 ft deep
15.	Type of soil	Deep black cotton
16.	Gat no / Survey no	212
17.	Reasons for using drip/ sprinkler irrigation	

#### Comments:

- The farmer has a total of 22 acres of land
- Crops grown are soybean, sugarcane, gram, onion and Jowar
- Soybean and onion is irrigated by a sprinkler system
- It was observed that, if irrigation is applied after the onion bulbs are formed, they get damaged. So, the last 2 to 3 irrigations are applied through the surface method and the sprinkler system is not used.

(Field Visit on 31 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Lasona**

**Taluka: Osmanabad**

**District: Osmanabad**

**Name of the Farmer: Dattu Nivruti Yadav**

1.	Crops	Sugarcane
2.	Crop area (Acres)	2 acres
3.	Crop Planting date	October 2019
4.	Crop harvesting date	1 <sup>st</sup> ratoon - January 2020 2 <sup>nd</sup> ratoon- December 2021
5.	Crop yield	45 tons/acre
6.	Source of irrigation	Dug well,
7.	Irrigation method	Drip
8.	Dripper flow rate (LPH)	4 LPH
9.	Spacing between two laterals and drippers (ft X ft)	4 ft X 1.25 ft
10.	Sprinkler flow rate (LPS)	
11.	Sprinkler and lateral spacing (ft X ft)	
12.	Number of irrigations	July to October as required
13.	Irrigation no: Month:	November to February- 8 days interval March to June 4 days interval
14.	Depth of soil	3 to 4 ft
15.	Type of soil	Light (sandy loam)
16.	Gat no / Survey no	125
17.	Reasons for using drip/ sprinkler irrigation	Drip irrigation can be completed within a shorter duration compared to the traditional furrow method. Fertilizer saving is about 2/3 as liquid fertilizers can be used.

**Comments:**

- Onion is grown as inter-crop in the first year.
- Drippers are getting clogged due to salts in the water. Water testing was not done by the system supplier/ dealer.
- The life of the lateral is usually found to be 4 to 5 years instead of 7 years as assured by the manufacturer.



(Field Visit on 31 August 2022)

**CROP WATER PRODUCTIVITY DATA / INFORMATION**

**Village: Lasona**

**Taluka: Osmanabad**

**District: Osmanabad**

**Name of the Farmer: Govind Dattu Yadav**

1.	Crops	Soybean
2.	Crop area (Acres)	1 acre
3.	Crop sowing/ dibbling date	22 June 2021
4.	Crop harvesting date	30 September 2021
5.	Crop yield	8 quintals/ acre
6.	Source of irrigation	Dug well
7.	Irrigation method	Portable sprinkler
8.	Dripper flow rate (LPH)	
9.	Spacing between two laterals and drippers (ft X ft)	
10.	Sprinkler flow rate (LPS)	1350 to 1950 liters /hour (design discharge)
11.	Sprinkler and lateral spacing (ft X ft)	40 ft X 40 ft
12.	Number of irrigations	2 nos.
13.	Irrigation no: Month:	8 hours per day
14.	Depth of soil	1 to 2 ft
15.	Type of soil	Light
16.	Gat no / Survey no	129
17.	Reasons for using drip/ sprinkler irrigation	Labour and water saving

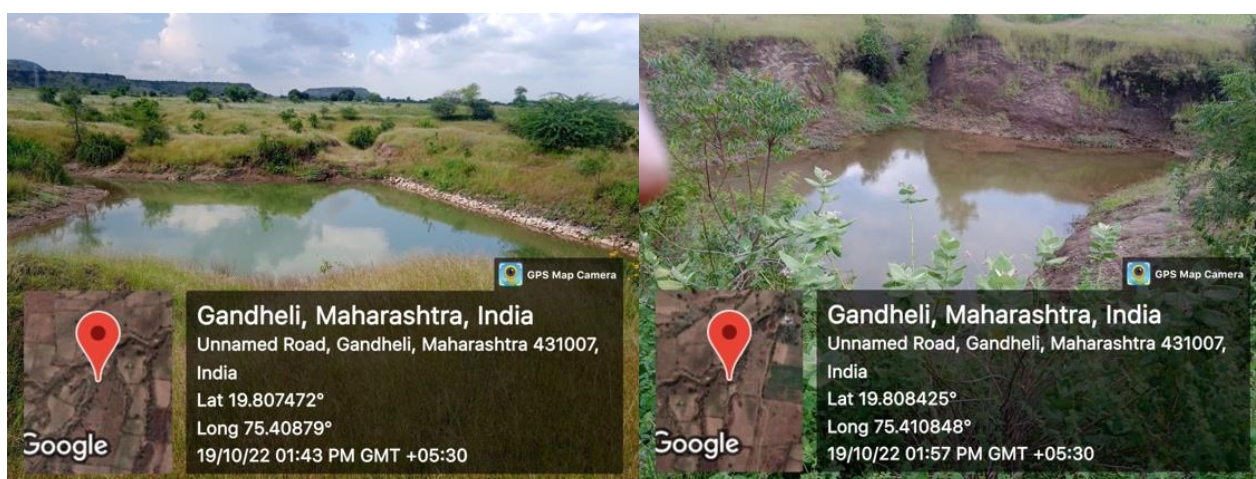
**Comments:**

- Erratic power supply causes disturbances in the continuous operation of the sprinkler system.
- During day time, normally power is available for 3 to 4 hours, that too intermittently.

