

GREENING RURAL VALUE CHAINS: ROADMAP OF DEPLOYMENT TOWARDS A BENIGN SOCIO- TECHNICAL-FINANCE REGIME

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Acknowledgements

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MP Ensystems Team

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Abbreviations

AIGGPA	Atal Bihari Institute of Good Governance and Policy Analysis
API	Application Programming Interface
DPR	Detailed Project Reports
DRP	District Resource Person
FAME	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles
FPO	Farmers' Producers Organisation
FSSAI	Food Safety and Standards Authority of India
GIS	Geographic Information System
MAGNET	Maharashtra Agribusiness Network
MAVIM	Mahila Arthik Vikas Mahamandal
MoFPI	Ministry of Food Processing Industries
MoU	Memorandum of Understanding
MP	Madhya Pradesh
MPVS	Madhya Pradesh Vigyan Sabha
MVSTF	Maharashtra Village Social Transformation Foundation
OEM	Original Equipment Manufacturers
PDD	Project Design Documents
PMFME	Pradhan Mantri Formalisation of Micro Food Processing Enterprises
POCRA	Project on Climate Resilient Agriculture
SMART	State of Maharashtra Agribusiness and Rural Transformation
UI	User Interface



TABLE OF CONTENTS

<i>Executive Summary</i>	04
1. INTRODUCTION	06
2. SUMMARY OF ENGAGEMENT WITH STAKEHOLDERS	08
2.1 Stakeholder roundtable at Mumbai, Maharashtra	08
2.2 Financing roundtable	09
2.3 Interactions with Farmers' Producers Organisations (FPOs)	12
3. VIRTUAL DASHBOARD FOR GRVC	16
4. IMPLEMENTATION ROADMAP AND WAY FORWARD	18
4.1 Stakeholder discussions	19
4.2 Government interactions	19
4.3 Handholding FPOs	20
4.4 Dashboard for investors	21
4.5 Implementation	21
4.6 Way forward	24
ANNEXURE 1: STAKEHOLDER ROUNDTABLE, MUMBAI NOVEMBER 2023	25
ANNEXURE 2: FINANCE ROUNDTABLE	30
ANNEXURE 3: GRVC VIRTUAL DASHBOARD DEVELOPMENT	35
REFERENCES	46



EXECUTIVE SUMMARY

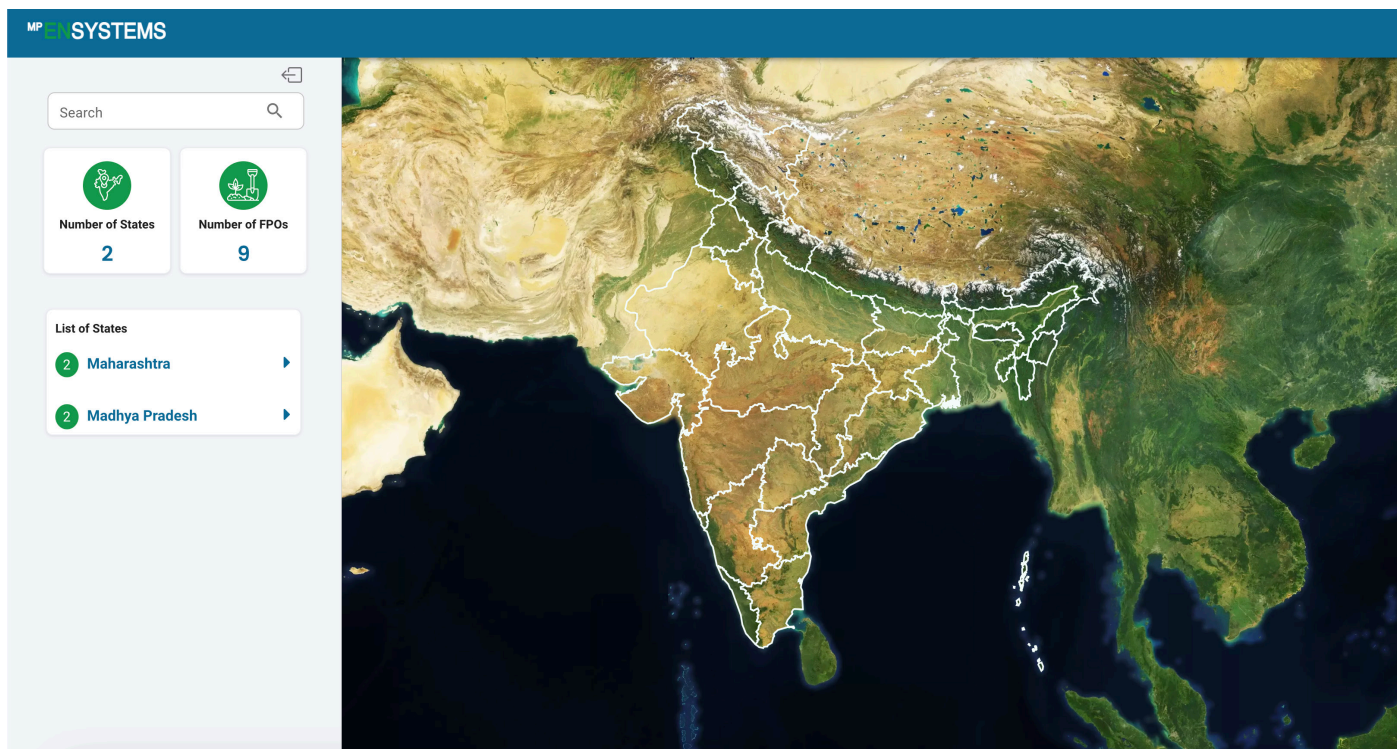
As a part of its mission on greening of rural value chains, the MP Ensystems team is assessing the potential for low carbon development by applying a Social-Technical-Policy-Financing approach in the districts of Chhindwara, Singrauli, Nandurbar and Jalgaon in Madhya Pradesh and Maharashtra. In the current phase of the project, we have worked on meeting stakeholders and developing a platform for sharing information on FPOs that are ready to invest in greening their operations.

The table below summarises feedback received from various stakeholders:

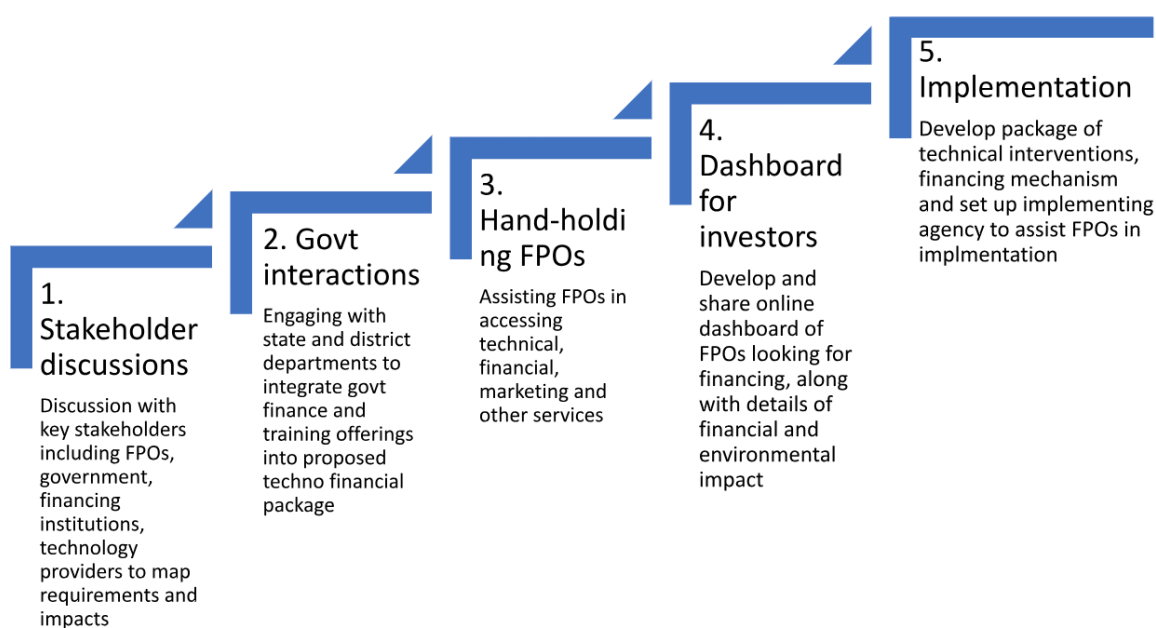
Stakeholders	Feedback
Policy makers	• There is no specific scheme supporting installation of renewable energy-based processing units • Subsidy can be availed under central and state schemes such as Pradhan Mantri Formalisation of Micro food processing Enterprises (PMFME) and State of Maharashtra Agribusiness and Rural Transformation (SMART)
Technology providers	• Financing options through Agri Infrastructure Fund and other government schemes need to be utilised
Banks and Financial Institutions	• While agriculture is covered under the priority sector lending norms for commercial banks, requirements like previous credit history and collateral for sanctioning loans, prevent recently formed FPOs from getting their projects financed • Micro-finance institutions are not only financing FPO projects, but also strengthening them with market research and linkages
Civil Society organisations	• Economic viability is a key consideration • Along with developing processing facilities, FPOs need training, capacity building and hand-holding to create a market for the sale of the processed products. • CSOs need to support the interventions keeping in mind the welfare of marginalised categories
Farmers' Producers Organisations (FPOs)	• FPOs' main challenges in financing are lack of credit history and collateral, preventing them from availing financial assistance from formal financial institutions. They are dependent on grants and affordable loans for financing upscaling and upscoping • FPOs require training and capacity building in areas including technology selection, marketing, and accessing government schemes

As seen in the table above, finance is a major roadblock for FPOs. To overcome this challenge, MP Ensystems has developed a virtual dashboard - <https://grvc-portal.mpensystems.com/home> that acts as a one-stop information hub on technical and financial interventions for FPOs seeking to green the value chain. The purpose of the dashboard is to prepare a portfolio of 100+ FPOs that seek technical and financial interventions and provide this information to investors and government agencies. The long term aim is to partner with investors, banks, technology providers and include FPOs across India.





In order to achieve technical and financial interventions at 100+ FPOs, we propose the following implementation roadmap to support transition through creation of alternative livelihood opportunities and climate resilient action plans.



1. INTRODUCTION

As a part of its mission on greening of rural value chains, the MP Ensystems team is assessing the potential for low carbon development by developing packages of interventions for four districts Jalgaon, Nandurbar (in Maharashtra) and Chhindwara, Singrauli¹ (in Madhya Pradesh).

In previous phases of the project, we have focused on developing a socio-technical-policy-financing framework to determine the components of the value chain, green technologies, policy interventions and investment roadmap to achieve both the states' goals of decarbonisation and doubling farmer income by 2022 compared to 2015-16 levels. We also developed a package of practices, including beneficiaries, expected impact on farmer income and GHG mitigation, seen in the table below.