## A8.9 GIS Expert

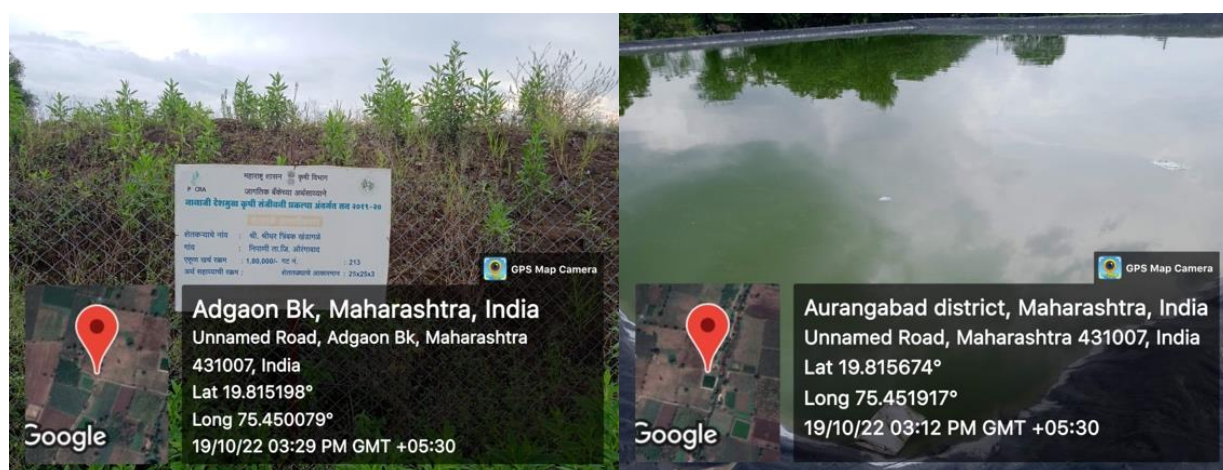
During the 19th and 20th of October 2022, a field visit was conducted in various villages of Aurangabad. During the visit, FPOs, Village agriculture Assistants and farmers were interacted with and interviewed.

On the 19th of October 2022, field visits were conducted at Nipani and Adgaon villages. During the Nipani village visit, Two Nala bund structures were visited; the structures were built under the NRM and PoCRA program and were completed in 2020. According to the farmers interviewed, they are doing horticulture all year after the construction of the Nala Bund. Farmers stated that they are making more money since the construction of the Nala Bund. They were harvesting traditional crops before the construction of the Nala Bund structure, and they switched to horticulture crops after the structure was completed. The two Nala bunds were constructed in accordance with the village development plan.



*Nala bund at Nipani villages with GPS location points*

On the afternoon of October 19th, visited Adgaon village. During the village visits, four farm ponds were visited; according to farmers, the farm pond was built in 2020, and they have been using it for two years. According to the village development plan, ten farm ponds were planned and ten are now built and operational. Some farm pond name and information boards were missing. During the interviews, farmers stated that the farm ponds were very useful to them. Throughout the year, they worked in agriculture. The protective fencing is damaged in a few farm ponds. This structure comes in helpful during the summer and non-rainy seasons. Water level and percolation have increased as a result of this structure. These farm ponds are beneficial to four to five farmers. The farmers requested and asked for more farm ponds to build. With these farm ponds, crop yield and revenue have both increased. When other farmers require water from the farm pond, they provide it. They were cropping vegetables and earning more money because of the availability of farm pond water.





*Photos of farm ponds at Adgaon village*

On the 20th of October 2022, a field visit was made to Pimpalgaon village, and four farm ponds were visited. Six farm ponds were built in the village, and ten farm ponds were planned according to village development plan. Six farm ponds will be completed around 2020, and farmers will begin using farm pond water in two years. According to farmers, the revenue has increased because of the farm pond and the availability of water. Fish farming is also carrying in one of the farm ponds. During the discussion, one farmer stated that they were using a shade net and a ploy house operation. This facility is also supported by PoCRA. Capsicum and cucumber are the most common crops grown under the shade net by farmers. The shade nets and ploy house visited during this time span cover four acres of land. Their plant growth was exceptional, and their yield was also exceptional; farmers are doing relatively well economically with the shade net. Farm ponds have greatly aided farmers, who were doing well economically prior to the construction of farm ponds.



*Photos of farm ponds in Pimpalgaon village*



S.NO	Village Name	Structure Type	Planned number according to Village development plan	Status
1	Nipani	Nala bund	2	2 built and in operational
2	Adgaon	Nala bund	2	2 built and in operational
3	Adgaon	Farm pond	10	10 built and in operational
4	Pimpalgaon	Farm pond	10	6 built and in operational