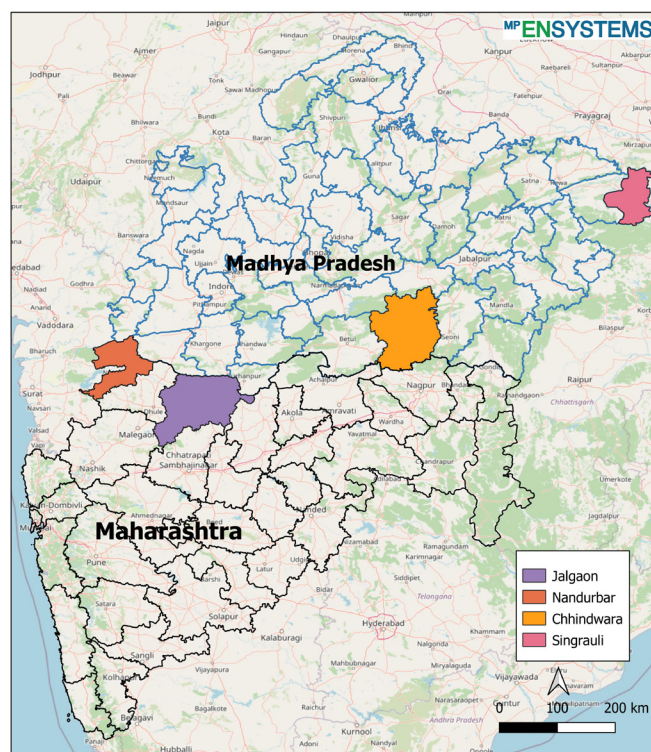


Table 1. Technological interventions and their expected impacts

Intervention	Direct Beneficiaries	Specifications	GHG abatement, tCO ₂	Reduced energy cost/ increased farmer income INR
Solar dryer	Small and medium	40 kg capacity	Singrauli	INR 3,10,000
Freight EV	farmers of chilli, tomato	Cost INR 34,000	16 over 10 years	Depending on distance covered, total cost of ownership can be less than ICE vehicle
Small Rooftop Solar PV	Setting up processing units for small and medium farmers of turmeric, millets	25 kW solar rooftop system Cost INR 1,23,538	80 over 25 years	1st year savings INR 21,000
Vertical axis wind turbine	For small medium and large operations of processing, cold storage	3kW turbine costs INR 50,000	80 over 25 years	Depends on wind speed at the location



RE based Distributed Cold storage	For large facilities or at community level, e.g. at district mandi	5MT capacity Cost INR 12,10,000 Annual maintenance INR 1,50,000	56 over 10 years	Net revenue depending on utilisation rate and rate of renting space to other farmers
Agrovoltaics	For owners of degraded land, at community scale	144 kW system on 1 acre of land Medicinals and aromatics planted between the solar panels Cost of PV system INR 72,00,000	3,700 over 25 years	215,477 kWh energy generated annually, which can be sold or used. Additional income from crops

Source: MP Ensystems Research, 2023

In the current phase, we have met with multiple stakeholders and developed a platform for sharing information on Farmer Producer Organisations (FPOs) that are ready to invest in greening their operations. The report is laid out as follows: Section 2 contains a summary of our discussions with stakeholders and partnerships built with public, private and civil society organisations targeting greening of the value chain. Section 3 describes the virtual dashboard developed to provide information on potential investments in the value chain. And Section 4 contains a roadmap towards hastened deployment of transitions towards a benign socio-technical-finance regime.



2. SUMMARY OF ENGAGEMENT WITH STAKEHOLDERS

MP Ensystems has been working towards development of a roadmap for implementation of the designed interventions with the active involvement of all stakeholders, including state government departments, civil society, technology providers, financing entities and members of FPOs which are instrumental to the implementation of this low carbon development pathway. Section 2.1 below describes the stakeholder roundtable held in Mumbai, 2.2 summarises the financing roundtable held online and 2.3 provides a summary of our engagement with FPOs.

2.1 Stakeholder consultations at Mumbai, Maharashtra

MP Ensystems conducted a roundtable conference in Mumbai on November 7, bringing together representatives of Government, FPOs, financing entities, think tanks, non-profits and agri-entrepreneurs, to discuss opportunities for financing greening of rural value chains. At the conference, we discussed our proposed framework for a low carbon development pathway through FPOs in 4 districts of Maharashtra and MP, while showcasing

- **Technical documents related to proposed interventions, financial details of identified projects' total cost and revenue forecast for the projects**
- **A suite of 10 projects that are ready for investment**
- **Development of project design documents that list the possible technical and implementation solutions and associated benefits and costs**
- **Projection for ready-to-invest portfolio of projects with an initial tranche of approximately 5 crores with a replication potential of INR 100 crores of portfolio**
- **MP Ensystems' website on greening of rural value chains (<https://grvc.mpensystems.com>), with discussions on our under-development GIS- based virtual platform listing ready-to-invest projects**

The table below lists key takeaways of the roundtable:



Table 2. Stakeholder recommendations

Stakeholders	Recommendations
Government implementing agencies Maharashtra Arthik Vikas Mahamandal (MAVIM) Mahatma Phule Renewable Energy & Infrastructure Technology Limited (MAHAPREIT)	- A collectivisation approach is necessary to help FPOs become strong market forces as the scale of production and processing for individual FPOs is too small. Enhancing volume of products available through approaches like clustering of FPOs can help. - Importance of capacity building, such as training FPOs on quality, FSSAI and other certification, developing marketing channels and partnerships along the value chain. Greening the value chain has a broad scope and there is a need to diversify the means of greening to add options alongside solar-powered solutions through corporation of options like wind energy, waste-to-energy, promotion of circularity et al.
Renewable Energy Solution providers Ecozen Solutions Pvt. Ltd., Energy Guru	There is a need for sustained efforts from Original Equipment Manufacturers (OEMs) working in the agricultural sector in both pre-harvesting and post-harvesting equipment to design financial models which are financially viable and accessible for small producers' organisations.
Think Tanks World Bank- Water resources Group, The Global Energy Alliance for People and Planet (GEAPP)	Capacity building of FPOs is a major aspect of their business acumen and sustainability that often gets ignored during the promotion of FPOs. These organisations need support and handholding in the initial years of their functioning to ensure that they are also well-versed with accounts, book keeping and management skills in addition to technical skills. Financing options included availability of low-cost loans under the Agri Infrastructure Fund and other government schemes and exploring social impact bonds.
Non-Government organisations Village Social Transformation Foundation (VSTF), Environmental Resources Foundation (ERF)	- It is the key to correctly identify the problems and bottlenecks through a bottom-up approach, e.g. energy reliability, farmer income, selection of appropriate technologies. - The scope of operations could further be expanded to utilisation of agricultural waste as inputs in nutraceuticals, utilisation of excess energy by farmers, accessing carbon credits.
Farmers' Producers Organisations (FPOs) Amarwara FPO, Ba Aakadata Shetkari Vikas Gat	Utilization rate of cold chains needs to increase for instance by using it throughout the year or introducing a pay as you go cooling model to improve viability. - There is a huge challenge of unsold inventory when it comes to processing of primary agricultural products, especially when the volumes are small, as is the case with processing units run by FPOs.
Training and capacity building Centre for Environment Education (CEE)	- The interventions should be designed keeping in mind the welfare of marginalised categories. There is a need to ensure that the financial and social benefits accrue to the agricultural producers and the rural youth. There is a need to support these FPOs such that they become self-sustaining models. Economic viability is a key consideration while considering technology interventions. EE and RE interventions are more likely to be successful when energy accounts for more than 10% of total costs. - Greening in agricultural value chains becomes more effective as a tool of poverty alleviation and rural upliftment when investments are made in development of the value chain of those products.

Source: MP Ensystems research 2023

2.2 Financing roundtable

MP Ensystems conducted a virtual roundtable conference on December 20, bringing together representatives of Krishi Vigyan Kendras (KVKs), financial institutions including National Bank for Agriculture and Rural Development (NABARD), public sector banks, non-banking financial companies (NBFCs), non-government organisations (NGOs) and Farmers' Producers Organisations (FPOs) from Madhya Pradesh and Maharashtra. At the conference, we discussed our proposed framework for a low carbon development pathway through FPOs in 4 districts in central and western India, while showcasing



- **Technical documents related to proposed interventions, financial details of identified projects' total cost and revenue forecast for the projects**
- **A suite of 10 projects that are ready for investment**
- **Development of project design documents that list the possible technical and implementation solutions and associated benefits and costs**
- **Projection for ready-to-invest portfolio of projects with an initial tranche of approximately 5 crores with a replication potential of INR 100 crores of portfolio**
- **MP Ensystems' website on greening of rural value chains (<https://grvc.mpensystems.com>), with discussions on our under-development GIS- based virtual platform listing all ready-to-invest projects**

The round table saw active participation from all attending members who discussed the challenges and opportunities when it comes to investment in rural value chains and strengthening of FPOs to enhance rural development. Some of the major points that emerged from this discussion are as follows:

- There is a need to have a holistic view of the whole sector in order to focus not only on providing financial assistance to FPOs, but also supporting them with market research, aggregation of demand and providing advisory services with respect to technology and management practices. Some NBFCs have focused exclusively on the value chain of agricultural produce to provide farmers with this support, but organisations like MP Ensystems can play a major role in providing technical support to the FPOs in execution of their planned activities.
- Currently, the rejection rate of loan application by FPOs to banks is high due to the unviability of proposals presented by the FPOs. Most projects are small scale, without upscaling in the long term and have low marketability of products.
- The FPOs in rural areas that have been formed recently have mostly been engaged in primary activities such as trading of agricultural produce, seeds, farm inputs, etc. In order to ensure financial growth, there is a need to help them graduate towards engaging in more productive activities such as secondary processing.
- Banks are keen to lending for projects that come with a greening component as they recognise the long-term benefits, especially in rural areas of Maharashtra and Madhya Pradesh, where access to affordable and reliable power is a major impediment to taking up of processing activities.



- There is also the need to focus not only on processing, but focus on the entire value chain of agricultural products right from the process of sowing seeds. FPOs taking up secondary processing in a sustainable fashion should also encourage farmers to take up sustainable agricultural practices, in order to leverage this to earn carbon credits.
- FPOs can switch to renewable energy-based processing activities if there are clearly demonstrated financial benefits and there is an assurance that there is no adverse impact on economic life of machinery due to RE.
- Institutions such as NABARD have been working towards the capacity building of FPOs for a long time and with the renewed push by the government towards strengthening of FPOs, this sector has garnered more attention and many institutions have been participating in capacity building and associated activities. There is a need to ensure long term support to the FPOs so that they can sustain their activities independently.
- There is a need to reduce wastage of horticultural produce in rural areas. Due to ripening of products, around 40% of the produce gets wasted due to a lack of storage infrastructure. The power and maintenance costs of traditional cold storages act as a prohibitive factor in rural settings, while the initial cost of renewable-energy powered cold storages is a major reason for their low uptake.
- Proposals for installation of renewable energy powered cold storages can go a long way towards reduction in wastage of horticultural products and augmentation of farmers' incomes. There is a need for technology providers and financial institutions to design innovative schemes to enable more uptake of this technology. Provisions for diversion of excess energy generated to solar pumps or electricity grid through net metering can further boost financial viability.
- There is a need to ensure more and easy availability of affordable finance through formal financial institutions to ensure a holistic change in the entire value chain starting from pre-harvesting activities to processing and creation of market linkages. In addition to financial institutions, technology providers and advisory institutions also have a major role to play to ensure the right technology and capacity building of FPOs so that the benefits can further be passed on to the farmers.



2.3 Interactions with Farmers' Producers Organisations (FPOs)

MP Ensystems has conducted multiple field visits to the premises of FPOs in the study areas, interacting with FPO members as well as government and non-government stakeholders in these districts. These visits have helped us understand the real-life challenges that FPOs face while starting their operations and scaling up the scope of their work. The map below shows the FPOs visited by our team.

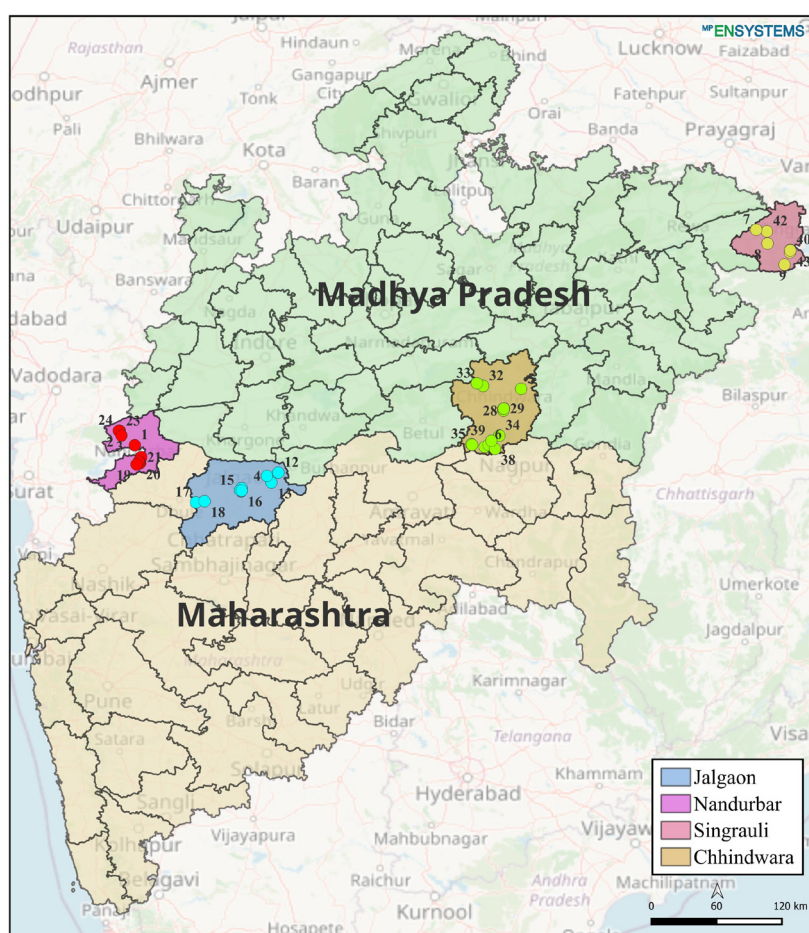


Table 3: List of FPO district wise

Sr. No.	FPO	District
1	Astamba Farmer Producer Company	Nandurbar
2	Pragati Mahila Bachat Gat	Nandurbar



3	Ba Aakadata Shetkari Vikas Gat	Nandurbar
4	Rajodak Farmers Producer Company	Jalgaon
5	Amarwara Farmer Producer Company	Chhindwara
6	Sausar Farmer Producer Company	Chhindwara
7	Deosariya Mahila Farmer Producer Company	Singrauli
8	Mahan Mahila Farmer Producer Company	Singrauli
9	Urjadhani Farmer Producer Company	Singrauli
10	District Agriculture Office	Jalgaon
11	Krishi Vigyan Kendra	Jalgaon
12	Taluka Agriculture Office, Raver	Jalgaon
13	Mahajan Banana Exports	Jalgaon
14	Collectorate Office	Jalgaon
15	Maharashtra Energy Development Agency	Jalgaon
16	ATMA Office	Jalgaon
17	Virendra Agro Farmers Producer Company	Jalgaon
18	Taluka Krushi Office, Parola	Jalgaon
19	Collectorate Office	Nandurbar
20	ATMA Office	Nandurbar
21	Krishi Vigyan Kendra	Nandurbar
22	Sumanaai Masale & Traders	Nandurbar
23	Molgi Parisar Seva Samiti	Nandurbar
24	Strawberry Farm	Nandurbar
25	NABARD District Development Manager	Nandurbar
26	MAVIM Nandurbar	Nandurbar
27	Collectorate Office	Chhindwara
28	Krishi Vigyan Kendra	Chhindwara
29	District Horticulture Department	Chhindwara



30	District Renewable Energy Department	Chhindwara
31	Srijan NGO, NCT NGO	Chhindwara
32	MP Vigyan Sabha Office	Chhindwara
33	Millet Processing Unit, Tamia	Chhindwara
34	Orange Farms	Chhindwara
35	Padhurna Orange Farming Producer Company	Chhindwara
36	Agriculture Department, Pandhurna	Chhindwara
37	Orange Juice Factory	Chhindwara
38	Borgaon Industrial Area	Chhindwara
39	Ardhanarishwar Farmer Producer Company	Chhindwara
40	Collectorate Office	Singrauli
41	Krishi Vigyan Kendra	Singrauli
42	Pradan Office	Singrauli
43	Singdev Mahila Kisan Utpadak Producer Company Limited	Singrauli

Source: MP Ensystems Research, 2023

Based on our discussions, FPOs highlighted the major challenges they face in accessing finance, implementing EE or RE and scaling and scoping up their business:

- **Lack of affordable finance acts as a major deterrent for the FPOs' plans to venture into value addition of agricultural products**
- **Lack of technical knowledge when it comes to handling of processing equipment due to which often FPOs are involved in trading of agricultural commodities**
- **Rural areas with difficult terrain face the recurring issue of inadequate power infrastructure to ensure reliable supply of electricity, acting as a deterrent to investment in processing machinery. There is a lack of knowledge of distributed renewable energy based equipment which can work even in the absence of conventional electricity supply.**
- **Lack of technical skills to create Detailed Project Reports (DPRs) for their proposals, due to which they are unable to avail financial assistance through government**



- **The government has been actively working to create awareness about the schemes it has brought to promote micro-entrepreneurship in rural areas. However, the FPOs lack proper guidance on the approach and the steps to avail financial assistance under these schemes.**
- **There needs to be clarity on greater economic returns by switching over to greening of value chain compared to conventional / traditional value chain.**
- **The running cost of greening the value chain has to be less than that of the conventional value chain.**
- **A cadre of enablers to help in transition to a green value chain is needed.**

MP Ensystems has coordinated with the FPOs as well as government and non-government actors active in the rural areas to bridge the information and financial gaps. The Mumbai round-table conference, comprising of government officials, representatives of think tanks, non-government organisations, academicians and start-ups working in agri-processing sector, saw the participation of some FPOs from Maharashtra. This was followed up individual and group calls and meets between our team and the FPOs in Maharashtra and MP.

The current engagement with FPOs is targeted at

- imparting technical knowledge on EE, RE and connecting them with technology partners
- connecting FPOs with banks and financial institutes
- assisting FPOs in accessing government subsidies under schemes such as PMFME and SMART (State of Maharashtra Agribusiness and Rural Transformation)
- capacity building of the FPOs

Our team's discussions with FPOs are expected to lead to the FPOs applying for Government assistance and bank loans, details are in Ch 4.



3. VIRTUAL DASHBOARD FOR GRVC

MP Ensystems has developed a portal hosting all its work in greening the value chain <https://grvc.mpensystems.com/> . During the current phase of the project, we have developed a dashboard on the GRVC site- <https://grvc-portal.mpensystems.com/home> that acts as a one-stop information hub on FPOs seeking to green the value chain.



The dashboard serves as a comprehensive platform to map and visualize the site visits conducted by MP Ensystems team in Maharashtra and Madhya Pradesh. In future the dashboard can be expanded to cover sites across India.



The dashboard provides the following information on FPOs:

- Geographical location
- Crops, processes
- Photographs
- Details of interventions
- Expected costs, investment required, payback period
- GHG emissions avoided

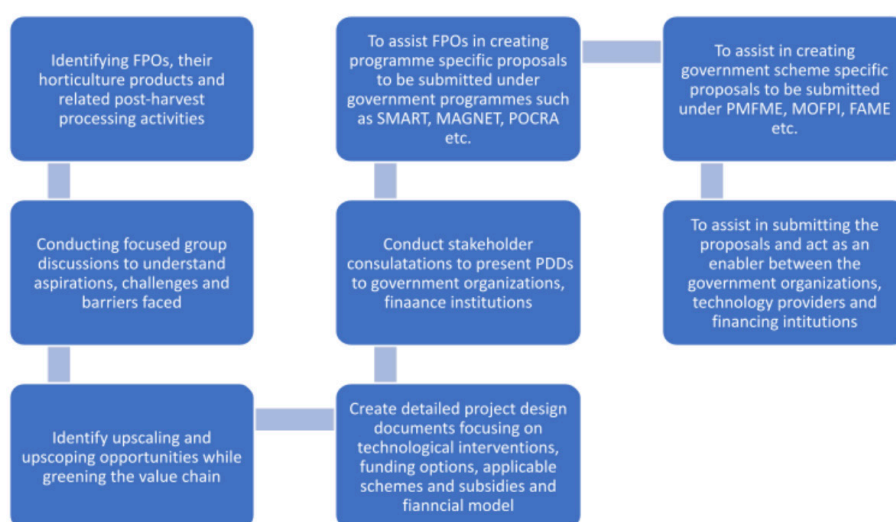
The site masks the following details of the FPO: name, company ID, contact information, and project design document. Site visitors can click on a button to contact the MP Ensystems team to find out more about the FPO and the proposed investment.

The purpose of the GRVC dashboard is to prepare a portfolio of 100+ FPOs that seek technical and financial interventions and provide this information to investors and government agencies. The long term aim is to partner with investors, banks, technology providers and include FPOs across India. In the next version of the dashboard, we intend to include details of existing government schemes, and offerings of financing institutions, banks, foundations, donor funds and resource agencies.

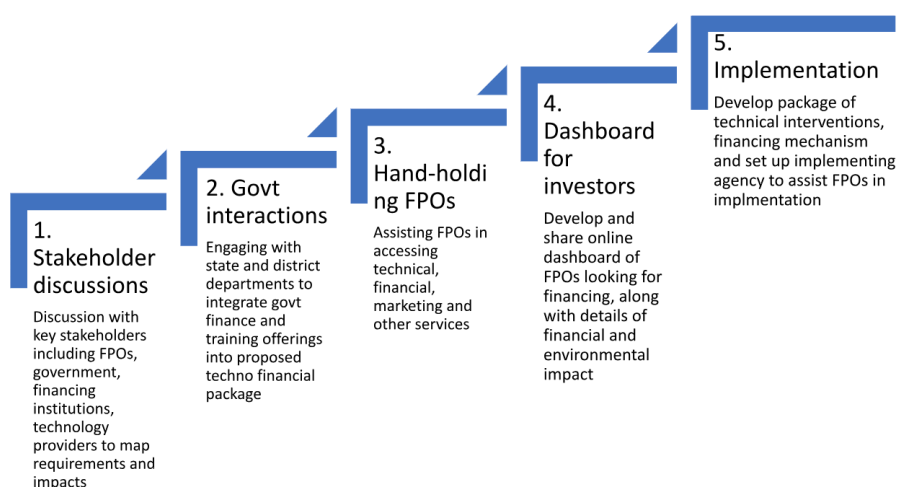


4. IMPLEMENTATION ROADMAP AND WAY FORWARD

During the first phase of this project, the team engaged with 9 FPOs across the targeted districts of Nandurbar and Jalgaon in Maharashtra and Chhindwara and Singrauli in Madhya Pradesh. The step wise engagement process is below:



Through the interactions conducted with key stakeholders in Maharashtra and Madhya Pradesh, the common takeaways point towards the need for an implementation roadmap to support transition through creation of alternative livelihood opportunities and climate resilient action plans.