## Annexure 9: Progress monitoring based on Results Framework (RF) indicators

Table A9. 1 RF Indicators

Indicator No. <sup>13</sup>	Indicator	Measurement technique and data source	Progress at CM Round 7
5	<i>Number of farmers reached with agricultural assets or services (% of female)</i>	<p>The data on the number of farmers reached with assets or services have been collected from the project MIS, associated applications and relevant project personnel from PMU. The number of direct beneficiaries of the PoCRA includes:</p> <p>1. The data on individual grant beneficiaries have been taken from the DBT portal.</p> <p>2. The data of beneficiaries of FFS has been taken from the FFS application.</p>	<p>Total Disbursement online- 1718918 (37585 Female and 171830 Male)</p> <p>Total Number of FFS participants to date are 497579. The total number of Guest farmers is 478721 and the host farmers were 18858. <i>Total Number of host farmers who attended during the season of Rabi 2021-22 is 2400 (344 female farmers and 2056 male Farmer). The total number of guest farmers who attended the FFS sessions is 43490 (5647 female farmers and 37843 male farmers) Current Round</i></p>
7	<i>Area provided with new/improved irrigation or drainage services (in ha)</i>	<p>The data on the area with new or improved irrigation services and drainage services through individual activities under the project have been taken from the DBT portal report. The data on community-level new/improved irrigation services has been taken from Project Specialists of the project districts.</p> <p>Total area under Irrigation Projects= IP (Irrigation Project)<sub>1</sub>*Area under irrigation project+ IP (Irrigation Project)<sub>2</sub>*Area under irrigation project+ IP (Irrigation Project)<sub>n</sub>*Area under irrigation project</p>	<p>Area provided with</p> <p>1. With water pumps only = 22442 Ha</p> <p>2. With only pipes is = 18604 Ha</p> <p>3. Sprinkler area =109973.4 Ha</p> <p>4. Drip area = 110234.2 Ha</p> <p>Total Area = 261253.60 Ha</p>
8	<i>Surface water storage capacity from new farm and community ponds (in 1,000 m3)</i>	<p>The data on individual-level farm ponds will be taken from the DBT portal report. The data on community farm ponds have been taken from DBT Portal.</p> <p>Total Water storage capacities of new Farm Ponds = FP (Farm Pond)  <sub>1</sub>*Storage capacity of FP+ FP</p>	27134.73 (1000 m3)

<sup>13</sup> as per PoCRA Results Framework

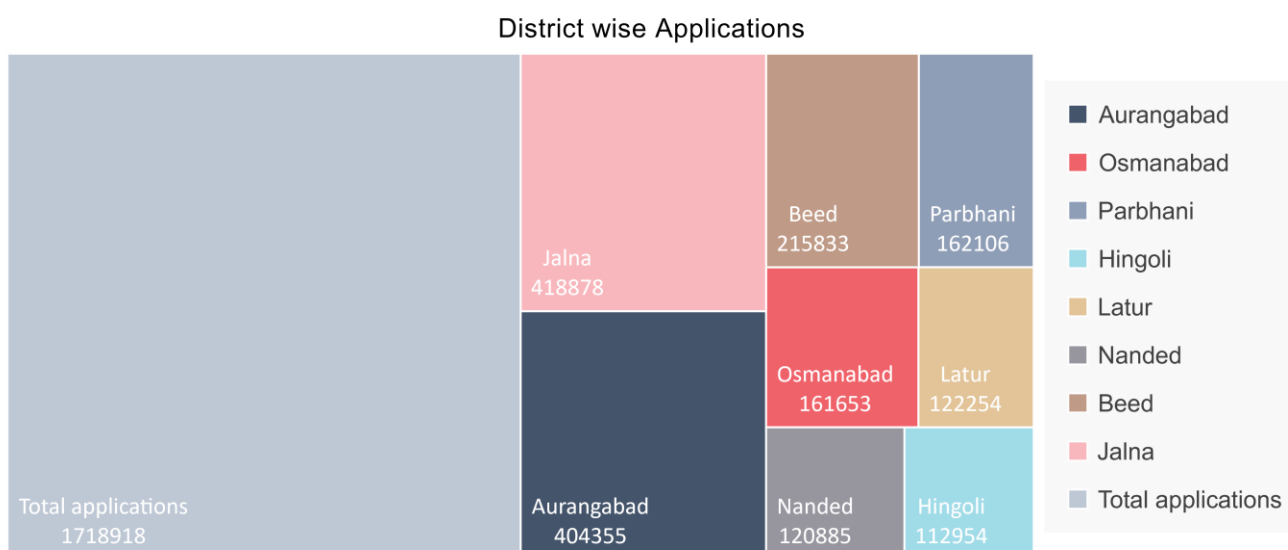
Indicator No. <sup>13</sup>	Indicator	Measurement technique and data source	Progress at CM Round 7
		$2^{\text{nd}}$ *Storage capacity of FP+.....+ FP $n^{\text{th}}$ *Storage capacity of FP	
		<p>Total Water storage capacities of new Community Ponds = CP (Community Pond) <math>1^{\text{st}}</math>*Storage capacity of CP+ CP</p> $2^{\text{nd}}$ *Storage capacity of CP+.....+ CP $n^{\text{th}}$ *Storage capacity of CP	
11.	<i>Number of the project-supported FPCs with growth in annual profits</i>	<p>With the support of PS agriculture, the FPC representatives were contacted and their annual profit details for the current year and last were enquired. Based on the analysis of the change in annual profits of the</p> <p>supported FPCs this indicator was to be calculated</p>	A total of 608 FPCs are supported through PoCRA in the Marathwada region until 30 <sup>th</sup> September 2022. The RF indicator implying the number of project-supported FPCs with growth in annual profit can only be estimated after analyzing their audited statements for at least three consecutive financial years. We are in process of analysis and will provide the estimate for the indicator in the CM VIII report.
14	<i>Number of approved participatory mini watershed plans implemented / under implementation</i>	This indicator will be reported as an absolute number of participatory mini watershed plans approved by Gram Sabha. The information is collected by the microplanning agencies from the offices of the SDAOs. The microplanning agencies submit the validated mini watershed plans to the PMU where the data is recorded by the M&E specialist.	The number of approved participatory mini watershed plans implemented/under implementation is 533 till 31 <sup>st</sup> March 2022.