The sections below describe the status of each step of the roadmap.

4.1 Stakeholder discussions

Covered in detail in Ch 2.

4.2 Government interactions

The team has conducted focused discussions with organizations including Mahila Arthik Vikas Mahamandal (MAVIM), Maharashtra Village Social Transformation Foundation (MVSTF), MPVS and Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis (AIGGPA) to understand the implementation roadmap with their assistance to ensure concrete state specific actions. The actions are documented as below:

• Consultations with MAVIM

- MAVIM is a nodal agency appointed by the Government to assist in implementing women's empowerment programmes
- MoU to be signed between MAVIM and MP Ensystems with an objective to collaborate on technical expertise, create awareness and conduct training and capacity building
- MP Ensystems to be appointed as technical partner with no financial implications on MAVIM, which will be onboarded as partner organization
- To conduct scoping study for all the value chains identified by MAVIM to evaluate the potential and scope of greening
- MAVIM to provide list of approximately 35 FPOs to be further assessed for greening the value chain
- MP Ensystems to assist FPOs in creating government programme specific proposals to fit SMART programme subsidy requirements and further to be submitted by MAVIM as a project implementation agency

• Consultations with MVSTF

- MVSTF is set up as a public private partnership with the Maharashtra government to achieve development goals in rural areas
- MoU to be signed between VSTF and MP Ensystems with an objective to collaborate on technical expertise, create awareness and conduct training and capacity building
- MP Ensystems to assist FPOs in creating government programme specific proposals to fit SMART programme subsidy requirements and further to be submitted by MVSTF as a project implementation agency
- MVSTF to share list of FPOs approved under SMART project for further technical assistance in terms of decarbonization



- **Consultations with Horticulture department, Madhya Pradesh**

- The department officials have guided the team for the next steps and have put the concerned district resource persons in touch for Chhindwara and Singrauli under PMFME
- Three PDDs are ready to be re-created in PMFME format, which will be further submitted on the PMFME portal
- The departments' State Level Committee meeting is due in the last week of December, and hence the proposals are required to be submitted on time for on-time approval and granting of funds

- **Consultations with, AIGGPA Bhopal**

- The discussions have led to understanding the nuances of the policies framed by the Madhya Pradesh government and also the funding allotted under several schemes to support FPO formations and implementations
- It has helped identify FPOs in other districts of Madhya Pradesh

Actions to be taken by MP Ensystems to boost implementation process:

- To discuss assistance of creating proposals and handholding to FPOs and align them with the DRPs (District Resource Persons) to further create detailed project reports and submit on the PMFME portal
- Identifying technology experts and providers and initiating discussions with them
- Creating opportunities for funding agencies to know details about FPOs and their requirements towards finances through dashboard

4.3 Handholding FPOs

Our team has interacted with 9 FPOs in Maharashtra and MP to map their current activities, determine their aspirations for upskilling and upscoping, develop a package of technical interventions for each FPO and identify financing schemes to implement them. NGOs like Madhya Pradesh Vigyan Sabha, assist FPOs in understanding their requirements of setting up processing units, in terms of evaluating the input potential and the forward and backward linkages. They further help them is designing their machinery based on the daily inputs, electricity requirements etc. The result of the assistance and handholding², as well as future steps are in the table below:



Table 4: Current status of FPO and interventions by MP Ensystems

Madhya Pradesh		
Name of FPO	Current status of the FPO	MP Ensystems interventions
Amarwara FPO	450 shareholders engaged in trading of maize and other agricultural commodities, started extraction of niger oil - They want to process millets and set up warehouse/cold storage facilities	- Technical appraisal of activities and scale of processing for the FPO and assessment of the power requirements of processing unit using solar energy - Coordination with banks to ensure timely sanction under PMFME scheme and connecting the FPO members with District Resource Person - Creating DPRs for proposed future activities - Connecting the FPO with technology providers
Sausar FPO	- FPO has 650 shareholders currently engaged in trading of maize, seeds - Have plans to establish a processing unit for peas, using renewable energy	
Yudhishtir FPO	- FPO has 450 shareholders, engaged in trading of millets - They plan to establish a cleaning, grading unit and a warehouse - At present, the value chain does not have a green component	
Maharashtra		
Ba Aakadata Shetkari Vikas Gat	- The FPO has 125 shareholders - They have recently installed a cold storage unit which they are using for storage of strawberries - They want to process of strawberries to produce value added products	- Technical appraisal of activities and scale of processing for the FPO and assessment of the power requirements processing unit based on solar energy - Coordination with concerned bank to ensure timely sanction under PMFME scheme and SMART project - Connecting the FPO members with District Resource Person for PMFME and guidance of SMART project - Conversion of DPRs and government scheme guidelines into Marathi for ease of usability by the FPOs

Source: MP Ensystems Research, 2023

4.4 Dashboard for investors

The virtual dashboard for investors has been described in Ch 3.

4.5 Implementation

Implementation of projects is key to achieve decarbonisation and doubling of farmer income. The current status of implementation at the selected FPOs is listed above. In order to project the expected impact of scale up, we have assumed that our interventions target 3% of FPOs in the selected districts, in the table below.



Table 5: Projection of impact of the interventions at a share of FPOs in the 4 districts³

	Chhindwara	Singrauli	Jalgaon	Nandurbar
Number of FPOs interacted with in district	60	25	46	29
Types of units to be established	Millet, Frozen Peas	Millet, Tomato	Millet, Banana	Millet, Banana, Strawberry
RE deployed (kW)	1416	495	828	566
Total Investment required (INR lakhs)	3144	1210	2014	1236
Permanent employment generated	360	150	359	257
SHGs benefitted	252	100	166	91
Environmental benefits (tonnes CO ₂ emissions mitigated every year)	1620	570	957	647
Revenue generated (INR lakhs)	44592	17470	26892	23248

Source: MP Ensystems Research, 2023

The potential cumulative benefits that can be accrued across the states (applying the same 3% assumption to all districts of the two states) as a result of state-wide implementation is in the table below:

Table 6: Projection of impact of interventions in the two states

	Madhya Pradesh	Maharashtra
Number of FPOs interacted with in state	722	864
Types of units to be established	Millet, tomato, turmeric, frozen peas	Millet, banana, strawberry
RE deployed (kW)	18628	16848
Total Investment required (INR lakhs)	42670	36811
Permanent employment generated	4621	7646



SHGs benefitted	3466	2722
Environmental benefits (tonnes CO2 emissions mitigated every year)	28086	19267
Revenue generated (INR lakhs)	673698	692626

Source: MP Ensystems Research, 2023

The table below presents the interventions, to the existing schemes of the governments along with the possible source of funding for execution.

Table 7: interventions to the existing schemes of the governments and possible source of funding

Interventions	Outputs	Beneficiaries	Responsibility	Source of Funding
Listing technology interventions	Suite of EE, RE interventions suitable for Madhya Pradesh and Maharashtra agro-climatic zones, solar insulation levels and local industries	Farmers, State Governments	State Governments to appoint consultant to study suitable EE and RE solutions	State and Central Government budget
Training and skill development	Training programs on EE, RE equipment installation and maintenance; EV charging and EV maintenance; entrepreneurship in green sectors	Local youth population, agri-entrepreneurs and startups	Directorate of Skill Development to use existing infrastructure; In partnership with ITIs; private sector to provide inputs and participate in job placement	Existing Skill Development Mission and SRLM funds; ITI and other institutes; Private sector sponsorship
Financial packages	Loans targeting RE, EE, EVs in rural sector	FPOs, farmers and banks	District lead banks	Bank lending Interest rate subventions from Government programs and donor agencies Blended finance
Awareness and Dissemination	Government machinery to provide information GRVC dashboard to provide investment ready projects	FPOs, farmers, lenders	Rural development ministry to inform panchayats of program Government to partner with industry to host website	Website to be part financed by industry
Monitoring and Evaluation	Studying the benefits, costs, effectiveness of the interventions Results to be used to modify future iterations of the programs	Policymakers, Consultants, NGOs	Nodal agency for the project	State Government budget

Source: MP Ensystems Research, 2023



4.6 Way forward

MP Ensystems proposes undertaking the following actions in 2024:

- To study the FPO ecosystem in a selected state based on data available with central and state governments, NABARD any other nodal organizations
- To identify existing or proposed value chains amongst FPOs
- To estimate potential of greening of value chains
- To prepare PDDs for FPOs selected as above and establish their economic viability and environmental sustainability
- To identify government programmes in GRVC and assist FPOs in making proposals
- To approach funding agencies to act as enablers for GRVC
- To implement PDDs through enablers in public and private sectors



ANNEXURE 1: STAKEHOLDER ROUNDTABLE, MUMBAI

Background

Farm-to-fork value-chains offer clear opportunities to improve rural livelihoods in vulnerable districts that are impacted by climate variability. Promoting value-chains from the villages to the market-places offer value-additions to the rural economy, quicker transfer of technologies that can enhance scale and scope of operations, promote entrepreneurship opportunities to rural youth and create finance flows including grants and low-cost financing in the village economy. Several challenges are faced by the rural entrepreneurs, including electricity availability, reliability and affordability.

Decarbonising the energy vector in the post-harvest processing - primarily the deployment of solar photovoltaic systems and first/last-mile connectivity through electrified transport services offer interesting investment opportunities and cost optimisation options where the technologies are adapted by the rural sector farmers' producers' organisations, self-help groups and private firms. It also strengthens the rural ecosystem as farmers have a local buyer, which reduces their transportation and storage costs, while the FPOs create local jobs for the rural youth and women. Handholding these FPOs through the principles of proper governance, financial prudence and technical assistance for up- scoping and upscaling can potentially help some of these initiatives to be self-sustained rural businesses in the long run. These interventions can serve as a template for other states for achieving value addition in the agricultural sector to augment farmers' incomes without leaving significant carbon footprint.

At MP Ensystems Advisory Pvt. Ltd., we have made specific efforts to understand these challenges and to promote quicker deployments through a set of projects in 4 districts in central and western India. Our efforts have resulted in the following outputs:

- **Templatized structure of project identification and documentation**
- **A suite of 10 projects that are ready to be deployed as value-chains**
- **Articulation of scaling-up of the post-harvest processes and scoping-up of secondary production**
- **Development of project design documents that list the possible technical and implementation**



- **Ready-to-invest portfolio of projects with an initial tranche of approximately 5 crores with a replication potential of INR 100 crores of portfolio**

MP Ensystems conducted a roundtable bringing together representatives of Government, FPOs, financing entities, think tanks, non-profits and manufacturers, to discuss opportunities for financing greening of rural value chains.

Presentation

MP Ensystems team presented key aspects of the “Greening of Rural Value Chain” project, including social, technical, policy, and financing approaches. The presentation highlighted targeted interventions, such as promoting electric vehicles (EVs), solar dryers, efficient cold chains and opportunities for upskilling and upscaling.

MP Ensystems launched a website (<https://grvc.mpensystems.com>) with details on its efforts in greening the value chain. MP Ensystems is also developing a GIS- based virtual platform with Project Design Documents (PDDs) for selected FPOs, with details of the organisational production and financing needs for expansion.

Discussion highlights

- Based on the experience of FPO members, **utilization rate of cold chains** needs to increase for instance by using it throughout the year, or introducing a pay as you go cooling model to improve viability.
- It is key to correctly identify the problems and bottlenecks **through a bottom up approach**, e.g. energy reliability, farmer income, selection of appropriate technologies.
- **Economic viability** is a key consideration while considering technology interventions. EE and RE interventions are more likely to be successful when energy accounts for more than 10% of total costs.
- **Greening the value chain** has a broad scope and could be expanded to utilisation of agricultural waste as inputs in nutraceuticals, utilisation of excess energy by farmers, accessing carbon credits.
- **Financing options** included availability of low-cost loans under the Agri Infrastructure Fund and other government schemes and exploring social impact bonds. CSR funds, while available, may have specific timelines and reporting norms that make them difficult to access.
- Importance of **capacity building**, such as training FPOs on quality, FSSAI and other certification, developing marketing channels and partnerships along the value chain.
- A **programmatic approach**, with a portfolio of 100 projects will help in reducing transaction costs of financing.



Overall, the meeting brought together diverse perspectives and expertise to explore the greening of rural value chains, with a focus on sustainability, technology, and finance. Next steps include launching the online platform, collaborating with stakeholders to develop an implementation model involving government agencies, equipment manufacturers, banks and an aggregator.

Agenda

Time-slot	Topic of discussion	Lead
11:00 am to 11:30 am	Introductions to the participants and project presentation	MP Ensystems Team
11:30 am to 12:00 pm	Discussion on financing and project identification barriers faced in the farm-to-fork project opportunities; showcase of virtual platform	MP Ensystems Team
12:00 pm to 12:45 pm	Reflections on the barriers and opportunities in financing rural sector projects	All participants
12:45 pm to 01:00 pm	Next steps and collaborative opportunities	All participants
01:00 pm to 02:00 pm	Lunch	

List of attendees

Sr. No	Organization	Name
1	Centre for Environmental Education	Satish Awate
2	Centre for Environmental Education	Navneet Wadkar
3	Ecozen Solutions Pvt. Ltd.	Abhishek Khanvilkar
4	Energy Guru	Rohit Chavade
5	Maharashtra Arthik Vikas Mahamandal	Rupa Mistry
6	Mahatma Phule Renewable Energy & Infrastructure Technology Limited. Mahapreit	Tejas Shinde, Gaurav Patil, Amol Bhilvade
7	Nandurbar FPO	Padvi Dilya Bijya
8	Nandurbar FPO	Tedya Fusa Padvi
9	The Global Energy Alliance for People and Planet (GEAPP)	Mr. Satya Prakash Choubey
10	Village Social Transformation Foundation	Chandrakant Mali
11	World Bank	Meghana Pahalajani Rao



12	MP Ensystems Advisory Pvt Ltd	Dr. Sudhirkumar Goel
13	MP Ensystems Advisory Pvt Ltd	Dr. Mahesh Patankar
14	MP Ensystems Advisory Pvt Ltd	Ira Athale Prem
15	MP Ensystems Advisory Pvt Ltd	Hrishabh Chandra
16	MP Ensystems Advisory Pvt Ltd	Asmita Ekawade
17	MP Ensystems Advisory Pvt Ltd	Kaustubh Arekar
18	MP Ensystems Advisory Pvt Ltd	Smitha Lobo
19	MP Ensystems Advisory Pvt Ltd	Swati Jha
20	MP Ensystems Advisory Pvt Ltd	Kastubh Arekar
21	MP Ensystems Advisory Pvt Ltd	Yashraj Gore
Online Participation		
1	Amarwara FPO (Chinndwara)	Santosh Dehariya
2	Environmental Resources Foundation (ERF)	Suuhas Tenddulkar
3	MP Ensystems Advisory Pvt Ltd	Prajakta Adhikari
4	MP Ensystems Advisory Pvt Ltd	Madhu Pillai
5	MP Ensystems Advisory Pvt Ltd	Ram Sarowar





ANNEXURE 2: FINANCE ROUNDTABLE

Background

Farm-to-fork value-chains offer clear opportunities to improve rural livelihoods in vulnerable districts that are impacted by climate variability. Promoting value-chains from the villages to the market-places offer value-additions to the rural economy, quicker transfer of technologies that can enhance scale and scope of operations, promote entrepreneurship opportunities to rural youth and create finance flows including grants and low-cost financing in the village economy. Several challenges are faced by the rural entrepreneurs, including electricity availability, reliability and affordability.

Decarbonising the energy vector in the post-harvest processing - primarily the deployment of solar photovoltaic systems and first/last-mile connectivity through electrified transport services offer interesting investment opportunities and cost optimisation options where the technologies are adapted by the rural sector farmers' producers' organisations, self-help groups and private firms. It also strengthens the rural ecosystem as farmers have a local buyer, which reduces their transportation and storage costs, while the FPOs create local jobs for the rural youth and women. Handholding these FPOs through the principles of proper governance, financial prudence and technical assistance for up-scoping and upscaling can potentially help some of these initiatives to be self-sustained rural businesses in the long run. These interventions can serve as a template for other states for achieving value addition in the agricultural sector to augment farmers' incomes without leaving significant carbon footprint.

At MP Ensystems Advisory Pvt. Ltd., we have made specific efforts to understand these challenges and to promote quicker deployments through a set of projects in 4 districts in central and western India. Our efforts have resulted in the following outputs:

- **Templatized structure of project identification and documentation**
- **A suite of 10 projects that are ready to be deployed as value-chains**
- **Articulation of scaling-up of the post-harvest processes and scoping-up of secondary production**
- **Development of project design documents that list the possible technical and implementation**



- **Ready-to-invest portfolio of projects with an initial tranche of approximately 5 crores with a replication potential of INR 100 crores of portfolio**

MP Ensystems conducted a roundtable bringing together representatives of Government, FPOs, financing entities, think tanks, non-profits and manufacturers, to discuss opportunities for financing greening of rural value chains.

Presentation

MP Ensystems team presented key aspects of the “Greening of Rural Value Chain” project, including social, technical, policy, and financing approaches. The presentation highlighted targeted interventions, such as promoting electric vehicles (EVs), solar dryers, efficient cold chains and opportunities for upskilling and upscaling.

MP Ensystems launched a website (<https://grvc.mpensystems.com>) with details on its efforts in greening the value chain. MP Ensystems is also developing a GIS- based virtual platform with Project Design Documents (PDDs) for selected FPOs, with details of the organisational production and financing needs for expansion.

Discussion highlights

MP Ensystems team presented key aspects of the “Greening of Rural Value Chain” project, including social, technical, policy, and financing approaches. The presentation highlighted targeted interventions, such as promoting electric vehicles (EVs), solar dryers, efficient cold chains and opportunities for upskilling and upscaling.

- The rejection rate of loan applications by FPOs to banks is quite high due to small proposals like setting up of flour mills, which do not show potential for upscaling in the long term and low marketability, which makes it difficult for the banks to sanction loans. Banks are willing to proceed ahead with sensible investment in **financially viable ideas**.
- It is key to correctly identify the problems and bottlenecks **through a bottom-up approach**, e.g. energy reliability, farmer income, selection of appropriate technologies.
- FPOs that have been formed recently have mostly been engaged in primary activities like trading of agricultural produce, seeds, farm inputs, etc. but in order to ensure financial growth, there is a need to help them graduate towards processing activities.
- FPOs can switch to renewable energy-based processing activities if they are clearly demonstrated the **financial benefits of switching to RE** and reassured that there is no adverse impact on **economic life of machinery** due to RE.
- Around 40% of the horticultural produce gets wasted due to a lack of storage infrastructure. The power and maintenance costs of traditional cold storages is a prohibitive factor, while the initial cost of RE powered cold storages is still quite high.



- **Greening the value chain** has a broad scope and should be expanded to the entire value chain of agricultural products right from the process of sowing seeds. Farmers taking up sustainable agricultural practices may also help generate additional income streams like carbon credits.
- Importance of **capacity building**, such as training FPOs on quality, FSSAI and other certification, developing marketing channels and partnerships along the value chain.
- A **programmatic approach**, with a portfolio of 100 projects in the long-term, starting with the 9 projects that have been listed on the dashboard, will help in reducing transaction costs of financing.

Overall, the meeting brought together diverse perspectives and expertise to explore the greening of rural value chains, with a focus on sustainability, technology, and finance. With the launch of the online platform listing the ready-to-finance projects that can be taken up, the focus is on collaborating with the participating stakeholders to develop an implementation model involving government agencies, equipment manufacturers, banks and an aggregator.

Agenda

Time-slot	Topic of discussion	Lead
11:00 am to 11:15 am	Introductions to the participants and project presentation	MP Ensystems Team
11:15 am to 11:30 am	Discussion on financing and project identification barriers faced in the farm-to-fork project opportunities; showcase of virtual platform	Dr. Sudhir Kumar Goel, Senior Strategy Advisor, MP Ensystems; Former Addl. Chief Secretary, Agriculture and Marketing, Govt of Maharashtra
11:30 am to 11:45 am	Finance related challenges and barriers faced by FPOs	Farmer Producer Companies (FPOs)
11:45 am to 12:20 pm	Reflections on the barriers and opportunities in financing rural sector projects	Financing institutions
12:20 pm to 12:30 pm	Conclusions and way forward	MP Ensystems team