## Annexure 10: Insights from PoCRA MIS Data

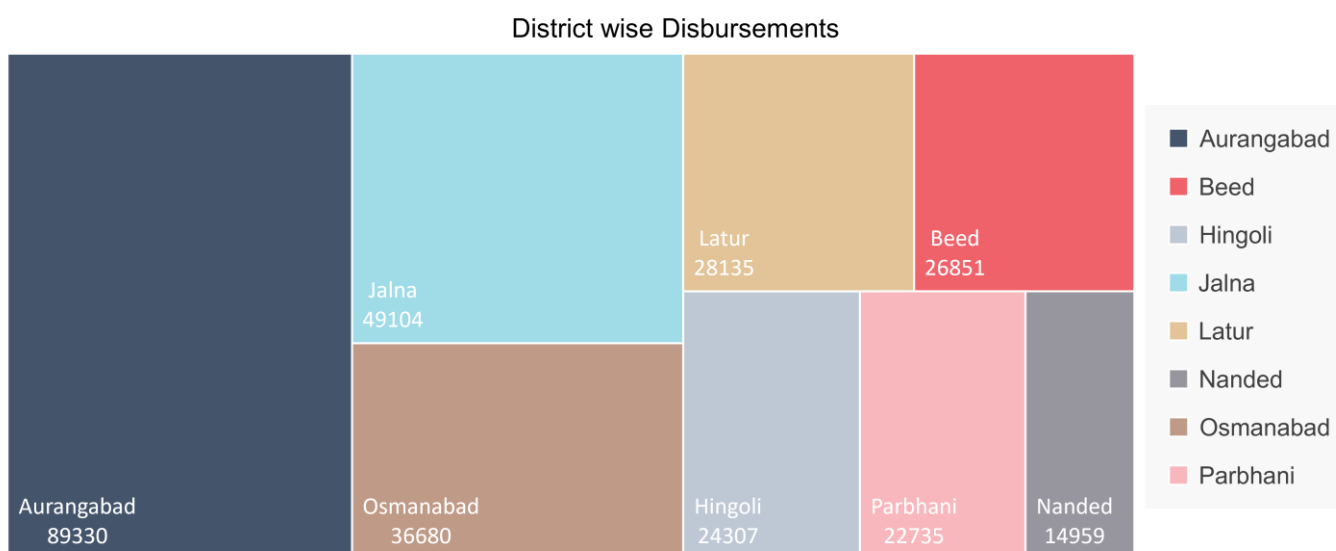
This section presents the analysis of the project's MIS data till 31st March 2022. This would help to understand the current implementation status of the project and draw insights from the same.

### Application Status



The total number of applications done for the activities under the project was 1718918. The District of Jalna was leading in terms of application which accounted for 24.37% of total applications for the activities followed by Aurangabad (23.52%). The district with the least application was Hingoli with only 6.57% of total applications. The total number of applications done by women for activities accounted for 18.87%. Jalna also leads the other district where the percentage of activities applied by women is more (4.95%) which is followed by Aurangabad (4.74%). The smaller number of women applications was found to be in the district of Hingoli with only 1% of women having applied out of the total applications in Marathwada.

### Review of active Disbursements as of 31st March 2022



The maximum number of disbursements were allotted in the district of Aurangabad where 30% of the total disbursements were allocated followed by the Jalna with 17% of disbursements. The least number of disbursements were allotted in the district of Nanded (5%).

The highest number of disbursements to date was to be found in the activity of drip where a total of 43% of the disbursement was spent on the single activity followed by the Shade Net (14.79%) followed by Sprinkler (13.87%) and Horticulture (7.68%).

*Table A10.1 Details of activity-wise disbursement*

Activity	Sum of Disbursed Amount (Rs.)	% of distribution
Agroforestry	1354368	0.01
Apiculture	17800017	0.16
Backyard Poultry	177250	0.00
Community Farm Pond	612375524	5.59
Compost (Vermicompost / NADEP / Organic input production unit)	1254795	0.01
Drip Irrigation	4773729234	43.54
Farm Mechanization	116727752	1.06
Farm pond lining	182202332.9	1.66
FFS Host Farmer Assistance	10663786	0.10
Horticulture Plantation	842032266.5	7.68
Individual Farm Pond	274618603.8	2.50
Inland Fisheries	30435304	0.28
Pipes	290677944	2.65
Planting material in polytunnels / Polyhouse / Shadenet house	30770326	0.28
Polyhouse/ Polytunnels	77724770	0.71
Promotion for BBF Technology	215590	0.00
Recharge of opendug wells	449093	0.00
Seed Production	108780599.7	0.99
Sericulture	123789917	1.13
Shadenet House	1621129510	14.79
Small ruminants	34847674	0.32
Sprinkler Irrigation	1520176407	13.87
Water Pumps	271076381	2.47
Well	21078400	0.19
<b>Grand Total</b>	<b>10964087844</b>	

## Male and Female wise Disbursement

Out of the total Disbursements, 53,860 disbursements were allocated to women beneficiaries, which is about 18.8% of the total disbursements. Amongst all the activities the highest percentage of disbursements to women was done in the activity of Small Ruminants where the women percentage was 46%. The other disbursements where women participation was more was recorded as Well (36%) followed by Agroforestry (24%).





*Table A10. 2 Details of activity-wise male and female beneficiaries*

Activity	Disbursements to women	Disbursements to Men	% Female Farmers	% Male Farmers
Agroforestry	46	141	24.60	75.40
Apiculture	35	115	23.33	76.67
Backyard Poultry	4	15	21.05	78.95


Activity	Disbursements to women	Disbursements to Men	% Female Farmers	% Male Farmers
Community Farm Pond	686	2454	21.85	78.15
Compost (Vermicompost / NADEP / Organic input production unit)	33	174	15.94	84.06
Drip Irrigation	16970	68209	19.92	80.08
Farm Mechanization	208	1740	10.68	89.32
Farm pond lining	478	1896	20.13	79.87
FFS Host Farmer Assistance	420	3454	10.84	89.16
Horticulture Plantation	5741	21756	20.88	79.12
Individual Farm Pond	659	2553	20.52	79.48
Inland Fisheries	265	1191	18.20	81.80
Pipes	3490	15114	18.76	81.24
Planting material in polytunnels / Polyhouse / Shadenet house	58	224	20.57	79.43
Polyhouse/ Poly tunnels	18	56	24.32	75.68
Promotion for BBF Technology	51	160	24.17	75.83
Recharge of open dug wells	7	39	15.22	84.78
Seed Production	2975	12258	19.53	80.47
Sericulture	423	1811	18.93	81.07
Shadenet House	500	1796	21.78	78.22
Small ruminants	684	785	46.56	53.44
Sprinkler Irrigation	16117	83787	16.13	83.87
Water Pumps	3741	18701	16.67	83.33
Well	71	123	36.60	63.40
<b>Grand Total</b>	<b>53680</b>	<b>238552</b>		

# Annexure 11: Verification of Agribusiness Assets

Table A11.1 List of project-supported FPCs which were visited during the CM VII round survey

SN	District	Taluka	Village	FPC Name	Remark	Photo
1	Jalna	Ghansavangi	Ghansavangi	P R Dhait Agro Producer Company Limited	All equipment were in good condition and present in shed. Date: 13/08/22 Time: 12:35 Lat: 19.52611 Long: 75.98594	
2	Aurangabad	Sillod	Borgaon	Shejul brother Farmer Producer Company	Tractor and Trolley available at the site, other equipment were available with farmers. Date: 13/08/22 Time: 12:35 Lat: 19.52611 Long: 75.98594	
3	Aurangabad	Sillod	Sisarkheda	Wangi Budruk Farmer Producer Company Ltd.	Rotavator and seed drill were available at the site but were not in the shed Date: 12/08/22 Time: 13:14 Lat: 20.35572 Long: 75.56427	
4	Beed	Kaij	Dharmala	Pawan Pratik Afro Producer Company	Equipment found in good condition in shed Date: 18/08/22 Time: 11:06 Lat: 18.78968 Long: 76.05946	

SN	District	Taluka	Village	FPC Name	Remark	Photo
5	Hingoli	Sengoan	Khajmapur	Khodkeshwar Farmer Producer Company	Equipment available and in good condition Date: 21/08/22 Time: 11:38 Lat: 19.37202 Long: 77.27697	
6	Hingoli	Basmath	Adgaon	Kote Bandhu Farmers Producer Company Limited	Equipment in good condition found at the site Date: 18/08/22 Time: 16:09 Lat: 19.34717 Long: 77.232	
7	Latur	Ausa	Limbala Dau	Kedareswar Agrotech Producer Company Limited	Equipment were in good operational condition Date: 23/08/22 Time: 11:14 Lat: 18.08038 Long: 76.5053	
8	Nanded	Nanded	Tuppa	Kadam Tuppekar Farmer Producer Company Limited	Equipment available in Shed and in good condition Date: 21/08/22 Time: 10:44 Lat: 19.10253 Long: 77.35435	

SN	District	Taluka	Village	FPC Name	Remark	Photo
9	Nanded	Nanded	Chimegaon	Vishwajeet Farmers Producer Company Limited	<p>Equipment were available in the CHC shed and were in good operational condition</p> <p>Date: 21/08/22 Time: 09:52 Lat: 19.23541 Long: 77.26544</p>	 <p> <small>           21/08/2022 09:52            19.23541, 77.26544            (21°19'34"N 77°15'55"E) Maharashtra 431103E         </small> </p>