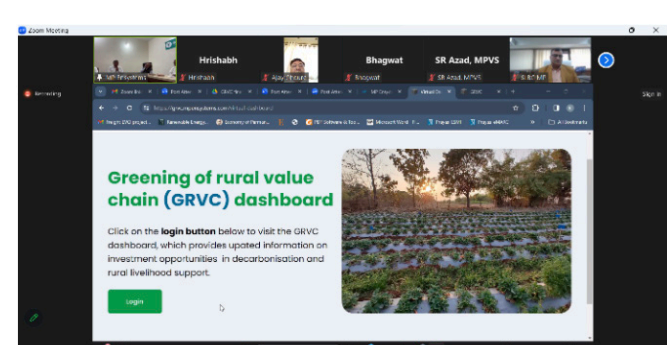
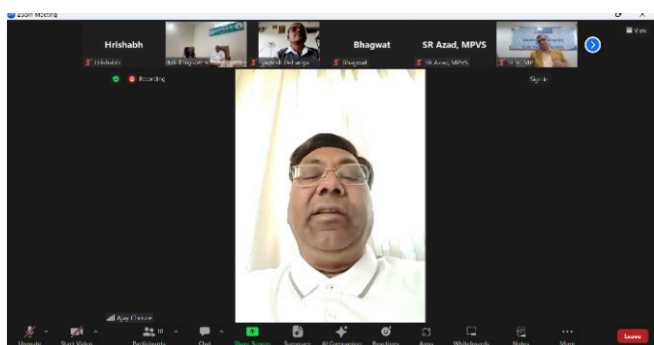
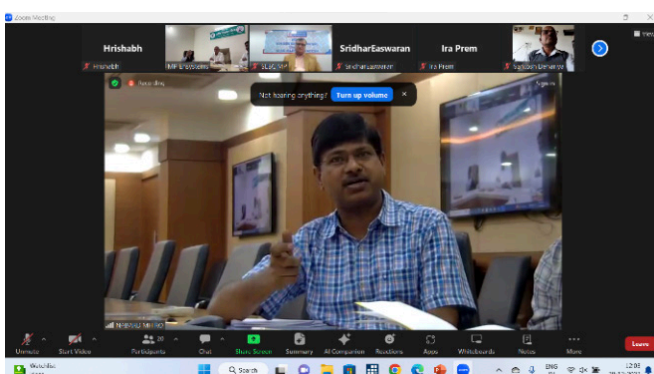
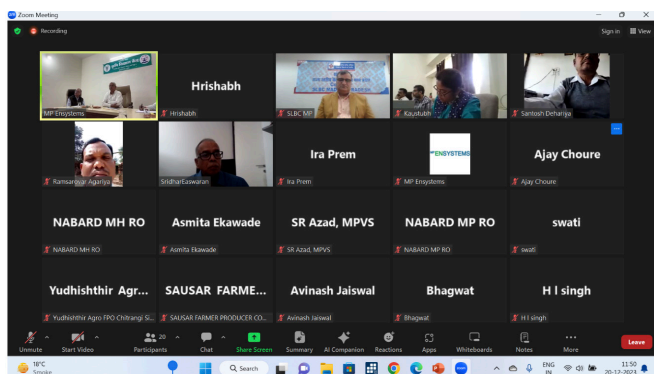
List of attendees

Sr. No	Organization	Name
1	Sausar FPO, Chhindwara	Mr. Ajay Choure
2	Urjadhani FPO, Singrauli	Mr. Avinash Jaiswal
3	Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis	Mr. Bhagwat Ahirwar
4	NABARD Maharashtra Regional Office	Mr. Anil Kumar



5	NABARD Madhya Pradesh Regional Office	Mr. Shiv Shankar Soni
6	Amarwara FPO, Chhindwara	Mr. Santosh Dehariya
7	State Level Bankers' Committee, Madhya Pradesh	Mr. Pramod Kumar Mishra
8	Madhya Pradesh Vigyaan Sabha	Mr. S R Azad
9	Samunnati	Mr. Sridhar Easwaran
10	Yudhisthir FPO, Singrauli	Mr. Radhekant Bais
11	Deosariya FPO, Chhindwara	Mr. Horil Singh
12	Kisan Vikas Kendra Narayangaon	Mr. Anil Meher
13	Kisan Vikas Kendra Narayangaon	Mr. Shriram Gadhave
14	Kisan Vikas Kendra Narayangaon	Mr. Dhanesh Padwal
15	Kisan Vikas Kendra Narayangaon	Mr. Satish Pate
16	Kisan Vikas Kendra Narayangaon	Mr. Omkar Gadhave
17	MP Ensystems Advisory Pvt Ltd	Dr. Sudhir Kumar Goel
18	MP Ensystems Advisory Pvt Ltd	Dr. Mahesh Patankar
19	MP Ensystems Advisory Pvt Ltd	Ms. Ira Athale Prem
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23	MP Ensystems Advisory Pvt Ltd	Mr. Kaustubh Arekar
24	MP Ensystems Advisory Pvt Ltd	Ms. Smitha Lobo
25	MP Ensystems Advisory Pvt Ltd	Mr. Yashraj Gore
26	MP Ensystems Advisory Pvt Ltd	Ms. Swati Jha
27	MP Ensystems Advisory Pvt Ltd	Mr. Aniket Shinde



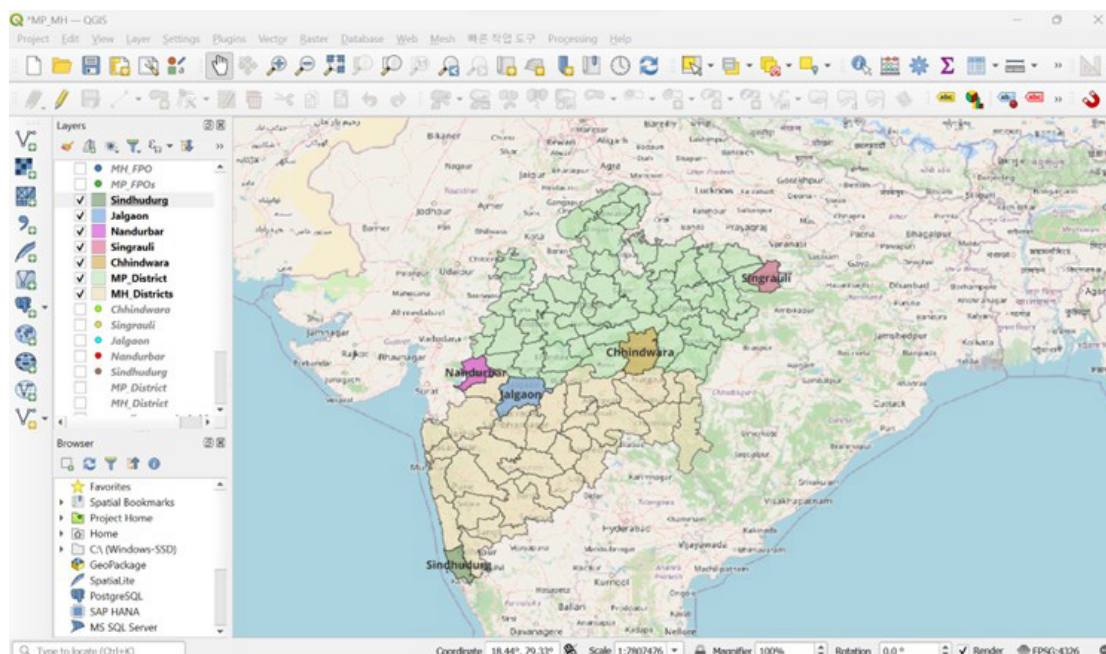


ANNEXURE 3: GRVC DASHBOARD DEVELOPMENT AND SPECIFICATIONS

Dashboard development

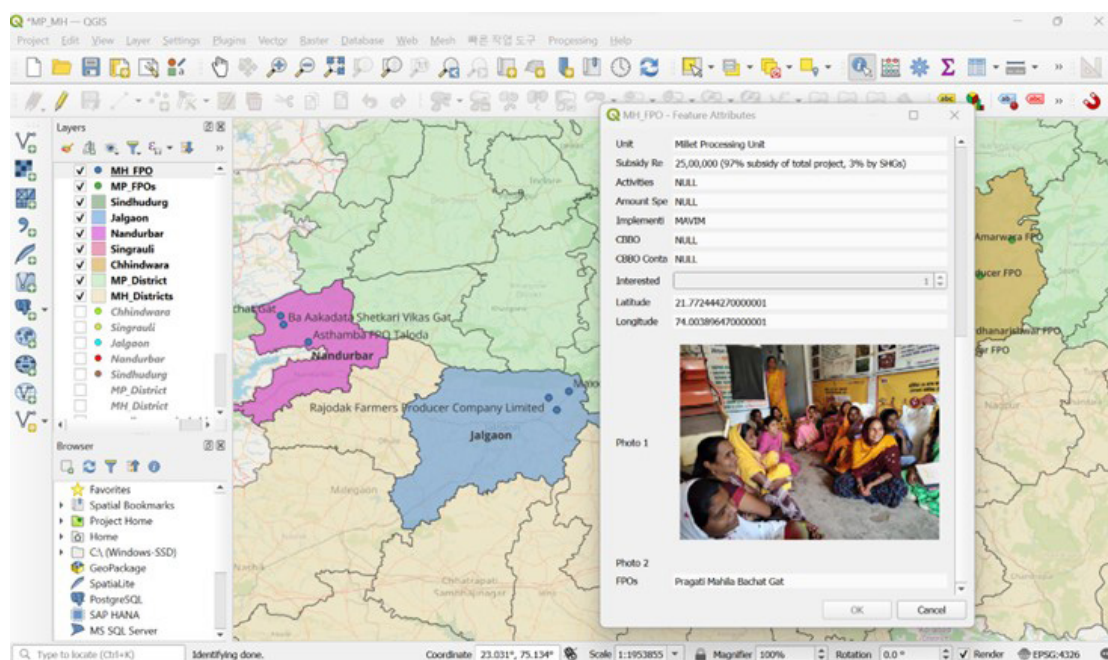
The GRVC dashboard was developed using QGIS, an open-source GIS tool that provides a robust framework for creating, managing, visualizing, and analyzing geographic data. QGIS enables users to visualize their data using maps, charts, and diagrams while customizing the presentation with a variety of symbology choices.

The data for the dashboard was gathered The process of mapping field visits involves several key steps, starting with data collection during on-site visits. Geographic coordinates are then recorded, and this data is inputted into QGIS for spatial mapping. The resulting maps offer a dynamic representation of field activities, allowing for in-depth analysis and exploration.



Interactive dashboards: transforming data into insights

Each site visit is represented as a point on the map, and by clicking on a specific location, users can access a popup window containing comprehensive information about the site such as the location's name, photographs, contact details, and relevant Project Design Documents (PDDs). This feature enhances accessibility and ensures that stakeholders can quickly retrieve detailed insights about each site.



Virtual dashboard outline

By integrating QGIS data into a web application framework, we have created an intuitive and visually engaging platform. This dashboard allows public access to a spatial representation of field visits in states like Maharashtra and Madhya Pradesh, providing a seamless interface for users to explore detailed information about each location. The dashboard is user-friendly, responsive, and equipped with features such as interactive maps, and detailed information panels.

Specifications of GRVC dashboard

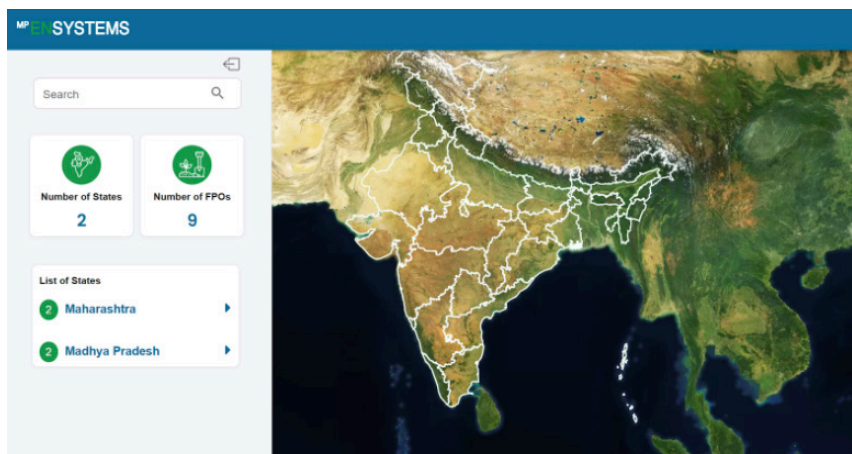
• User login and authentication

- All users are required to log in to use the GRVC application. No functionality is open without a verified email address. Authorization to the GRVC application is backed by MP Ensystems Single Sign-On (SSO). The SSO module is owned by MP Ensystems and used to authorize several applications backed by MP Ensystems. A user must register onto the SSO module and log in with their credentials into the GRVC. New users will receive a link to verify email and set up password. The forgot password option will allow users to create a new password.

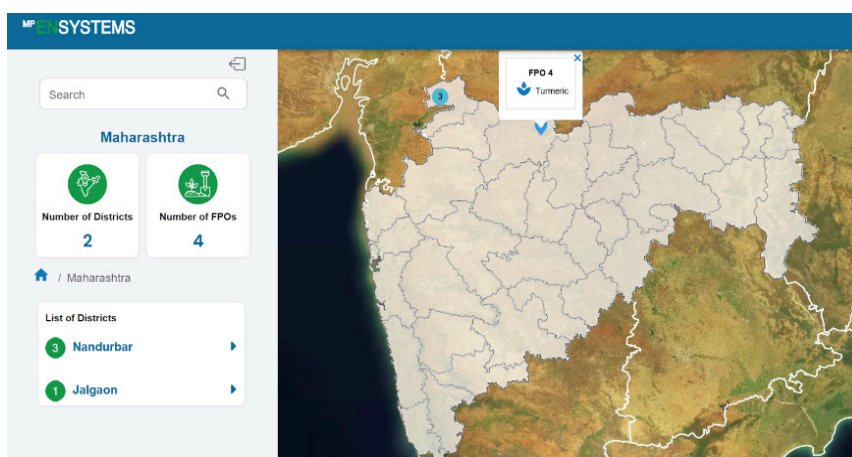


• User Interface

- After logging in, a map appears with a sidebar listing states.
- The screen displays the total number of states and FPOs in India.
- Users can choose a specific state to view a list of districts and the corresponding FPOs in that state.



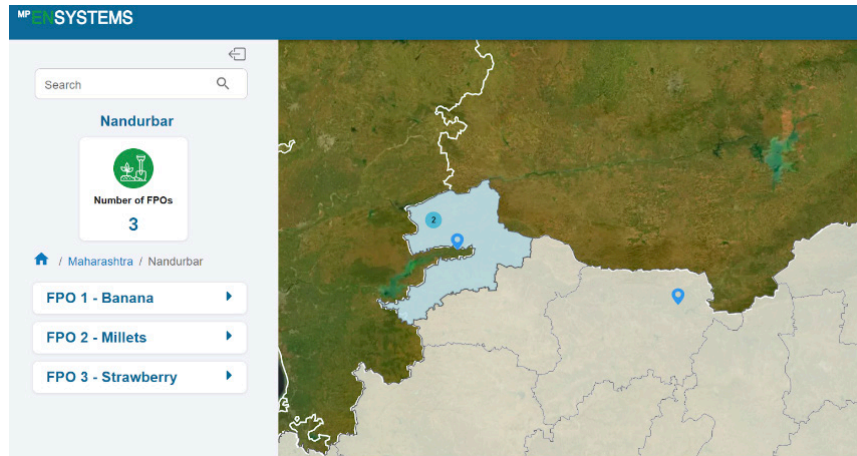
- Upon selecting a state, the sidebar shows a list of districts with the respective number of districts present in that state.
- The map highlights the selected state, and details about the number of FPOs in each district are displayed in the sidebar.



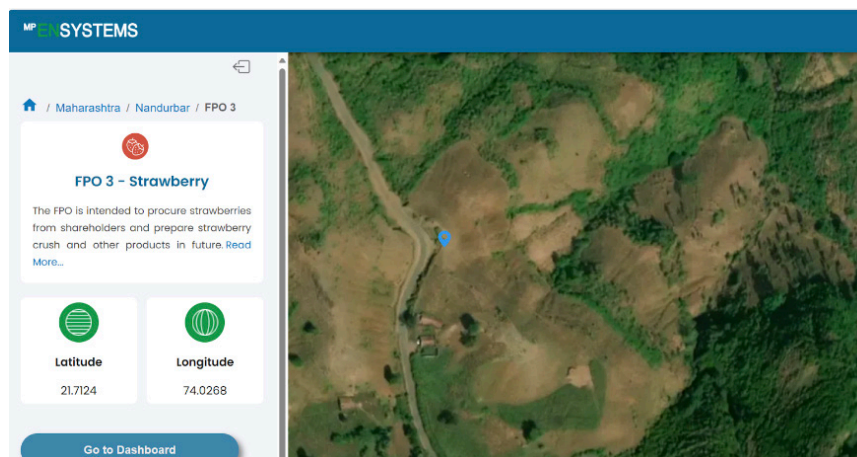
- In the highlighted state, the map displays location markers for FPOs.
- If there's only one FPO in an area, a single marker is shown.
- In case of multiple FPOs in close proximity, a cluster of markers appears.
- Clicking on the cluster expands to reveal all individual markers representing FPOs in that location.
- Clicking on a district's button reveals a list of all FPOs present in that specific district.

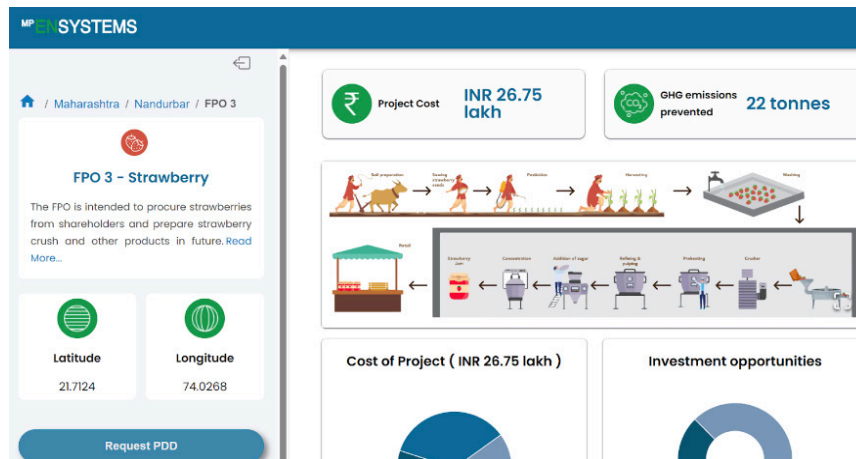


- Clicking on any marker on the map provides detailed information about the corresponding FPO.
- The displayed information includes the crop name associated with that specific FPO.



- Double-clicking on a map marker navigates the user to the specific location of the FPO.
- FPO details, including information about crops, are then prominently displayed on the sidebar for easy reference.
- This functionality enhances user experience by providing a quick and intuitive way to explore FPO details at the selected location.
- To access the dashboard, simply click on the “Go to Dashboard” button.





• Map Integration

- Mapping Library/API: Mapbox
- Data Format: GeoJSON

- Mapbox Library:

- Description: Mapbox is a popular mapping platform that provides APIs to integrate customizable maps and location-based services into applications. It supports various map styles, layers, and interactive features.
- Map Styles: Mapbox offers a variety of map styles, including streets, satellite, outdoors, etc.
- Customization: customize maps, add markers, overlays, and incorporate interactive elements.
- Geocoding: Geocoding and reverse geocoding services for converting addresses to coordinates and vice versa.
- Vector Tiles: Efficiently load and render maps using vector tiles for a smoother user experience.
- Integration: Mapbox can be integrated into web and mobile applications using Mapbox GL JS (JavaScript library) or Mapbox SDKs for native development.

- GeoJSON Data:

- Description: GeoJSON is an open standard format for encoding geographic data structures. It represents geographical features, their properties, and their spatial relationships. GeoJSON is commonly used for exchanging spatial data between servers and web applications.
- Structure: GeoJSON supports different geometry types, including Point, LineString, Polygon, MultiPoint, MultiLineString, MultiPolygon, and GeometryCollection.



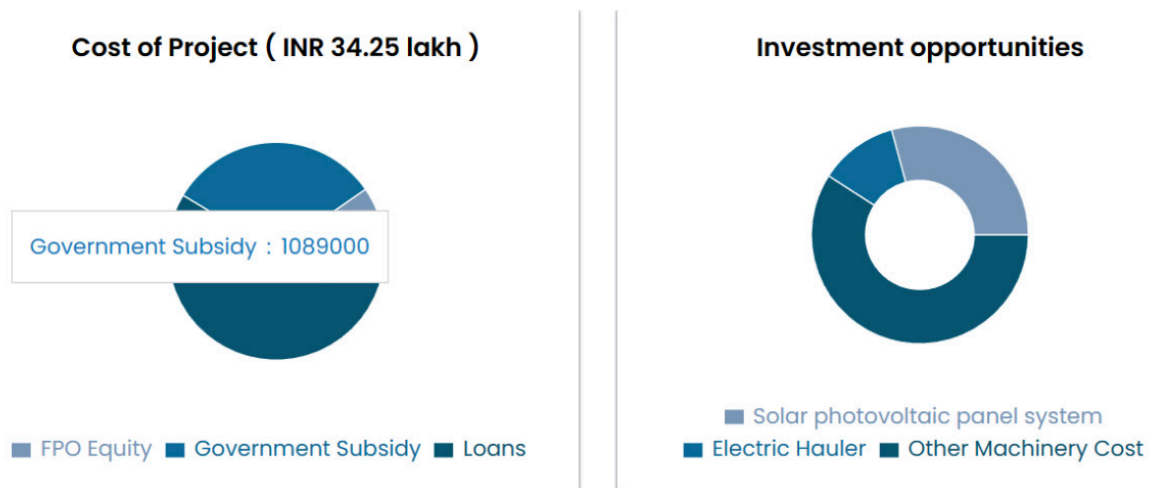
- Usage: GeoJSON is widely used to represent spatial data such as points of interest, routes, boundaries, and more.

- Integration Steps:

- Map Initialization: Use Mapbox GL JS to initialize the map container on the web page.
- Map Style Configuration: Choose a Mapbox style (e.g., streets, satellite) for the map.
- Data Loading: Load GeoJSON data onto the map using Mapbox's data source functions.
- Styling and Interaction: Customize the map's appearance, add markers, popups, and implement interactivity.
- Field Visits Data: Fetch field visit data from a server or database in GeoJSON format.
- Display on Map: Plot field visit data on the map using GeoJSON features, providing insights into spatial patterns.

• Data Visualization

- The incorporation of pie and donut charts contributes to a more visually intuitive representation of data, aiding users in better understanding both project costs and investment opportunities.
- A detailed graph is provided for analyzing data related to cost benefit and net benefit.
- User can go back to map on a click of button present in dashboard.





• Data Retrieval

- Database Storage:

- Set up a database to store relevant information, particularly details related to field visits for FPOs.
- This database acts as a centralized repository for the data, providing a structured and organized storage solution.