## Annexure 12: List of Sample Project and Comparison Villages for CM VII Round

Cluster Code	District	Subdivision	Taluka	Census	Village	Village	Phase
515_Gv-53_05	Aurangabad	Aurangabad	Paithan	549545	Nandar	Project	1
523_Gv-78_02	Beed	Majalgaon	Wadwani	559421	Devla Bk.	Project	1
514_Gp-37_03	Jalna	Partur	Partur	548057	Shelgaon	Project	1
524_Mr-45_04	Latur	Latur	Nilanga	560819	Shelgi	Project	1
513_Gv-79_03	Parbhani	Parbhani	Manwath	546858	Wazur Bk	Project	1
515_Gv-43_04	Aurangabad	Vaijapur	Vaijapur	549176	Deogaon Shani	Project	2
515_Gv-34_02	Aurangabad	Vaijapur	Vaijapur	549014	Wakla	Project	3
515_Gv-34_04	Aurangabad	Vaijapur	Vaijapur	549022	Sawkhed Khandala	Project	3
515_Gv-42_03	Aurangabad	Vaijapur	Gangapur	549329	Manjari	Project	1
523_Gv-56_03	Bid	Manjlegaon	Georai	559104	Umapur	Project	2
523_Gv-90_04	Bid	Ambejogai	Parli	559967	Maralwadi	Project	3
512_Ppg-10_01	Hingoli	Hingoli	Kalamnuri	546133	Dholkyachi Wadi	Project	2
512_Ppg-8_03	Hingoli	Hingoli	Kalamnuri	546223	Dhardhawanda	Project	3
514_Gpd-1_01	Jalna	Jalna	Bhokardam	547287	Padmavati	Project	2
514_Gp-36_02	Jalna	Partur	Partur	548050	Satona Kh.	Project	2
514_Gp-26_03	Jalna	Partur	Ambad	547808	Dudhpuri	Project	2
514_Gv-63_03	Jalna	Partur	Gahansawai	547961	Ghansawangi	Project	3
524_Mr-27_01	Latur	Latur	Latur	560177	Gangapur	Project	3
524_Mr-48_02	Latur	Udgir	Deoni	560908	Dawan Hipparga	Project	3
524_Gv-96_02	Latur	Udgir	Ahmadpur	560319	Nagzari	Project	3
511_Gv-100_05	Nanded	Nanded	Ardhapur	544616	Kondha	Project	1
511_Gv-105_02	Nanded	Nanded	Mudkhed	544779	Wardada	Project	2
511_Npg-14_02	Nanded	Kinwat	Mahoor	544149	Dahegaon (Sa.)	Project	3
525_Bm-134_02	Osmanabad	Osmanabad	Lohara	561674	Achaler	Project	2
525_Sa-38_04	Osmanabad	Osmanabad	Tuljapur	561580	Khadki	Project	3
525_Mr-11_03	Osmanabad	Bhum	Kalamb	561321	Saundana Amba	Project	3
525_Bm-9a_03	Osmanabad	Osmanabad	Umarga	561693	Gugalgaon	Project	2
525_Sa-29a_03	Osmanabad	Bhum	Paranda	561095	Dhagpimpri	Project	2
513_Gp-51_02	Parbhani	Parbhani	Manwath	546830	Kharba	Project	2
513_Gp-59_02	Parbhani	Parbhani	Parbhani	546771	Sonna	Project	3
515_Te-15a_03	Aurangabad	Sillod	Soegoan	548493	Dhanwat	Comparison	
515_Gp-8_02	Aurangabad	Aurangabad	Phulambri	548740	Chincholi Bk	Comparison	
515_Gp-2_04	Aurangabad	Sillod	Kannad	548393	Bharamba Tanda	Comparison	
523_Gv-61_03	Bid	Manjlegaon	Georai	559113	Kaudgaon	Comparison	
523_Gv-86_01	Bid	Manjlegaon	Dharur	559835	Surnarwadi	Comparison	
512_Ppg-5_03	Hingoli	Hingoli	Hingoli	545972	Borala	Comparison	
514_Gp-24_02	Jalna	Jalna	Badnapur	547741	Ambadgaon	Comparison	
514_Gv-60_03	Jalna	Partur	Ambad	547882	Rui	Comparison	

Cluster Code	District	Subdivision	Taluka	Census	Village	Village	Phase
524_Mr-52_01	Latur	Udgir	Udgir	560976	Mutalgaon	Comparison	
524_Mr-55_01	Latur	Udgir	Deoni	560886	Dharmapuri	Comparison	
511_Mr-49_02	Nanded	Deglur	Mukhed	545447	Wartala	Comparison	
525_Mr-18a_04	Osmanabad	Osmanabad	Osmanabad	561410	Kamegaon	Comparison	
525_Mr-17_02	Osmanabad	Osmanabad	Osmanabad	561402	Arni	Comparison	
513_Gv-95_01	Parbhani	Parbhani	Palam	547106	Sheikh Rajura	Comparison	
513_Gp-61_01	Parbhani	Parbhani	Purna	547237	Khambegaon	Comparison	

## Annexure 13. List of Stakeholders Interviewed

### List of Agriculture Assistants interviewed

Cluster Code	District	Subdivision	Taluka	Census Code	Village
525_Bm-134_02	Osmanabad	Osmanabad	Lohara	561674	Achaler
511_Npg-14_02	Nanded	Kinwat	Mahoor	544149	Dahegaon (Sa.) (N.V.)
524_Mr-48_02	Latur	Udgir	Deoni	560908	Dawan Hipparga
515_Gv-43_04	Aurangabad	Vaijapur	Vaijapur	549176	Deogaon Shani
523_Gv-78_02	Beed	Majalgaon	Wadwani	559421	Devla Bk.
525_Sa-29a_03	Osmanabad	Bhum	Paranda	561095	Dhagpimpri
512_Ppg-8_03	Hingoli	Hingoli	Kalamnuri	546223	Dhardhawanda
512_Ppg-10_01	Hingoli	Hingoli	Kalamnuri	546133	Dholkyachi Wadi
514_Gp-26_03	Jalna	Partur	Ambad	547808	Dudhpuri
524_Mr-27_01	Latur	Latur	Latur	560177	Gangapur
514_Gv-63_03	Jalna	Partur	Gahansawangi	547961	Ghansawangi
525_Bm-9a_03	Osmanabad	Osmanabad	Umarga	561693	Gugalgaon
525_Sa-38_04	Osmanabad	Osmanabad	Tuljapur	561580	Khadki
513_Gp-51_02	Parbhani	Parbhani	Manwath	546830	Kharba
511_Gv-100_05	Nanded	Nanded	Ardhapur	544616	Kondha
515_Gv-42_03	Aurangabad	Vaijapur	Gangapur	549329	Manjari
524_Gv-96_02	Latur	Udgir	Ahmadpur	560319	Nagzari
515_Gv-53_05	Aurangabad	Aurangabad	Paithan	549545	Nandar
514_Gpd-1_01	Jalna	Jalna	Bhokardam	547287	Padmavati
514_Gp-36_02	Jalna	Partur	Partur	548050	Satona Kh.
525_Mr-11_03	Osmanabad	Bhum	Kalamb	561321	Saundana Amba
515_Gv-34_04	Aurangabad	Vaijapur	Vaijapur	549022	Sawkhed Khandala
524_Mr-45_04	Latur	Latur	Nilanga	560819	Shelgi
513_Gp-59_02	Parbhani	Parbhani	Parbhani	546771	Sonna
523_Gv-56_03	Bid	Manjlegaon	Georai	559104	Umapur
515_Gv-34_02	Aurangabad	Vaijapur	Vaijapur	549014	Wakla

## List Cluster Assistants Interviewed

Cluster Code	District	Subdivision	Taluka	Census Code	Village
525_Bm-134_02	Osmanabad	Osmanabad	Lohara	561674	Achaler
511_Npg-14_02	Nanded	Kinwat	Mahoor	544149	Dahegaon (Sa.) (N.V.)
524_Mr-48_02	Latur	Udgir	Deoni	560908	Dawan Hipparga
515_Gv-43_04	Aurangabad	Vaijapur	Vaijapur	549176	Deogaon Shani
523_Gv-78_02	Beed	Majalgaon	Wadwani	559421	Devla Bk.
525_Sa-29a_03	Osmanabad	Bhum	Paranda	561095	Dhagpimpri
512_Ppg-8_03	Hingoli	Hingoli	Kalamnuri	546223	Dhardhawanda
514_Gp-26_03	Jalna	Partur	Ambad	547808	Dudhpuri
524_Mr-27_01	Latur	Latur	Latur	560177	Gangapur
525_Bm-9a_03	Osmanabad	Osmanabad	Umarga	561693	Gugalgaon
525_Sa-38_04	Osmanabad	Osmanabad	Tuljapur	561580	Khadki
513_Gp-51_02	Parbhani	Parbhani	Manwath	546830	Kharba
515_Gv-42_03	Aurangabad	Vaijapur	Gangapur	549329	Manjari
523_Gv-90_04	Bid	Ambejogai	Parli	559967	Maralwadi
524_Gv-96_02	Latur	Udgir	Ahmadpur	560319	Nagzari
515_Gv-53_05	Aurangabad	Aurangabad	Paithan	549545	Nandar
514_Gpd-1_01	Jalna	Jalna	Bhokardam	547287	Padmavati
525_Mr-11_03	Osmanabad	Bhum	Kalamb	561321	Saundana Amba
513_Gp-59_02	Parbhani	Parbhani	Parbhani	546771	Sonna
523_Gv-56_03	Bid	Manjlegaon	Georai	559104	Umapur
515_Gv-34_02	Aurangabad	Vaijapur	Vaijapur	549014	Wakla
511_Gv-105_02	Nanded	Nanded	Mudkhed	544779	Wardada
513_Gv-79_03	Parbhani	Parbhani	Manwath	546858	Wazur Bk

## List of Agricultural Supervisors Interviewed

Cluster Code	District	Subdivision	Taluka	Census Code	Village
515_Gv-43_04	Aurangabad	Vaijapur	Vaijapur	549176	Deogaon Shani
523_Gv-78_02	Beed	Majalgaon	Wadwani	559421	Devla Bk.
525_Sa-29a_03	Osmanabad	Bhum	Paranda	561095	Dhagpimpri
512_Ppg-10_01	Hingoli	Hingoli	Kalamnuri	546133	Dholkyachi Wadi
525_Bm-9a_03	Osmanabad	Osmanabad	Umarga	561693	Gugalgaon
525_Sa-38_04	Osmanabad	Osmanabad	Tuljapur	561580	Khadki
513_Gp-51_02	Parbhani	Parbhani	Manwath	546830	Kharba
511_Gv-100_05	Nanded	Nanded	Ardhapur	544616	Kondha
515_Gv-42_03	Aurangabad	Vaijapur	Gangapur	549329	Manjari
515_Gv-53_05	Aurangabad	Aurangabad	Paithan	549545	Nandar
514_Gpd-1_01	Jalna	Jalna	Bhokardam	547287	Padmavati
525_Mr-11_03	Osmanabad	Bhum	Kalamb	561321	Saundana Amba

Cluster Code	District	Subdivision	Taluka	Census Code	Village
523_Gv-56_03	Bid	Manjlegaon	Georai	559104	Umapur
515_Gv-34_02	Aurangabad	Vaijapur	Vaijapur	549014	Wakla
511_Gv-105_02	Nanded	Nanded	Mudkhed	544779	Wardada