- Backend API:

- The backend application exposes APIs (Application Programming Interfaces) that serve as communication channels between the frontend and the database.
- These APIs are designed to handle specific requests for data retrieval. They handle requests for field visit details.

- Connection Between Backend and Frontend:

- The frontend application, the dashboard, communicates with the backend using HTTP requests to the provided APIs.
- This connection can be established through various HTTP methods like GET requests, which are commonly used for fetching data.

- User Triggered Actions:

- Users interact with the frontend dashboard by initiating actions, such as requesting details about field visits.
- These actions trigger corresponding API requests from the frontend to the backend.

- Data Fetching Process:

- When an API request is received at the backend, it processes the request, including retrieving data from the database.



- The backend transforms the database information into a format suitable for transmission.
- Storing the images in the server and fetching the images in base64 format and displaying in frontend.

- API Response:

- The backend sends a response containing the fetched data back to the frontend.
- This response is typically in a standardized format, such as JSON (JavaScript Object Notation), making it easy for the frontend to parse and utilize.

- Dynamic Display on Frontend:

- The frontend receives the API response and dynamically updates the dashboard's user interface.
- The user can now view and interact with the retrieved field visit details directly on the dashboard.

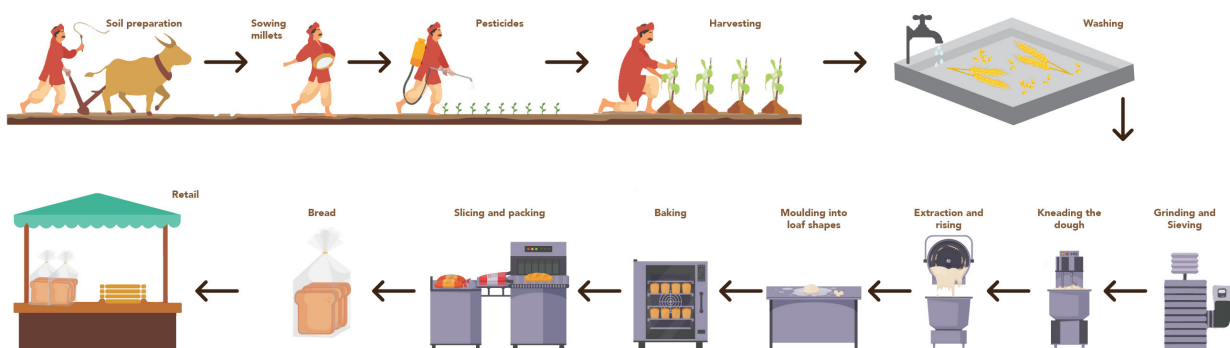
• Information Panels

The dashboard consists of multiple components specifically designed for displaying information about each FPO and its cost such as:

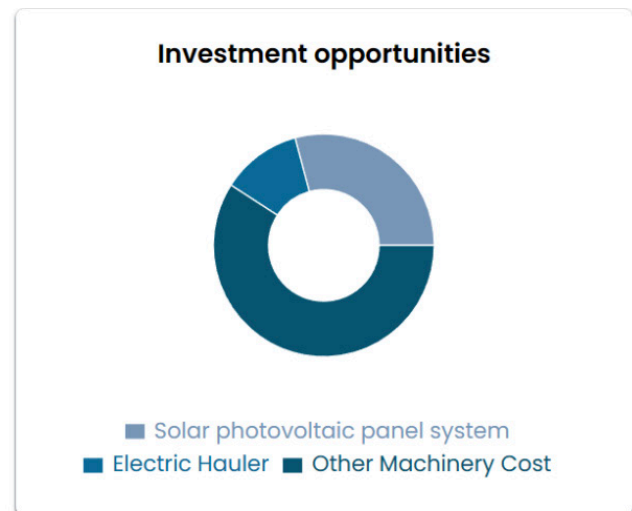
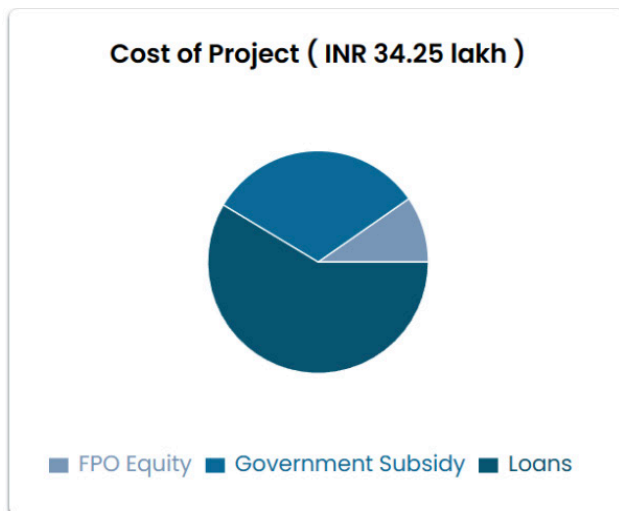
- Project cost
- GHG Emissions Prevented



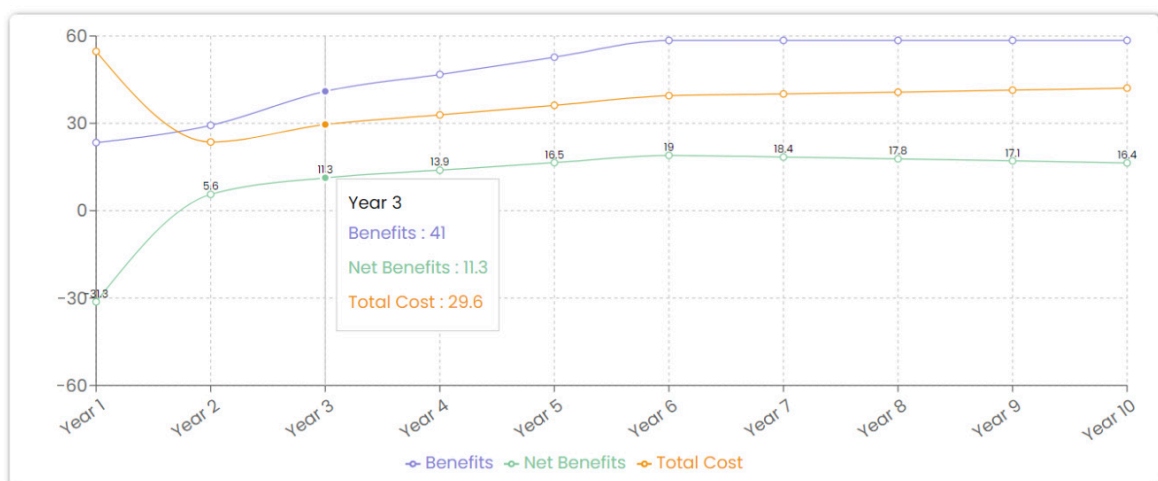
- Image of processing of each crop in FPOs



- Cost of project



- Graph visualizing project cost, benefits, net benefit



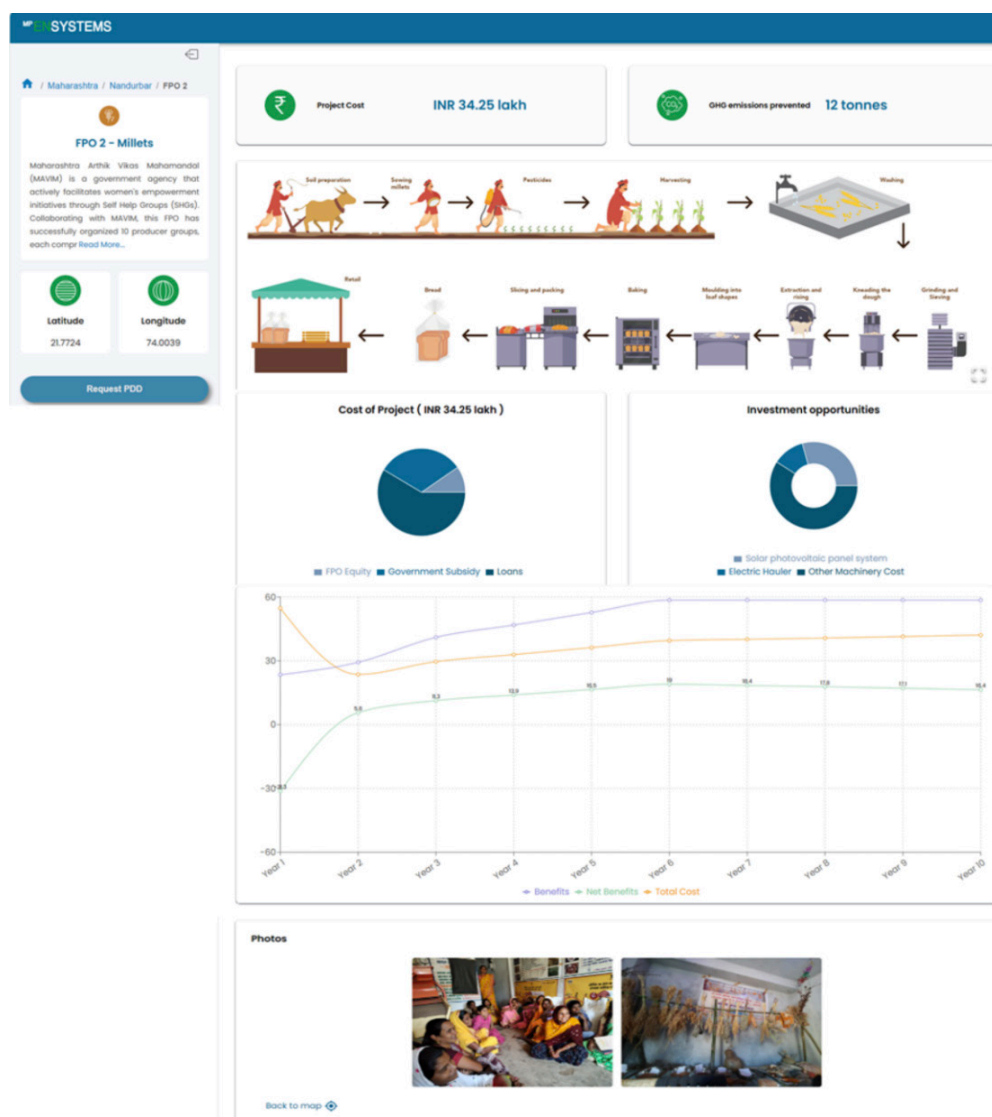
- Photos of FPOs



- **Responsive Design**

Dashboard design is compatible with all the devices as tested on different screen sizes.

- **Desktop View:**



- **Design In mobile devices:**



REFERENCES

¹ Jalgaon, Nandurbar and Singrauli are part of the aspirational districts programme, which aims to transform districts with relatively low performance of socio-economic indicators.

² Out of the 9 FPOs, the table contains the next steps for four FPOs. The remainder could not be included as one proposed to work on banana fibre, which does not come under the PMFME scheme, and others have either already installed processing facilities or have postponed their plans.

³ For assumptions used to estimate projected numbers, see MP Ensystems (2023). Roadmap of investments and package of practices to green the rural value chain in selected districts of Madhya Pradesh and Maharashtra.



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