### List of Krishi Tai Interviewed

Cluster Code	District	Subdivision	Taluka	Census Code	Village
515_Gv-43_04	Aurangabad	Vaijapur	Vaijapur	549176	Deogaon Shani
525_Sa-29a_03	Osmanabad	Bhum	Paranda	561095	Dhagpimpri
512_Ppg-8_03	Hingoli	Hingoli	Kalamnuri	546223	Dhardhawanda
524_Mr-27_01	Latur	Latur	Latur	560177	Gangapur
514_Gv-63_03	Jalna	Partur	Gahansawangi	547961	Ghansawangi
511_Gv-100_05	Nanded	Nanded	Ardhapur	544616	Kondha
515_Gv-42_03	Aurangabad	Vaijapur	Gangapur	549329	Manjari
523_Gv-90_04	Bid	Ambejogai	Parli	559967	Maralwadi
524_Gv-96_02	Latur	Udgir	Ahmadpur	560319	Nagzari
515_Gv-53_05	Aurangabad	Aurangabad	Paithan	549545	Nandar
514_Gpd-1_01	Jalna	Jalna	Bhokardam	547287	Padmavati
514_Gp-36_02	Jalna	Partur	Partur	548050	Satona Kh.
525_Mr-11_03	Osmanabad	Bhum	Kalamb	561321	Saundana Amba
515_Gv-34_04	Aurangabad	Vaijapur	Vaijapur	549022	Sawkhed Khandala
524_Mr-45_04	Latur	Latur	Nilanga	560819	Shelgi
523_Gv-56_03	Bid	Manjlegaon	Georai	559104	Umapur
515_Gv-34_02	Aurangabad	Vaijapur	Vaijapur	549014	Wakla
511_Gv-105_02	Nanded	Nanded	Mudkhed	544779	Wardada
513_Gv-79_03	Parbhani	Parbhani	Manwath	546858	Wazur Bk

### List of FFS Facilitator Interviewed

Cluster Code	District	Subdivision	Taluka	Census Code	Village
524_Mr-27_01	Latur	Latur	Latur	560177	Gangapur
523_Gv-90_04	Bid	Ambejogai	Parli	559967	Maralwadi
523_Gv-90_04	Bid	Ambejogai	Parli	559967	Maralwadi
524_Gv-96_02	Latur	Udgir	Ahmadpur	560319	Nagzari
515_Gv-34_04	Aurangabad	Vaijapur	Vaijapur	549022	Sawkhed Khandala
513_Gp-59_02	Parbhani	Parbhani	Parbhani	546771	Sonna

## List of FPC Representatives Interviewed

SN	District	Taluka	Village	FPC Name
1	Aurangabad	Sillod	Borgaon	Shejul Brother Farmer Producer Company
2	Aurangabad	Sillod	Sisarkheda	Wangi Budruk Farmer Producer Company
3	Beed	Kaij	Dharmala	Pawan Pratik Afro Producer Company
4	Beed	Patoda	Waghira	Waghira Agro Producer Company
5	Hingoli	Sengoan	Khajmapur	Khodkeshwar Farmer Producer Company
6	Hingoli	Basmath	Adgaon	Kote Bandhu Farmers Producer Company
7	Jalna	Ghansavangi	Ghansavangi	P R Dhait Agro Producer Company
8	Jalna	Ghansavangi	Ghansavangi	Manling Agro Producer Company
9	Latur	Ausa	Limbala Dau	Kedareshwar Agrotech Producer Company
10	Latur	Latur	Murud	Alok Farmer Producer Company
11	Nanded	Nanded	Tuppa	Kadam Tuppekar Farmer Producer Company
12	Nanded	Nanded	Chimegaon	Vishwajeet Farmers Producer Company
13	Osmanabad	Osmanabad	Palsap	Narwade Agro Producer Company
14	Osmanabad	Osmanabad	Upala	ODSR Agro Producer Company
15	Parbhani	Parbhani	Rahati	Dhansanchay Agro Producer Company
16	Parbhani	Parbhani	Jamb	Dattaprayag Agro Producer Company

## List Of TAO Interviewed

District	Subdivision	Taluka
Aurangabad	Vaijapur	Vaijapur
Beed	Majalgaon	Wadwani
Hingoli	Hingoli	Kalamnuri
Latur	Latur	Latur
Jalna	Partur	Gahansawangi
Nanded	Nanded	Ardhapur
Aurangabad	Aurangabad	Paithan
Osmanabad	Bhum	Kalamb
Parbhani	Parbhani	Parbhani
Bid	Manjlegaon	Georai

## List of Project Specialists Interviewed

Sr. No	District	Project Specialists Participated In FGD
1	Parbhani	PS AGRI
		PS HRD
		PS Agribusiness
		PS-Procurement
2	Aurangabad	PS HRD

Sr. No	District	Project Specialists Participated In FGD
3	Nanded	PS Agri
		PS-Procurement
		PS AGRI
		PS HRD
		PS Agribusiness
4	Hingoli	PS-Procurement
		PS AGRI
		PS Agribusiness
		PS HRD
5	Latur	PS HRD
		PS Agri
		PS AB
		PS-Procurement
6	Jalna	PS-Procurement
		PS Agri Business
		PS HRD
7	Osmanabad	PS Agri
		PS Agri Business
		PS HRD
8	Beed	PS Agri Business
		PS-Procurement
		PS HRD

### List of Sub-Division Agriculture Officers Interviewed

District	Subdivision
Hingoli	Hingoli
Latur	Latur
Nanded	Nanded
Bid	Bid
Parbhani	Parbhani

### List of DSAOs Interviewed

District
Latur
Osmanabad
Aurangabad
Parbhani





**Head Office**

C - 126, Sector 2,  
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